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Uprooting Bias in the Academy

Lessons from the Field

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We dedicate this work to the UC Davis community—to those who championed diversity, equity, and inclusion before us and those who will continue to do so in the future. Your collective efforts have inspired, encouraged, and sustained us.

Preface

The UC Davis ADVANCE IT program began when the campus was awarded a National Science Foundation grant in September of 2012.

In the first year of the grant, the ADVANCE leadership organized the five initiatives described in Chap. "Leadership and Organizational Structure," identified the relevant faculty members to be involved, and assembled teams. We held numerous meetings of the launching steering committee to clarify initiative goals, going from the aspirational to the actionable. We created external and internal advisory boards, met with the board members to explain the initiatives and their expected outcomes, and developed a strategic plan for moving forward. At the same time, we began holding retreats and symposia featuring well-known experts in implicit bias training to help educate the ADVANCE team about the role of implicit bias in undermining diversity, equity, and inclusion. At the beginning, most members of the various ADVANCE initiatives had heard of implicit bias but did not fully understand it or its harmful effects on campus climate. This collective learning on the part of approximately 50 faculty was vital to the success of the entire ADVANCE effort.

In the second year of the grant, each of the initiatives launched their activities and programs. We also held annual retreats and workshops. The retreats focused on reports from each initiative, including successes and challenges that each faced. The workshops focused around an issue—for example, "Building and Sustaining a Diverse Faculty: Implications for Faculty Advancement and Reward Systems," held in the spring of our second year, 2015. These workshops engaged faculty and administrators from all ten campuses of the University of California system and served as a mechanism to share knowledge and best practices across the campuses.

The five-year funded period of the grant ended in August of 2017. We requested a no-cost extension for the academic years 2017–2018 and 2018–2019. The no-cost extensions afforded us the time to institutionalize key elements from each initiative, as well as oversee their implementation. We also used this time to keep the team together to discuss and reflect on what we had learned and to consider what advice we might have for others embarking on the same journey. In the spirit and tradition of sharing hard-won knowledge, we offer this book as documentation of the institutionalization of UC Davis ADVANCE. We hope it will stimulate further discussion and a deeper

understanding of what being inclusive means and how barriers to genuine equality can be overcome.

This book is divided into five parts. The first part focuses on understanding the nature of bias in society and the academy. We discuss the shift from affirmative action programs to diversity, equity, and inclusion (DEI) efforts in the UC system and the major barriers to inclusion as identified in the literature. The second part is about making the case for institutional change. It covers: the need to fully understand the local culture one is trying to transform; the importance of data-driven decision-making in assessing whether policies and practices institutionalize bias; the benefits of ongoing conversation with faculty on campus to solicit input and feedback; and the vital role of leadership and team building in coordinating action. This part also covers the nuts and bolts of the ADVANCE program initiatives.

The third part focuses on Latinx communities vis à vis higher education in California. We discuss the state of the educational pipeline for Latinx and other historically underrepresented students and the specific challenges of accessing and inclusion they face. We argue that rather than debate the exact point at which the STEM career path is most problematic, the entire pipeline must be transformed to support diversity, equity, and inclusion. This part also outlines the aims of the Social Sciences Research Initiative and the importance of qualitative research in understanding intersecting dimensions of inequality in the academy.

The fourth part covers the processes involved in institutional transformation and some key structures needed to support and sustain them. In this part, we describe one of the crowning features of the UC Davis ADVANCE Program: the Center for the Advancement of Multicultural Perspectives on Science (CAMPOS). After explaining the rationale for its development, we outline its goals, organizational structure, and programming. We also address mentoring and networking. Mentoring is critical for faculty development, and a commitment to mentoring across the career path helps ensure a supportive environment conducive to success. We end this part with a discussion of a particularly entrenched barrier to inclusion: work-life integration. The persistence of the "ideal worker norm," which presumes faculty are unencumbered by family responsibilities, is rooted in an outdated and historically specific model of family organization that belies the contemporary reality of dual-career couples, and continues to disadvantage women relative to men.

The final part reflects on the challenges of institutional transformation, both those we faced and those that lie ahead. In sharing the lessons we learned in the process of implementing the programs of the ADVANCE grant on our campus, we hope to continue the vital conversation about how to forge a more diverse, equitable, and inclusive academy. This material is based upon work supported by the National

Science Foundation under Grant No. 1209235. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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Acknowledgments

Any success we have achieved is due in large part to the many individuals we encountered who shared our vision and helped make it real. We want to thank the UC Davis community at large for their support. Admittedly, in the beginning, there was skepticism ranging from "there is no problem" to "you are preaching to the converted" to "the institution is so deeply flawed no amount of grant money will fix it." But alongside that skepticism, there was openness, willingness to listen and engage, and always, always encouragement. We are also grateful to the ADVANCE community beyond our own campus—recipients of the grant at other institutions, and those who study inequality in academia—for candidly sharing with us best practices (what has worked) as well as failures (what has not worked) in different environments. We learned much from discussing both. We hope this book continues the legacy of knowledge-sharing in the service of forging a more equitable academy for all.

We want to acknowledge the hard work of our Inclusive Campus Climate Initiative in crafting our Strength through Equity and Diversity (STEAD) faculty search committee workshops. A committed faculty team read the literature, analyzed our own campus data, and created a highly effective implicit bias training program that was central to our efforts to institutionalize meaningful change in recruitment and hiring. They created the fertile soil in which the other initiatives could thrive. We thank especially the STEAD leadership, Kim Shauman and Susan Rivera, for designing the workshops, training faculty to lead them, and evaluating the feedback surveys from workshop attendees. The STEAD faculty (Steve Athanases, Manuel Calderón de la Barca Sánchez, Tom Famula, Katherine Ferrara, Michael Hill, Louise Kellogg, Leticia Saucedo, Mitch Singer and Lisa Tell) were, and are, tirelessly dedicated to keeping abreast of the implicit bias literature and holding multiple half-day workshops each year. We are indebted to the University of Michigan's "Strategies and Tactics for Recruiting to Improve Diversity and Excellence" (STRIDE) team for their assistance in developing our own STEAD program. The STEAD leadership enrolled in a STRIDE workshop and met with deans and administrators to gather advice and information useful for implementation at UC Davis.

The University of California operates on a shared governance model. The Academic Senate, in addition to full oversight of academic programs, routinely

advises and consults with the campus administration. Although ADVANCE was an externally funded program, the UC Davis Division of the Academic Senate graciously listened to our ideas, made room for us on crowded committee agendas, and spent time, our most precious commodity, providing constructive feedback on proposed programs and initiatives. We specifically thank the Executive Council, Committee on Academic Personnel, Oversight, Committee on Affirmative Action and Diversity, the Committee on Faculty Welfare, Undergraduate Council and Graduate Council for their engagement and suggestions. This critical vetting shaped our programs and strategies for creating a more inclusive community—and reinforced how inclusive our community already was.

Administrative leadership was vital to our success. We thank then-Provost Ralph Hexter for his unwavering support during the entire grant period and strong encouragement to write this book. We thank Chancellor May for continuing the support of Chancellor Emerita Linda Katehi, who served as lead Principle Investigator (PI) overseeing the grant. We also thank Renetta Tull, Vice Chancellor for Diversity, Equity and Inclusion, for her commitment to extending and sustaining the ADVANCE program. Although not part of our ADVANCE team, Barbara Horwitz has played a pivotal role in campus diversity and inclusion efforts, both when she served as Vice Provost for Academic Affairs and then as Interim Provost. She stepped down from her administrative position before the ADVANCE grant was awarded but participated in drafting earlier ADVANCE grant applications. In key ways, Professor Horwitz embodied our vision—in being the lead PI for an "Initiative for Maximal Student Development" (IMSD) NIH training grant to support underrepresented students, in personally mentoring these students, and in her steadfast focus on equity in academic advancement.

We deeply appreciate the faculty team that conducted the 3rd year review of our ADVANCE IT grant for the National Science Foundation: Kevin Favor, Sophia Hayes, Kathrin Zippel, Pamela Norris, Marie Mora, John Sawyer and Jennifer Sheridan. We also thank the NSF representatives who participated in the review: Jesse DeAro and Bevlee Watford. This review catalyzed our first collective self-reflection on program objectives and outcomes and led a tactical plan for achieving short- and long-term goals. It was they who first suggested we document our experiences in written form and thus inspired the writing of this book. We are grateful to our NSF ADVANCE Program Officers, Beth Mitchneck and Jesse DeAro, for their assistance, advice, and encouragement. The major outcome of this review was "go for it." And we have.

Words cannot adequately express the depth of gratitude we owe our External Advisory Board members—Diana Bilimoria, Carlos Castillo-Chavez, Olivia Graeve, Brian Nosek, Refugio Rochin, Ivonne Santiago, Abigail Stewart, Caroline S. T. Turner, and Ruth Zambrana—for their commitment to our success. They reviewed reports, participated in roundtables, lead campus workshops and symposia, and generously shared their time and sound counsel. They catalyzed our learning of the barriers to inclusion, kept us on track to focus on all of the barriers, and emphasized the need to more deeply understand the available data and to go beyond the

superficial of what was merely collected. In addition, we thank Kerry Ann O'Meara and Lynn Conway for coming to campus to lead topical roundtable discussions.

Another heartfelt thank you goes the members of our Internal Advisory Board (IAB): Jennifer Sinclair Curtis, and Enrique Lavernia before her, Dean of the College of Engineering; Helene Dillard, and Neal van Alfen before her, Dean of the College of Agriculture and Environmental Sciences; Mark Winey, and Peter Wainright and James Hildreth before him, Dean of the College of Biological Sciences; Alexandra Navrotsky, and before her the late Winston Ko, Dean of Mathematics and Physical Sciences; Li Zhang and George (Ron) Mangun, Dean of Social Sciences; Rahim Reed, Associate Executive Vice Chancellor, Office of Campus Community Relations; Sheryl Soucy Lubell, Director of Interdisciplinary Research Services; and Bruno Nachtergaele, Andre Knoesen and Rachael Goodhue, Chairs of the Davis Division of the Academic Senate. The IAB provided not just support for our programs but access to their faculty, particularly in inviting us to speak to Department Chairs and Senate committees. We also thank our communications coordinator, Karen Nikos-Rose, for her invaluable help in telling our story to the community. All of these individuals were and are committed to diversity, equity, and inclusion. Further, Deans Lavernia and Curtis committed staff support to the ADVANCE IT program, Manju Kaul served as our budget and chief financial analyst, and Pia Donaldson, Linda Zhao, Paula Lee, and Gisele Morris provided much-appreciated administrative, purchasing and human resources support.

Evaluation of our programs and progress was an important component of our continuous self-reflection. We thank our internal evaluators Robin Martin and especially Terry Westover who, in addition to Lisa Sullivan, participated in numerous planning meetings to devise an effective follow-up survey. Our initial external evaluator, Daryl Smith, set us on the path to embrace constructive criticism. Our second external evaluator, Mariko Chang, made us crave that criticism. Her dedication to improving our efforts and reaching our goals matched our own.

We are indebted to the other members of our ADVANCE team. We are especially grateful to Ray Rodriguez, a man of many hats—Co-principal investigator, steering committee member, co-developer of the CAMPOS "blueprint," CAMPOS committee member, and "front man" for the ADVANCE program—tirelessly promoting our program and our philosophy to countless external audiences. We thank Elva Diaz and Elizabeth Mitloehner for their efforts early on and participation on the ADVANCE launch steering committee. We also thank the participants in each of our initiatives, some of whom remained involved for the entire duration of the grant. In addition to co-directing the Inclusive Campus Climate Initiative, Kim Shauman and Susan Rivera served on our steering committee and shaped our initial understanding of implicit bias. Kim served as the original Faculty Director of the ADVANCE program, overseeing the launch of the initiatives, visioning initiative goals and the recruitment of faculty participants. She was our data guru and established our principles of data-driven decision-making.

Members of our Social Sciences Research Initiative are contributors to this book; they (and we) want to take this opportunity to thank the many Latina scholars who agreed to lengthy interviews, and thereby deepened our understanding of the barriers

to inclusion for women of color in STEM. They taught us the meaning of resilience and their perseverance in unwelcoming environments humbled and inspired us.

We appreciate the efforts of CAMPOS committee members: David Acosta, Nina Amenta, Susan Kauzlarich, Kyaw Tha Paw U, Julie Sutcliffe, Kent Pinkerton, and Ray Rodriguez. Their thoughtful deliberations and vision created a dynamic and vibrant CAMPOS program. They successfully recruited a stellar group of CAMPOS scholars and showed that a commitment to diversity and inclusion goes hand- in-glove with research creativity and disciplinary excellence.

Co-directors of the Mentorship and Networking Initiative, JoAnne Engebrecht and Carol Erickson, crafted a highly successful LAUNCH program for new faculty. They were supported in these labor-intensive efforts by their initiative committee members, Magali Billen, Chen-Nee Chuah, Gitta Coaker, Raissa D'Souza, Lorena Garcia, Lynne Isbell, Deb Niemeier, and Jay Stachowicz. The LAUNCH committees were spectacularly successful in making new hires feel immediately welcome and valued. We are grateful to the many individuals recruited to serve on LAUNCH committees, who, according to surveys, found the experience as rewarding as the new faculty. JoAnne and Carol also served on the steering committee and helped develop a plan for the LAUNCH program's sustainability.

Perhaps the most boring job was undertaken by the Policy and Practices Review Initiative. Cataloging existing policies, evaluating the presence of bias in application, and forming lengthy recommendations are tedious at best. We thank founding co-director Jonathan Eisen and subsequent co-director Jeannie Darby for their leadership. Members Ricardo Castro, Satya Dandekar, Susan Handy, Becky Parales, and Monica Vazirani were indispensable in evaluating campus policies as well as the efforts of other ADVANCE institutions, ultimately determining that while it is impossible to craft policies to prevent implicit bias, we can increase awareness of how bias works how to mitigate its most harmful effects.

Our Capital Resource Network was created to address the very real issue of dual-career hiring, a particularly challenging issue with STEM faculty. We appreciate the leadership and vision of Linda Assadian, the Managing Director of the program, in launching this network and providing much-needed resources to new faculty. We thank Program Manager Loraine Hernandez-Covello for making it all happen and being the initial point of contact for employers and faculty.

None of what we have accomplished would have been possible without dedicated support staff who ensured this complex network of initiatives ran smoothly. We hit some speedbumps along the way, including poor communication among initiatives, and the staff-created processes and practices that enabled ADVANCE to function as a unified whole. We are indebted to founding Program Coordinator Janie Booth and our first Program Coordinator, Michelle Riley, for getting us on the right path. We have been blessed with highly talented program managers and program assistants over the course of the grant. Kate Blumenthal, Giovanis Montero, Jasleen Singh and Phil Choi—thank you all for your efforts and expertise.

We are humbled by and grateful for the tremendous talent of our student artists: Meghan Crebbin Coates, Mengmeng Luo and Chastine Leora Madla. Their works

help illustrate key concepts within the book. Special thanks to Mengmeng Luo for drawing the artwork for the frontispiece.

Finally, we owe a deep debt of gratitude to the reviewers of the original submission of this book. Their thorough review and many thoughtful comments and suggestions for additional content greatly improved this book.

Illustrations: Meghan Crebbin Coates, Mengmeng Luo and Chastine Leora Madla

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Foundations: Why We Need Institutional Change

From Affirmative Action to Inclusion

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Abstract Achieving a diverse and inclusive community requires establishing a culture of genuine equality for all members. Our purpose in writing this book is to share our collective knowledge about how to challenge the forces that enable and sustain discrimination in the workplace as informed by our experience developing and implementing the UC Davis ADVANCE program. The program's goal is to create an inclusive academic community that reflects and serves the diverse population of California. In this introductory chapter, we emphasize the need to move

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from affirmative action programs, which have played an important role in fostering diversity, to a focus on institutional transformation, which requires not only changes in policy but also shifts in academic culture. Much of what we cover in this book is broadly applicable beyond academia and will interest those wanting to understand and address challenges to diversity, equity, and inclusion in their own organizations. Since workplaces differ in their goals, priorities, and culture, the book is not a "how to" manual but rather a collective effort to share with readers the approaches we took, the information we gathered, what we observed and experienced, and the lessons we learned along the way.

Keywords Affirmative action · Inclusion · NSF ADVANCE · Proposition 209

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1 Introduction

The National Science Foundation ADVANCE Institutional Transformation (NSF ADVANCE-IT) program is a federally-funded initiative focused on increasing the participation of women in academia across science, technology, engineering, and mathematics (STEM) fields. In the U.S., the percentage of female faculty, and especially of female faculty of color, continues to lag behind the pool of women obtaining graduate degrees in these fields. The NSF ADVANCE-IT program provides funding to institutions to address this inequality and to define the factors inhibiting diversity along the STEM career path.

The University of California–Davis received an ADVANCE-IT grant in 2012 in order to create an ADVANCE program on our campus. As program leaders, we have focused our efforts on understanding the intersection of gender and race as it pertains to the marginalization of women in STEM. Given the demographics of California and the public mission of the campus to serve the diverse peoples of the state, we focus particularly on the marginalization of Latina STEM scholars. Other ADVANCE awardee institutions have sought to develop affirmative action programs to address inequalities in faculty hiring and advancement. California Proposition 209, a voter-approved constitutional change that prohibits state governmental institutions from considering race or gender in employment or education decisions (and thus bans many affirmative action programs), led us to take a different approach.

We recognize both the value and the limitations of affirmative action initiatives and understand the difference between being diverse and being inclusive, a distinction that affirmative action programs (along with many of the diversity initiatives that replaced them) do not always address. Being diverse refers to the fact that individuals belonging to a wide variety of social identity categories are present in a given setting. Being inclusive refers to the fact that people with different social identities both feel and actually are valued in that setting. In developing our own ADVANCE program at UC Davis, our overarching goals have been to identify barriers to inclusion and to understand why many women, especially women of color, remain underrepresented in STEM careers. In this and subsequent chapters, we share the knowledge we have gained, along with our assessments of programs and practices developed to enhance inclusion. We hope this book will help inform and inspire those interested in fostering a diverse, inclusive work environment.

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2 The Mandate and Legacy of California Proposition 209

Although diversity, equity, and inclusion (DEI) initiatives have largely replaced affirmative action programs in both the corporate world and higher education today, their roots are entangled. Kelly and Dobbin (1998) argue that affirmative action effectively became "diversity management" as the former faced increasing legal and political backlash initially in the 1980s (under President Reagan) and continuing through the 1990s (under President Clinton). Affirmative action first arose in response to federal efforts to outlaw employment discrimination during the Civil Rights era, notably President Kennedy's Executive Order 10,925 in 1961 and Title VII of the Civil Rights Act in 1964. Employers sought to comply, hiring specialists to create programs to shield them from litigation (Kelly & Dobbin, 1998; see also Edelman, 1992). As legal and political challenges to affirmative action gained traction in subsequent decades, certain offices and activities survived by inventing the discipline of "diversity management," which recast workplace integration goals in terms of efficiency, organizational effectiveness, and business success. Unsurprisingly, as Kelly and Dobbin (1998) note, the employment practices and programs that survived the attack on anti-discrimination/affirmative action law were least effective at changing the gender and racial composition of the workplace.

California, while following this overall pattern of retrenchment, has a particular history with regard to affirmative action that has shaped how the UC system can remedy systemic race- and gender-based discrimination in the hiring, promotion, and retention of faculty. In 1996, a narrow majority (55%) of California voters passed Proposition 209, which outlawed public-sector affirmative action policies in the state. Titled "Prohibition Against Discrimination or Preferential Treatment By State and Other Public Entities," the Proposition added to the California State constitution language banning discrimination in all state agencies, with "discrimination" understood to apply to white men as well as historically underrepresented groups. In November of 2020, voters had the opportunity to repeal Proposition 209 and a slightly broader majority (57%) voted against repeal—thus reaffirming this added language in the constitution and effectively continuing the ban on affirmative action as an approach to increasing workplace (and classroom) diversity. The pertinent sentence of Proposition 209 reads: "The state shall not discriminate against, or grant preferential treatment to, any individual or group on the basis of race, sex, color, ethnicity or national origin in the operation of public employment, public education, or public contracting" (California Ballot Pamphlet General Election: Proposition 209 Prohibition Against Discrimination or Preferential Treatment by State and Other Public Entities, 1996).

Proposition 209 was originally put on the ballot following the successful bid by two influential University of California Regents—Ward Connerly and then Governor Pete Wilson—to prevent the University of California from continuing to use many affirmative action initiatives. A year earlier, in July 1995, the UC Regents passed special orders SP1 and SP2, which ended any UC programs deemed to give "preferential treatment" to groups such as underrepresented minorities. Then Governor

Pete Wilson was embarking on a presidential candidacy run, and some viewed SP1 and SP2 as a political maneuver to advance his career aspirations and to build the necessary momentum to introduce and pass Proposition 209 (Douglass, 1997). That Ward Connerly, a black man, supported Prop 209 lent credence to this effort.

Proposition 209 mandated the end of programs defined as "preferential treatment," including all quota systems as well as all affirmative action measures aimed at addressing historically persistent race- and gender-based discrimination. The language of the proposition re-cast these race- and gender-based affirmative action programs as *perpetuating* discrimination, not eliminating it. The "victims" of this ostensible discrimination were said to be white men being passed over in favor of "less qualified" workers, and also, ironically, white women and under-represented minority men of color themselves—the very constituencies affirmative action was designed to help. The latter groups supposedly suffered under affirmative action because the granting of "special preferences" implied an inability to advance on the basis of individual merit. This argument was made clear in the ballot pamphlet, as presented in Fig. 1.

The constitutionality of Proposition 209 was soon challenged. Federal courts subsequently upheld the measure (122 F.3d 692, 1997). The U.S. 9th District Court, in reaching its decision supporting the proposition's constitutionality, cited the language against discrimination as being consistent with the 14th Amendment to the U.S. Constitution. In expressing support for the court's ruling in a *Washington Post* story, California Governor Pete Wilson called it a "victory for every Californian [and] for every man, woman and child who asks only that he or she be treated equally and fairly under the law on the basis of merit" (Claiborne, 1997) University of California regent Connerly discussed his view of those who opposed Proposition 209 in a *Los Angeles Times* editorial: "I hope they realize the damage they are doing to our society

"Let's not perpetuate the myth that ''minorities'' and women cannot compete without special preferences. Let's instead move forward by returning to the fundamentals of our democracy: individual achievement, equal opportunity and *zero tolerance for discrimination against--or for--any individual."* (emphasis theirs)

http://vigarchive.sos.ca.gov/1996/general/pamphlet/209text.htm

Fig. 1 Text from the proposition 209 ballot pamphlet

by trying to frustrate the will of the majority of Americans, who want to achieve a society of genuine equality for all and special privileges for none" (Connerly, 1997).

Although SP1 and SP2 were rescinded in 2001, Proposition 209 has remained state law for the past 25 years. As noted, voters in November 2020 opted not to repeal it, despite the fact that all ten UC Regents went on record in support of restoring affirmative action in the state.[1] The willingness of politicians, educators, and other state leaders to positively re-evaluate the value and efficacy of affirmation-action-style initiatives is in no small way a response to the persistence of stark racial inequalities in California and U.S. society more broadly—a reality underscored most recently by the COVID-19 pandemic and public protest against anti-black police violence. Assuming we can all compete equally on the basis of merit presumes a race-neutral (i.e., race-equitable) context which doesn't exist, and never has. Indeed, *not* acting affirmatively to counter racism (and other forms of social inequality) in the pursuit of equity is itself racist, just as positively "discriminating" by implementing race-conscious policies is anti-racist if it helps create equity (see Kendi, 2019).

A research report authored by UC faculty reveals the negative consequences of Proposition 209 for women in the UC system, as the number of women faculty hired into the University of California, including UC Davis, dropped dramatically (the report does not distinguish between white women and women of color, but given other institutional data we can assume a white majority). Before 1995, the UC was hiring women at an increasing rate, suggesting a certain level of support for affirmative action goals. Between 1984 and 1995, the percentage of new female hires system-wide rose from approximately 25–35%, while for UC Davis that percentage rose from approximately 25% to slightly over 50% (West et al. 2005). Following the passage of SP1, SP2, and Proposition 209, the percentage dropped to mid-1980s levels. There was a 21% drop in hires at UC Davis, representing about a 50% relative drop in the hiring rate of women; for the systemwide data, the drop was about 9%, representing a 26% relative drop in the hiring rate of women.[2] West et al. (2005) posit the changes reflected a return to explicit and implicit bias against women, which were decreasing under the stronger affirmative action years prior to 1995. The lesson here is that gradual progress in combatting institutional bias can be erased relatively quickly by political events: in one to two years, the gains from the previous decades were undone.

None of this is to argue that affirmative action programs and policies are problem-free or even the most effective way to uproot historical discrimination. Indeed, the very need for such programs is itself proof that societal-level disadvantage remains intact. Many affirmative action programs throughout the U.S. have helped institutions diversify and promote individual achievement, but whether under the rubric of "affirmative action" or "diversity," a "fix the numbers" approach does not guarantee

[1] https://www.universityofcalifornia.edu/press-room/uc-board-regents-endorses-aca-5-repeal-prop-209.

[2] To arrive at these numbers, we applied standard linear regression to the data between 1984 and 1995, and for the data between 1996 and 2002, then compared the predicted values for the year 1995, to estimate the percentage drop in females hires associated with SP1, SP2, and Proposition 209.

an inclusive environment. Nor does it address the flip side of historical disadvantage: historical privilege (sometimes referred to as "legacy privilege"), by which we mean the advantages that accrue from membership in dominant (highly valued) social categories—being white, male, upper-class, able-bodied, cisgender, heterosexual, etc. The continued existence of race and gender bias *against* white women and people of color and *in favor of* white men, despite having affirmative action in place, is well-documented in the literature (see Stewart & Valian, 2018) and underscores the importance of factors other than numerical representation in addressing social inequality in the workplace.

In the decades since Proposition 209 was passed, the University of California has developed institutional methods for diversifying UC campuses in accordance with the law, as exemplified in the Sept. 2016 publication, "Guidelines for Enhancing Diversity at UC in the Context of Proposition 209." The gradual success of post-Proposition 209 programs and efforts to shift academic culture are reflected in the increasing percentage of new hires that are female, with rates approximating the pre-Proposition 209 rise (see Fig. 2).

That the rate of increase is similar before and after the passage of Proposition 209 implies that the diversity enhancement programs following Proposition 209 have been roughly as effective as the affirmative action programs preceding it. We proceed from this basis, acknowledging the historic importance of affirmation action in disrupting persist patterns of marginalization on the basis of race and gender, while at the same time seeking to address the missing dimensions of equity and inclusion and their impact on faculty culture.

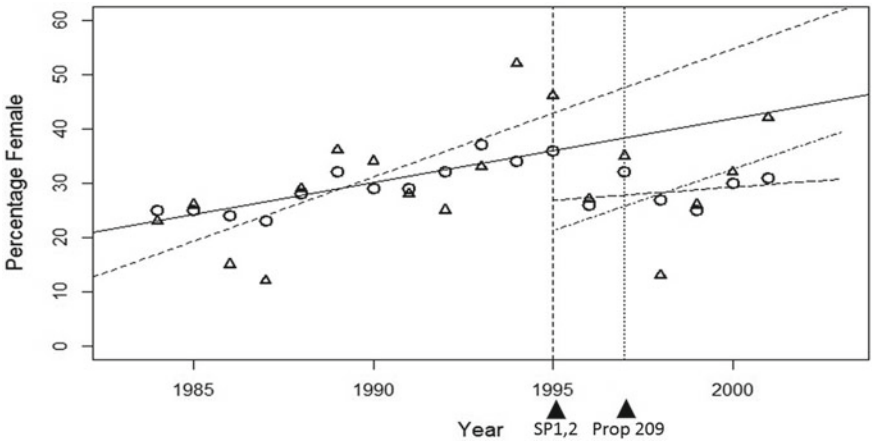

Fig. 2 Drop in percentage of women in new faculty hires following the passage of SP1, SP2 and proposition 209. University of California system (UCS, circles), and the University of California, Davis (UCD, triangles). Regression lines for pre-SP1&SP2, and for post-SP1&SP2, for UCD and UCS are shown. Based on data from UC Academic Senate (2003), after West et al. (2005)

3 Equality, Equity, and Inclusion

Much social science literature discusses the origins and nature of discrimination in contemporary U.S. society, as we discuss in the chapter 'Barriers to Inclusion'. Here, three concepts are important to define: equality, equity, and inclusion. Figure 3 contrasts the nature and impacts of equal treatment with those of equity programs.

In this depiction, the fence represents a barrier that is clearly discriminatory. Some individuals have full access to the view behind the fence while others are blocked by the barrier. The boxes represent programs or processes that enable access. In the left panel, all individuals have the identical advantage of one identical box on which to stand. The individual on the far left, perhaps because of body height, has full access without need of a box. The panel on the right demonstrates equality of outcome (equity). In this case all individuals now have the same view (or access)—however, an unequal distribution of boxes is needed to achieve this. Achieving equity requires that the boxes be distributed disproportionately so as to address the disadvantages arising from the barrier. This analogy makes it clear that "being treated equally" is not the same as "being given equal opportunity." Tension between equality and equity arises because discriminatory barriers create inequality of access, and such barriers are widespread throughout society. Thus, to extend the analogy of the playing field shown in Fig. 3, the societal challenge is not so much the number and distribution of boxes but instead the fence itself. Figure 4 adds a panel to the right that depicts the outcome of genuine equality, where individuals of all types have equal access because the discriminatory nature of the barrier—the fence—has been eliminated.

When efforts to foster inclusion are successful, discriminatory barriers denying access or equality of treatment are eliminated. As inclusion is enhanced, the difference between "equal treatment for all" and "equal opportunity for all" disappears. Extending the analogy further, the boxes can be thought of as special privileges designed to counter historical disadvantage represented by the fence,

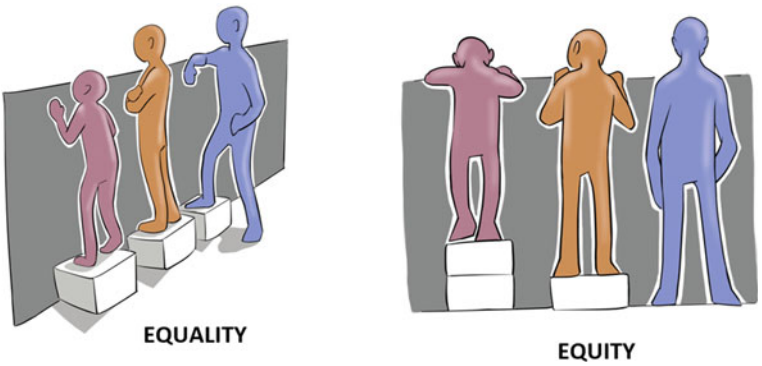

Fig. 3 Equality versus equity in access. Illustrations by Chastine Leora Madla

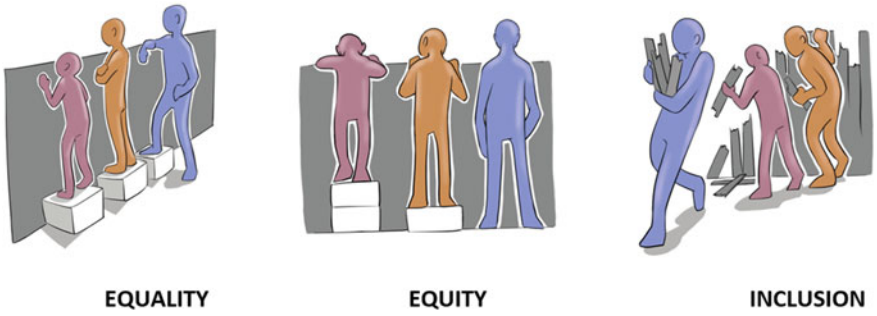

Fig. 4 Equality and equity versus inclusion and the removal of barriers to access for all individuals. Illustrations by Chastine Leora Madla

but they are workarounds that do not address the broader impacts of historical disadvantage/privilege or create genuine equality.

We would like to note the difference between our use of "diversity" and "inclusion." Diversity is defined as participation by various groups in society (the more groups, the more diverse), as evidenced by their mere presence. Although diversity of participants may suggest inclusion, this is not always the case. Diversity is a necessary step on the road to inclusion, as illustrated in Fig. 5. The first panel depicts exclusion—where some groups are denied access. The second panel depicts segregation—the attempt to create a climate of "separate but equal" participation. The third panel depicts integration—bringing together previously segregated groups. Affirmative action programs have traditionally been aimed at achieving diversity, integration, and guaranteed access—in effect, "a seat at the table"—but many such programs failed to guarantee the quality of that access. Quality, in this case, means full incorporation into the activities of the group. Inclusion recognizes not only the rights of all members to participate but also the equivalent nature or quality of that participation. The final panel depicts the situation when inclusion exists—when the views and opinions of all participants are sought equally, valued equally, and respected fully.

4 The UC Davis Advance Program

The NSF ADVANCE award enabled UC Davis to assess issues of systemic bias, inequality, and equity in STEM fields. At the same time, we saw this as an opportunity to think more broadly about our campus culture than the narrow STEM focus of the grant. As members of the UC Davis ADVANCE program, our goal has been to create an inclusive campus climate consistent with Proposition 209. A critical yet partial metric of success is achieving and retaining numerical diversity within the ranks of STEM faculty. Accomplishing a broad vision of diversity and inclusion, however, requires understanding the nature of discrimination in contemporary U.S. society as

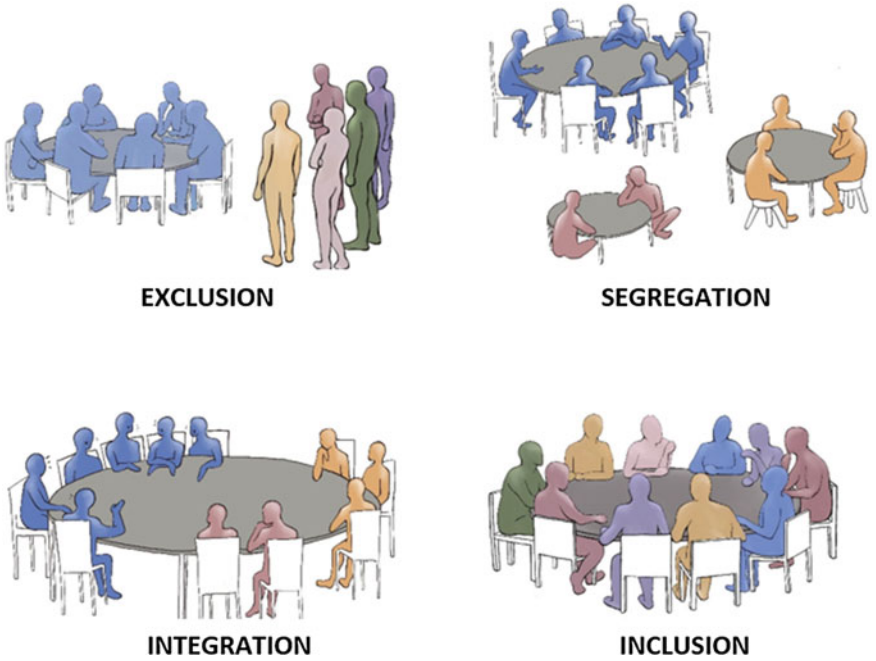

Fig. 5 The path to inclusion. Segregation and integration illustrations by Mengmeng Luo and exclusion and inclusion illustrations by Meghan Crebbin-Coates

well as the ways in which historical privilege for some and disadvantage for others continues to create barriers to full equality.

NSF ADVANCE programs are tasked with transforming educational institutions by eliminating barriers that impede the ability of women and other underrepresented groups to achieve and thrive in academic STEM careers. At UC Davis, we will have reached our goal of working and living in a genuinely inclusive culture when such equity programs are no longer necessary or relevant. We seek outcomes that not only respect the rights of all members to participate but also achieve a deeper understanding and appreciation of the benefits to the group of multiple, diverse perspectives. In short, we seek to create a truly inclusive STEM and non-STEM environment.

5 Creating a More Inclusive STEM Academic Environment

Creating a more inclusive culture requires first understanding how the current environment sustains systemic bias, inequality, and inequity. To achieve this understanding, we undertook several initiatives. First, it was important to understand our own data on diversity at different levels of the academy. Numerical data provide

insight into what is happening but not why it is happening. Surveys, interviews, focus groups and other tools can assist in defining reasons behind numerical trends. In addition to understanding data, it is important to fully assess institutional policies and practices to define areas where systemic bias, inequality, or inequity may arise, intentionally or unintentionally. Academic institutions are assumed to be meritocracies, meaning advancement is largely tied to continued accomplishment, assessed periodically via (seemingly objective) metrics. These assessments, however, can be susceptible to bias if the metrics employed assess factors that are not equally accessible. It is important to both understand the drivers of inequity in advancement and to implement programs that address them. Toward this end we launched mentoring, networking, and advising programs to help level the playing field for faculty.

We began our efforts knowing that the lack of racial and gender diversity in academia, as well as the existence of inhospitable climates for female and minority scholars, has multiple causes ranging from benign neglect to overt hostility, and from personal/individual behavior to institutional structures (National Academy of Sciences, National Academy of Engineering and Institute of Medicine, 2007; Stewart & Valian, 2018). Much discussed in the literature is the concept of bias, both unconscious and subconscious (implicit), which refers to a pervasive and cumulative cognitive process or set of schemas that can lead to discrimination by passive discouragement (Valian, 1998). Bias is at play, for example, when women of color are presumed to be less competent, reliable, or authoritative than their white male counterparts in a workplace. The pervasiveness of such bias makes the achievement of inclusive cultures a seemingly daunting task. Unconscious bias develops in childhood (Dhont & van Hiel, 2012; Halim et al., 2017), and it is difficult to unlearn childhood experiences. Subtle forms of bias and discrimination against women and other groups in academia have been recognized for more than 50 years (Bernard, 1965; Rossi, 1965) and continue to thwart progress toward inclusion.

The members of the UC Davis ADVANCE leadership team were understandably influenced by both social science research and the experiences of other ADVANCE institutions as we set about to design our robust program. One issue that repeatedly arose in conversations with other ADVANCE leaders around the country was the transient nature of commitments made to inclusion—and the resulting backsliding when campus leadership and priorities changed. We concluded that transient transformation is not true transformation, rather it can reflect a top-down approach that is ineffective/unstainable because detached from the communities it seeks to change. Consequently, our ADVANCE Program has focused on creating a community-centered commitment to inclusion that prioritizes accountability. Leadership from the top does matter, but it must complement and amplify efforts on the ground while taking responsibility for outcomes.

Embracing a multi-pronged and multi-level approach to institutional transformation is supported the by existing literature outside the academy. Admittedly, research on the effectiveness of workplace diversity programs is inconclusive—in part because different programs prioritize different avenues of redress, some aiming to establish *organizational responsibility* for change, some tackling *managerial bias* through training, and some seeking to reduce the *social isolation* of women and

minority workers through networking (see Kalev et al., 2006). In their analysis of federal management-level data from 708 private-sector companies, Kalev al. (2006) conclude that, of the three interventions, companies that prioritize organizational responsibility were most effective at increasing managerial diversity in terms of sheer numbers, and in this sense they mirrored more traditional affirmative action programs; at the same time, organizations that establish responsibility *also* see better effects from both diversity trainings and networking/mentoring efforts, which, ideally, go beyond numbers address non-inclusive cultures. Institutions that prioritize all three dimensions are therefore poised to effect deeper, more sustainable change. Whatever the avenue of redress, a commitment to diversity, equity, and inclusion should be rooted in the community in question—and reflect a deep understanding of that community. When this understanding is lacking, transformation efforts are more likely to fail (see Kotter, 1995).

6 The Path to Inclusion

This book is divided into five sections that detail how our UC Davis ADVANCE team approached the task of creating a more inclusive STEM community.

Part 1

The first section describes how we developed an understanding of the nature of discrimination within our organization. The chapter, 'Barriers to Inclusion,' discusses the social roots of discrimination and barriers to inclusion, including the role played by social processes in establishing/sustaining bias. Which barriers matter and how they operate varies, of course, by local culture and context. The chapter, 'Barriers to Inclusion,' along with this chapter make the case that we need change and that the foundation for change is understanding what drives systemic bias, inequality, and inequity.

Part 2

The second section describes our efforts to understand our own data and to review policies and practices for potential bias and inequity; it also outlines how our ADVANCE program was organized.

Undertaking a cultural transformation always requires buy-in from the affected communities. Buy-in requires a thorough understanding of the importance of inclusion and how/why the institution may be falling short. This the focus of the chapter, 'Data-Driven Decision Making,' which assesses local campus data on diversity, reports the results of surveys on local barriers to inclusion, and evaluates the effectiveness of existing equity programs—three steps that are vital in establishing baseline levels of bias and creating a path to equality.

The chapter, 'Assessing Institutionalized Bias,' provides a guide for evaluating existing institutional policies and procedures to determine if they perpetuate discrimination. The aim of such evaluations is to understand how local culture can unknowingly institutionalize bias and non-inclusion. How policies are enacted and operationalized may introduce bias, making a review of practices every bit as important as a review of the actual policies. To achieve inclusivity, practices and policies must be internally consistent.

Chapter 'Leadership and Organizational Structure,' the final chapter in this section, discusses the challenges of institutional transformation and its scope and the importance/role of consistent leadership in this process. Commitment from an organization's leadership is essential for a principled, action-oriented approach to inclusion. Addressing systemic bias and inequity is not simple; it requires a long-term commitment to change. Sustaining enthusiasm for change is a challenging but critical task for leaders because they are not only visible, they also set priorities and command resources.

Part 3

The third section of the book focuses on our main target demographic, Latina STEM scholars. The chapter, 'A Long-Term Vision on Faculty Diversity at UC Davis,' discusses the creation of a broad vision of faculty diversity and inclusion. The sustainability of ADVANCE beyond its early successes at UC Davis largely depends on whether it can propel the types of changes we know are critical to prioritize in the future. One type of transformational change is expanding the pipeline of Latinx and other underrepresented students into Ph.D. programs, both generally and in STEM specifically. We must enlarge the pool of underrepresented minority (URM) Ph.D. students both at UC Davis and nationally, as well as support successful careers after graduation, whether as professors in academia or research scientists in government or industry. At UC Davis, these efforts have already begun in earnest; they include visionary recruitment practices for graduate students, changes in graduate admissions practices, and improved mentoring of students both during and after completion of their programs.

The chapter, 'Making Visible the Invisible,' focuses on the experience of conducting collaborative, interview-based research on the career pathways of a small sample of Latina STEM scholars across the United States. We address the process of conducting the research and explain why the Latina experience is crucial to understanding current discriminatory practices. In addition to discussing the theoretical foundations of our methodology and the importance of qualitative, in-depth interviews as a specific form of knowledge-production, we cover such topics as researcher ethics, how our identity influences perception and interpretation (positionality), issues of confidentiality and emotional labor, and the advantages and challenges of interdisciplinary collaboration.

Part 4

Systemic bias creates inequity and inequality within an organization. Previous chapters discussed assessment of systemic bias and its impact in hiring and advancement for STEM faculty. In the fourth section we describe specific programs that we launched to increase equity and inclusion for all faculty on our campus.

Earlier surveys of Latinx scholars and other underrepresented groups highlight the importance of a sense of belonging when pursuing a specific career path. The chapter, 'Seeing Self,' describes our efforts to address a lack of belonging for minority scholars in STEM through the creation of the Center for Advancing Multicultural Perspectives on Science (CAMPOS). CAMPOS serves an important dual purpose. First, it aims to support a diverse community of STEM scholars by fostering belonging within the group; second, it showcases the individual successes of these scholars, thus broadening public perception of who belongs in STEM.

The chapter, 'Mentorship, Sponsorship, and Professional Networking,' discusses the importance of mentoring to faculty success and explains how to create comprehensive faculty mentoring programs. It is well known that women often cite deficits in mentoring as a top reason for leaving STEM careers (National Academy of Sciences, National Academy of Engineering and Institute of Medicine, 2007). Mentoring is important at multiple levels—in-group mentoring to guide individuals along their career path, in-group mentoring of outgroup members to enable integration within the in-group, mentoring during undergraduate and graduate education (Bernard, 1965) and general mentoring to address issues unique to a subgroup.

The final chapter in this section, chapter, 'Work Life Integration in Academia,' discusses the conflict of identities that can occur when a scholar is both a professional and a parent. Work-life integration is often regarded as an elusive goal and may even become a career-choice barrier, especially for women academics. In this chapter, we review several work-life integration interventions at UC Davis, including dual career programs such as the Partner Opportunity Program and the Capital Resource Network (an initiative started under the UC Davis ADVANCE program); the expanded work-life program for academics at UC Davis as compared to those at other UC campuses; and additional family-friendly options, such as UC Davis's customized recruitment program. We discuss challenges experienced while conceptualizing and implementing these interventions, and we recommend best practices for improving work-life integration in academia and beyond. Instead of work-life balance programs that sustain a conflict of identities (worker versus mother, for example), we advocate a philosophy of work-life integration that views the two identities as distinct yet compatible parts of a whole.

Part 5

The final section of the book covers various challenges to establishing a truly inclusive climate for STEM scholars.

The chapter, 'Leading While Female,' shares the personal journey of our former Chancellor and the complexities involved in balancing loyalty to the existing organization with the desire to change it. It also discusses the problem of systemic gender

bias in the institution and the impact this bias can have on female leaders seeking to create a more inclusive culture.

The chapter, 'Advice Not Taken,' discusses what we call "advice ignored." The goal of this chapter is to demonstrate how the efforts of organizations must be tailored to the local culture in order for institutional transformation to succeed. Commitments to inclusion must always be rooted within the community undergoing change and reflect an understanding of its priorities and goals. The chapter, 'Disrupting Complacent Systems,' discusses the concept of "complacent systems"—why cultural systems become complacent and what is necessary to disrupt them in order to effect change.

The final chapter, Chapter 15, summarizes the key lessons learned during the six years of implementing the ADVANCE program on our campus. We summarize the approaches that proved most successful and highlight the challenges that remain going forwards.

7 Conclusion

In writing this book, we have been motivated by the belief that knowledge is power. In the spirit of that belief, we offer our observations, reflections, and experiences of creating a more inclusive campus culture through institutional transformation. Our goal is to contribute to the important, ongoing dialogue on how to best ensure equity for all faculty in academia—and for all workers in the broader society.

Acknowledgements The authors thank our illustrators Meghan Crebbin-Crates (Fig. 5, Exclusion and Inclusion), Chastine Leora Madla (Figs. 3 and 4) and Mengmeng Luo (Fig. 5, Segregation and Integration). Their enthusiasm for this project and ability to bring concepts to life is greatly appreciated.

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Barriers to Inclusion: Social Roots and Current Concerns

Laura Grindstaff

Abstract A working knowledge of the roots of, and barriers to, diversity, equity, and inclusion within organizations is essential to creating a more inclusive community, both in and beyond the academy. Structural inequalities arise and are reproduced at multiple levels simultaneously, each reinforcing the other: socially through interaction, culturally through ideas, values, and representations, and institutionally through formal rules and procedures as well as informally through taken-for-granted norms and practices. This chapter focuses primarily on the socio-cultural and cognitive factors identified by scholars as important barriers to achieving a diverse, inclusive academic community. Identity exclusion, stereotyping, and implicit bias, among other barriers, play a role, and, together with inequitable distribution of opportunities and resources, produce and reproduce racial and gendered inequalities. Identifying barriers to inclusion and understanding how they shape behavior is critical to eliminating them.

Keywords Diversity · Inclusion · Equity · Structural inequality · Identity exclusion · Stereotyping · Implicit bias

1 Introduction

Across the U.S., institutional diversity efforts are forcing change. The UC Davis ADVANCE Program seeks to remove identifiable intra-organizational barriers that white women and people of color face when pursuing STEM careers in academia. As a science-based initiative, ADVANCE targets the STEM disciplines and asks how we move beyond "fixing the numbers" (getting more white women and people of color into STEM) to "fixing the culture"—creating and sustaining an environment in which a diverse array of faculty with a diverse array of social identities can fully participate and thrive.

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Psychology and management studies figure prominently in diversity, equity, and inclusion (DEI) literature, much of it focusing on the role of individual/cognitive processes in accomplishing cultural change; in what follows, I include this literature but also provide significant sociological grounding for understanding barriers to inclusion, because social and individual processes are inevitably entwined. Such grounding might seem self-evident to some readers, but my seven years of collaborating on ADVANCE initiatives on my own campus with STEM and non-STEM colleagues alike has convinced me that it's essential to get on the same page with respect to what concepts mean and how to effectively deploy them in transformational efforts, particularly when that transformation requires interdisciplinary collaboration. Consider this chapter a primer of sorts for those seeking a common language with which to pursue diversity, equity, and inclusion in their own organization or institution.

2 Difference, Hierarchy, and Inequality

People are social creatures—we live, work, and play in groups and communities of varying sorts that we ourselves create and sustain. These groups may reflect family, kin, or neighborhood ties, professional networks, religious or political beliefs, shared abilities/disabilities, and/or national allegiances, among other possibilities. Communities may be governed by informal norms or formal laws; their boundaries may be relatively porous or strictly policed. Boundaries define who's inside and outside of the group: consequently, groups and communities impart a shared sense of belonging as well as a shared sense of difference from others—which may (but does not automatically) lead to the creation of hierarchy.

2.1 Hierarchy

"Difference" is a necessary but not sufficient prerequisite to hierarchy unless the difference makes a difference in relation to systems of power. Wade and Ferree (2019) use the example of tongue aptitude versus sex category. Because of the presence or absence of a gene, some people are able to curl their tongues while others cannot, yet tongue aptitude is not a socially significant difference that we organize hierarchical relations around, unlike biological sex (female/male). Differences give rise to hierarchies which create/sustain inequalities when power—economic, political, cultural, and social—is unequally distributed among groups systematically and over time (Fig. 1). Other terms for hierarchy include "stratification" and "tiering"—metaphors that suggest the layering of groups on the basis of status and/or access to resources and opportunities. Those of the top are better off than those at the bottom.

Social hierarchies may be fixed or open to varying degrees. Fixed hierarchies are akin to caste systems: individuals are born into their tier and the status/resources conferred by tier membership is a function of birthright, not specific skills, attributes, or accomplishments. Mobility within a tier may be possible, but not between tiers. Slavery in the U.S. was a fixed hierarchy organized around race. By contrast, open hierarchies are said to allow social mobility (the more mobility, the more "open")—social class is a typical example. Today, the U.S. class structure is generally understood to be hierarchical but in an open way; popular narratives suggest that if you work hard enough you can move up in the hierarchy, thanks to your own initiative, to educational opportunities, or some combination of both. Yet even open hierarchies are still hierarchies, and they can be and often are discriminatory if differential access to the resources needed to be socially mobile (either within or across tiers) creates systemic barriers to that mobility.[1]

Access to higher education is one of those resources, yet access is not equally available to everyone and some who gain access are made to feel they don't belong. Consider a working-class Latina student whose parents are migrant farmworkers. Because of gender, race, and class disadvantage, along with, potentially, English language barriers, she will not have the same access to the economic capital (resources), social capital (networks), and cultural capital (culturally-valued knowledge and culturally-valued ways of demonstrating that knowledge) as a U.S.-born young man from the white middle class. These structural disadvantages limit access to high-quality educational experiences at every stage of the academic pipeline, and, ultimately, career choice (see Mayer, 2010). Should both students eventually attend a prestigious four-year university, their experience of the institution may (and likely will) differ dramatically; for the young man, it may seem a natural stage along a predetermined path, whereas, for the young woman, it may seem a strange and alienating place.

[1] By "discriminatory" we don't mean the neutral ability to differentiate or discern the difference between one thing and another, rather we are invoking the more sociological definition of discrimination that refers to behavior that denies to members of particular groups resources or rewards available to others.

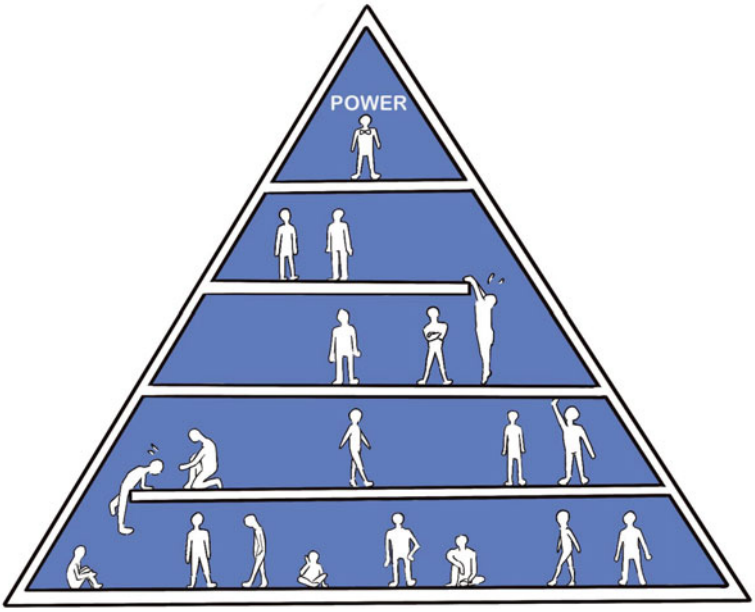

Fig. 1 Social hierarchy. Illustration by Mengmeng Luo

2.2 Social Identity

Sociologists have long used the concept of identity not only to study how people understand who they are (self-identity), but also, and more important, how that understanding is shaped by social/group membership (social identity). Social identity is thus one's sense of self as a member of a social group.

Typical categories that give rise to social identities in the U.S. include but are not limited to gender, race, ethnicity, sexual orientation, social class, age, ability/disability, religious affiliation, political ideology, occupation or work status, geographic location, and national origin. Some social identities and the categories from which they are derived are ascribed (based on "innate" qualities) and some achieved (based on chosen or elective criteria), although ascription and achievement are not mutually exclusive; consider that one might be assigned male at birth but identify as a woman later in life, or that an ethnic identity may be rooted as much in cultural practices as in phenotype or national origin. Moreover, even so-called innate qualities must be interpreted and given meaning in a social context. Although seemingly self-determining, social identities are formed and embraced in relation to others and so the perspectives of others—whether inside or outside one's own group—can influence identity-formation. In other words, although no one else can force you to identify in a particular way, the options available to you and the meanings attributed to those options are not exclusively within individual control.

Although identities are by no means static or unchangeable, and although some identities are more strongly held than others, they typically constitute a core sense of sense, at least while they are held. When aspects of the self are more loosely embraced or short-lived, they may be better described as roles. As the theatrical metaphor implies, roles are parts people play in their lives—in the family (daughter), workplace (teacher), and other organized groups such as sports teams (goalkeeper), civic organizations (treasurer), or professional associations (council member). There can be a blurry line between "identities," "roles," and "occupations." For example, "mother" can be both an identity and a role because it is potentially a core sense of self but also a part played within the family or kinship network. Likewise, "scientist" is an occupation/profession but may also be an identity.[2]

Within any given identity category exists a range of possible social identities. The category "race" may encompass Latinx, indigenous, African American or Asian American identities. Identities tend to be more dynamic than the categories from which they're derived in response to changing personal and/or socio-political influences. Any one individual may hold multiple identities simultaneously: within or alongside racial identifications, people will have different gender, class, religious identifications, etc., although which identities are claimed or felt to be salient can vary considerably by context. This notion of multiple identities is related to but not synonymous with the terms "social location," "positionality," and "intersectionality."

3 Social Location, Positionality, and Intersectionality

Social location refers to the combination of identity categories to which a person belongs (Fig. 2). Theoretically, everyone has a social location—straight, white, middle-class men no less than queer, working-class women of color. However, people may or may not recognize/acknowledge their social location as a social location or as influencing their worldview—how they know what they know and make sense of the world around them. Positionality, a term coined by feminist philosopher Linda Alcoff (1988), refers to the effect of social location on perspective. According to Alcoff, the key issue is not that some social locations are "objective" and others "biased," but that all social locations are perspectival and some perspectives are more important to prioritize than others in understanding and challenging social inequalities.

Intersectionality is a framework that seeks to understand how systems of power converge in patterned ways to amplify oppression. Coined by the legal scholar Kimberlé Crenshaw in 1989 but theorized by women of color scholars and activists long before this, "intersectionality" denotes the ways in which race, class, gender, sexuality, and other axes of hierarchy operate not as mutually exclusive categories but as reciprocally constituted ones that shape social experience. In its early formulations,

[2] The concept of "roles" has been critiqued by feminist sociologists for over-emphasizing the harmonious interplay of parts contributing to a larger whole, which obscures the power relations that often shape which roles people play and why (see Acker, 1992; Risman & Davis, 2013).

the concept of intersectionality underscores the multidimensionality of marginalized subjects' lived experiences as the result of interlocking structures of oppression (see Truth, 1851; The Combahee River Collective Statement, 1977; Dill, 1983; Anzaldua, 1987; King, 1988; Crenshaw, 1989, 1991; Collins, 1990/2000). Other terms that predate or are in dialogue with the concept of intersectionality are "multiple jeopardy" (King, 1988) and "matrix of domination" (Collins, 1990/2000).

A legal scholar, Crenshaw developed the framework of intersectionality to address the fact that the experiences and struggles of women of color have been rendered invisible in U.S. discrimination doctrine because, in legal as in popular discourse, the iconic subject of racial discrimination is assumed to be male and the iconic subject of gender discrimination is assumed to be white (Crenshaw, 1989, 1991). Black women, and women of color more generally, are neither men nor white, and their unique experiences of oppression in society often reflect the simultaneous inflection of their specific social locations, race and gender among them. One needn't possess a specific constellation of social identities to experience intersectional subordination, nor is intersectionality "additive" (the more layers, the more oppression). The point is to understand how different vectors of power/inequality come together to shape experience. A Vietnamese-American waitress isn't necessarily more or less oppressed than, say, an immigrant Latina scientist, but the specificity of their social locations will position them to experience subordination differently. Intersectionality is an analytic framework or lens, not a collection of identities.[3]

This is not to suggest that social identities are irrelevant in recognizing (and, conversely, failing to recognize) intersectional vulnerability. It is no accident that it was women of color feminists who developed the concept of intersectionality; people who are marginalized on the basis of social location do not have the luxury of ignoring its impact on their lives. An important aspect of social privilege is believing that one is somehow unmarked or "neutral" with respect to identity categories (being white and male, for example). In actuality, there is no neutral person who doesn't have a social location, nor is there a person who occupies only a single social location—there is no "raced" person who isn't also gendered, for instance, just as there is no gendered person who is raceless. But the degree to which individuals *recognize* their positionality—the intersections shaping their experience—often reflects the degree to which they are marginalized (and privileged) in relation to the category.

[3] Although no singular definition of intersectionality exists, sociologist Patricia Hill Collins (2015, p. 14) has usefully outlined a series of principles or guiding assumptions in her essay, "Intersectionality's definitional dilemmas" appearing in the *Annual Review of Sociology*.

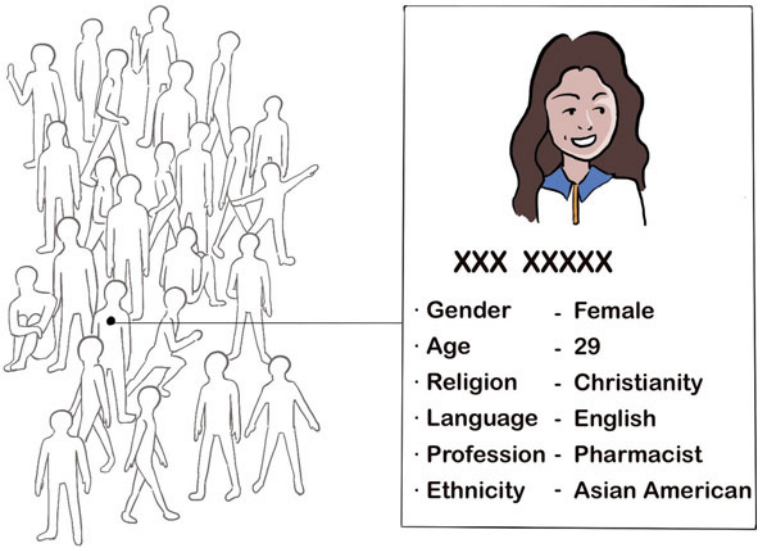

Fig. 2 Social location and social identity. Illustration by Mengmeng Luo

4 Controlling Images

Social identities are learned, acquired throughout life in various ways: face-to-face interaction, shared experience, explicit instruction, cultural representations, formal assignment by rule of law, etc. This means social identities arise from both inside and outside groups and communities and may require the negotiation and resolution of conflicting messages. Socialization within the family or school may encourage/support one social identity, and the attributes associated with it, while peer networks or the media may support quite another; some groups have more influence than others in identity-formation, and this is true of both self-identity and social identity.

Social identities, and their associated attributes, are not equal in status in the broader society, nor, to reiterate a point made earlier, are they simply a matter of self-determination—of deciding, among competing options, which one you prefer. Generally speaking, the more marginalized are members of a community in terms of access to power and resources, the less able they may be to define for themselves who and what they are in the broader society and the more vulnerable they are to being negatively defined by others, since a key aspect of power is the ability to determine how people are perceived and treated. A clear example is the use of what Collins (1990/2000) calls "controlling images" to denigrate African-American women. Controlling images go beyond visual imagery to encompass societal representations more generally and they are related to but not synonymous with stereotypes, since stereotypes can be positive or neutral as well as negative and harmful. Controlling images facilitate "othering," whereby dominant groups create/sustain the

subordination of "others" by constructing these others as inferior, thereby reaffirming the apparent legitimacy of the arrangement (see also Hooks, 1989).

When internalized, controlling images may not only shape how marginalized groups make sense of their lives but also effectively hinder their ability to challenge their subordination (see Pyke, 2010; Pyke & Johnson, 2003). Collins was focused primarily on controlling images of black womanhood—the mammy, the matriarch, the welfare mother, and the jezebel[4]—but her concept has been usefully applied to other groups and communities, including Asian American women (Pyke & Johnson, 2003) and Latinas (Mendible, 2007). As Pyke and Johnson (2003) note, pathologizing the femininity of women of color renders white constructions of femininity as "normal" and superior, thus according white women racial privilege, even as they may suffer gender oppression relative to white men.

The concept of controlling images reminds us that societal-level representations—historical narratives, cultural images, political ideologies, and/or laws and policies—do not provide a panoply of "neutral" options for identity-formation. Because societal-level representations reflect the priorities and experiences of those with the greatest power to author them (wealthy straight white men), they may reinforce, intentionally or not, demeaning (racist, sexist, homophobic, etc.). characterizations. Changing societal-level representations by diversifying their authorship is one reason why diversity in social institutions such as law, medicine, education, and politics matters, and why it's imperative to challenge the exclusion of marginalized voices from these spaces.

5 Collective Action and Institutional Change

Of course, marginalized groups and communities do not automatically internalize others' ideas of what their identities signify, although this happens. They can and do define themselves, sometimes in explicit opposition to mainstream narratives and ideologies. Identity-formation can involve a dynamic interplay of social forces, including collective action. The labor movement of the 1930s, the black and brown power movements of the 1960s, and the feminist and queer rights movements of the 1970s were key moments in U.S. history when racial, ethnic, class, and gender identities were actively renegotiated and reframed, in some respects quite profoundly.

[4] For example, the mammy figure portrays black women as "happy domestics"—maternal and nurturing, devoted to her white family, and content with her subordination. The black matriarch, by contrast, is a kind of "failed" mammy—a mother who is overly aggressive, unfeminine, and emasculating, and therefore responsible for the "pathologies" of the black family, particularly the high incidence of female-headed households. Whereas the mammy represents the "good" black mother, the matriarch symbolizes the "bad" black mother and both cultural scripts function to objectify black women (decontextualize them from lived reality) and provide ideological justification for their oppression (Collins, 1990/2000, p. 75).

Along with other U.S. institutions, institutions of higher education were partially transformed by these movements, albeit unevenly and incompletely, as newly-founded gender and ethnic studies programs demanded an expansion in what kinds of knowledge got produced and who got to produce it. More traditional disciplines "diversified" much less readily, particularly the STEM fields, prompting the emergence of federal grant initiatives like the one that inspired this book. Today, across the U.S., the majority of under-represented minority (URM) faculty—and to a lesser degree white female faculty—in academia remain clustered in ethnic and gender studies programs. Not coincidentally, these programs have been chronically under-funded, under-valued, and subject to conservative political attack. Consequently, although academia has widened the range of social identities represented among its faculty, it mirrors the culture at large in that faculty from historically marginalized groups are clustered at the "low" end of the occupational hierarchy (in gender and ethnic studies) and grossly under-represented at the "top" (in STEM).

Institutional transformation efforts such as the NSF ADVANCE Program exist in no small measure because of social justice efforts, but this history is indirect—the more immediate legacy is the notion of "diversity education" that began in corporate, military, and educational contexts in the post-civil rights era, solidifying in the 1980s and 90s when businesses began hiring diversity trainers as a way to avoid civil rights lawsuits (Kelly & Dobbin, 1998; Vaughn, 2007). Although ethnic and gender studies scholars, along with humanities-oriented social scientists, are critical of terms such as "diversity" and "inclusion" because of their ascension within corporate workplaces and their prioritization of individual-level behavioral/cognitive understandings of social inequality over deeply structural ones, the individual and the social inevitably come together and touch down in different ways in a variety of settings, including STEM.

Initiatives such as ADVANCE are strategic and necessarily limited interventions. The ADVANCE Program at UC Davis aims to change the organizational culture of STEM fields; it is not a broad social justice project designed to eliminate racial and gender inequality in higher education as a whole (if it were, time and resources would be also be devoted to improving the funding and working conditions for the humanities and social science disciplines that are, comparatively, already quite diverse), let alone society writ large. Rather, as a science-based initiative, it attempts to address identifiable, measurable, and (ideally) correctable barriers within academia that hinder the diversification of STEM faculty by discouraging white women and people of color from full participation and inclusion. Since STEM is the primary target for institutional transformation, the vision and the strategies for implementing it have to come from within the STEM community, not imposed from outside. UC Davis ADVANCE has a particular emphasis on Latinas in STEM, given the demographics of California and the mission of the university to serve the diverse peoples of the state.

6 Diversity and Inclusion

As discussed in the first chapter, 'From Affirmative Action to Inclusion,' "diversity" and "inclusion" are related but not synonymous: being diverse means the group or community in question encompasses a range of social identities representing a range of social locations/backgrounds, whereas being inclusive means that people of different backgrounds and identities feel—and are—valued members of the group who participate on equal footing. Sherbin and Rashid (2017) quote diversity advocate Verna Myers in explaining the difference: "diversity is being invited to the party, inclusion is being asked to dance." Diversity is necessary but not sufficient to achieving inclusivity within social institutions; moreover, whereas diversity is relatively easy to measure (e.g., a headcount), inclusion is less so because it is an aspect of culture and must be interpreted and narrated. Why are diversity and inclusion important? Why should we strive for them? Why should we care about them?

In their masterful book, *An Inclusive Academy: Achieving Diversity and Excellence*, Stewart and Valian (2018), draw on a range of data across multiple disciplines to address these and other questions related to defining, understanding, and fostering diversity and inclusion in the academic workplace both in and outside STEM. Their review of the literature suggests that embracing diversity in an inclusive way yields multiple benefits: increased innovation and creativity; greater capacity to challenge received wisdom; the development of new fields of inquiry; and the ability to reach and inspire students of different backgrounds and experiences. In no instance will mere demographic diversity *guarantee* any of these benefits just as homogeneity won't automatically preclude them (as Stewart and Valian point out, many important advances have occurred despite the historic homogeneity of higher education); but diversity will be make such benefits more *likely* because it is a proxy for diverse thinking—and thus more varied ways of seeing, understanding, and inhabiting the world, which has an impact not only on knowledge itself but also those aspiring to become knowledge-producers (see Chap 2 in Stewart & Valian, 2018).

7 Stem in Academia: Barriers to Diversity and Inclusion

Having discussed a number of general sociological processes and concepts of broad relevance to understanding diversity and inclusion as well as the benefits of diverse, inclusive environments, I now turn to some of the specific challenges STEM fields confront in pursuing those two interrelated goals with regard to their faculty. Below we focus on six different but interrelated phenomena: exclusion, the ideal worker norm, positionality, stereotypes, microaggressions, and implicit bias.

7.1 Exclusion, Isolation, and Tokenism: The Problem of (Not) Belonging

Despite increasing numbers of white female graduate students and early-career scholars in certain STEM fields such as biology and veterinary medicine, the STEM disciplines in U.S. research universities have generally remained largely dominated by white men, especially at the senior ranks of the faculty and in executive administration. As STEM slowly diversifies to include white women and domestic URM scholars, members of these groups, particularly women of color, may experience a sense of social exclusion and isolation, as well as tokenism if they are "the only____" (fill in the blank) in their department or campus unit.

The problems associated with being a token are well known (Grey, 2006; Kanter, 1977; Laws, 1975; Niemann, 1999; Yoder, 1991). Tokenism makes individuals hypervisible and puts them in the position of representing all members of their group to others—what Shohat and Stam (1994) call the *burden of representation*—as well as educating others about any misperceptions or stereotypical assumptions they might hold. Performance anxiety is heightened because failure will reflect on the group, not just the individual—a stressor that members of dominant identity categories don't face. Self-doubt, emotional distress, and increased "stereotype threat" (discussed below) may result, potentially compromising performance. In a self-fulfilling prophecy, heightened visibility and anxiety about failure may make failure more likely (see Steele, 1997, 2011).

The isolation of being the only or one of the only representatives of a group may be experienced as a lack of connectedness or belonging to others in the workplace, regardless of performance (Fig. 3). The sense that one doesn't belong because of the absence of "people like me" can discourage individuals from participating in certain activities or taking risks that could lead to rewards, from remaining in an occupation over time, or even from seeking to enter an occupation in the first place (Niemann, 1999). In this sense, diversity begets diversity, and lack of diversity sustains lack of diversity, because people's aspirations are affected by who they see (and the positions those people occupy) in their environment.

In the chapter titled 'Seeing Self' in this volume, the authors use the term "seeing self" to emphasize the importance of having people of one's own identity categories not just present *in* but truly integrated *into* a workplace. In academia, this not only requires hiring faculty of diverse experiences and backgrounds, but also building networks, partnerships, and shared spaces of knowledge-production that enable members of historically underrepresented communities to thrive.

Fig. 3 Sense of exclusion versus belonging. Illustration by Chastine Leora Madla

7.2 The Ideal Worker Norm

Token or superficial efforts at diversity enable workplace cultures to resist meaningful change. The persistence of what sociologists have termed "the ideal worker norm" (see Acker, 1990; Williams, 2000) is a good example. If a biochemistry department consists primarily of white male faculty and the culture of the workplace is to prioritize research above everything else in life, as if one had no familial obligations outside the lab, scientists who have such obligations will be disadvantaged; instead of the workplace changing to accommodate realities of having a family or other care-work responsibilities, the individual worker will either have to struggle to conform to the norm or risk being seen as less dedicated to the job. The individual has to make a "choice" that his or her colleagues don't have to make.

Like other women workers, women scientists, especially those with children, struggle far more than men to embody the ideal worker norm because of the deeply-entrenched gendered division of labor in the broader society that assigns housework and childcare to women; indeed, the norm itself presupposes this gendered division of labor. The separation of work (paid) and home (unpaid), combined with the lack of high-quality affordable daycare, creates a "second shift" for many working women (Hochschild, 1989/2012). Meanwhile, unless they embrace an equal share of housework and parenting, male employees with children get the benefits of fatherhood without violating the expectation of dedication to work. This social arrangement is also racialized. Consider that, because racial inequality has a strong economic dimension, white and Asian-American men are more likely than black or Latino men to earn salaries that support a stay-at-home partner (whose unpaid labor, in turn, upholds the masculinization of the "ideal" worker), and that white women are more likely able to afford outsourcing domestic labor to other women, typically black and brown women. Consider too, in the case of Latinas, especially those of working-class origins, that the expectations, commitments, complexities, pleasures, and rewards of *la familia* may play a stronger role in their identity-formation compared to their white or otherwise non-Latina female counterparts (see Hurtado, 2003; Gutierrez et al., 2012).

Parental leave and other work-life balance policies are designed to challenge the ideal worker norm in academia and elsewhere, and they are critical interventions, as discussed in the Chapter, 'Work Life Integration in Academia: From Myth to Reality.' But until fathers contribute equally to raising children (and everything else associated with family life), men won't need such policies as much as women and they can continue to embody the ideal worker. The strength and persistence of the ideal is underscored by studies that show women with children suffer a "motherhood penalty" in the labor force while men with children enjoy a "fatherhood bonus" (Budig, 2017; Budig & England, 2001; Gough & Noonan, 2013). Data further show that married fathers earn 4–7% more than married men without children, and that premium shrinks or disappears when you control for race, meaning the father premium is larger for white men than for men of color (Glauber, 2008; Hodges & Budig, 2010; Killewald, 2013).

7.3 Denying Positionality

Clearly, "diversifying" academia is not a matter of sprinkling a few white women or URM scholars into otherwise unchanged environments; the norms, values, and practices that created and continue to sustain white male homogeneity in the first place have to shift. This poses a particular challenge in many STEM fields because of the strong belief that science, when conducted properly, is neutral, objective, and value-free. In combination with the ideal worker norm, this construction of science can hinder diversity in two ways. First, it suggests that social identity is irrelevant to conducting good science and so it doesn't matter what race or gender the scientist is. Second, it obscures the fact that, in Western cultures, objectivity and neutrality have been (and often still are) associated with masculinity, especially white masculinity; indeed, they help to construct the very definition and meaning of masculinity itself (see Keller, 1985; Harding, 1986; Hubbard, 1990; Martin, 2001; Fausto-Sterling, 2000/2020; Alcoff &Potter, 2013). Culturally speaking, apparently oppositional qualities such as objectivity/subjectivity, reason/emotion, and logic/intuition are deeply gendered, mapping onto and reinforcing the binary construction of men/masculinity and women/femininity in predictable ways.

The point here is not that scientists shouldn't aim to conduct careful, rigorous research that is as objective as possible, or that women and men of color aren't capable of conducting such research, but that the very ideals of the scientific enterprise themselves aren't neutral with respect to social identity—they more "naturally" align with some people than others. This is important to acknowledge and confront, especially because the group generally advantaged by this alignment—middle-class white men—may not see themselves as occupying a social location at all. As mentioned earlier, an important aspect of privilege is appearing to be unmarked or neutral with respect to identity; this is because dominant- or majority-group members represent the implicit norm against which others are "marked" and measured. Their "normalcy" is part of their privilege. Consequently, privilege is difficult to see for those who possess it, and what appears to them as a neutral environment may actually be supportive and inclusive *for them*—and, conversely, unsupportive or alienating for everyone else (Fig. 4). Positionality is the willingness and ability to consider how your own social location—the constellation of identity categories that you occupy—may influence how you view and move through the world, whether with ease or great struggle.

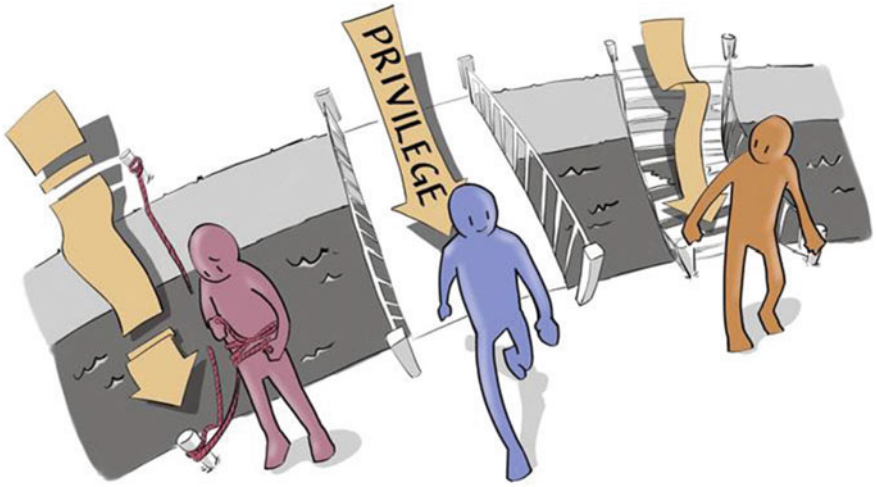

Fig. 4 The invisibility of privilege. Illustration by Mengmeng Luo

7.4 Stereotypes and Stereotyping

Stereotypes are over-simplified, and often distorted, typifications or ideas of what people are like (Fig. 5). When we stereotype, we think in terms of fixed and inflexible categories. Individual behavior is perceived and understood in terms of these categories; relatedly, stereotypes associated with a group are presumed applicable to all members of that group. Stereotypes abound, but some are more culturally familiar and consequential: men as "naturally" strong and competent leaders, women as "naturally" nurturing and caring, Asian-Americans as "naturally" inclined toward science, African Americans as "naturally" gifted at sports, etc. Of course, some men are competent leaders, some women are nurturing, some Asian-Americans excel at science, and some African Americans are impressive athletes. The problem is that stereotypes limit our perspective, preventing us from seeing the full range of who and what people are. When stereotypes are pejorative and amplified across multiple social fields to justify systematic subordination, they become "controlling images" (Collins, 1990/2000) as discussed earlier: the black woman as jezebel, the Asian woman as exotic lotus blossom, the "fiery" Latina, the dangerous, threatening black man, etc.

Stereotypes are thus cognitive shortcuts that may or may not be rooted in reality; regardless, they have consequences for those at whom they're directed. "Stereotype promise" (also called "stereotype lift") is a phenomenon where being viewed through the lens of a positive stereotype can lead to a strong performance that confirms the stereotype; conversely, "stereotype threat" is a phenomenon where being viewed through the lens of a negative stereotype can lead to a poor performance that confirms the stereotype. Claude Steele (1997) developed the concept of stereotype threat in an effort to understand and explain the effect of negative stereotyping on the academic performance of black students, especially in the context of standardized test-taking.

Anxiety about the stereotype creates cognitive stress; as a task becomes more difficult, people waste time and energy by focusing on the implications of the stereotype, potentially amplifying it. The concept has since become familiar across different levels of academia. The prevalent stereotype that Latinx and black faculty are less intellectually capable than their white counterparts makes faculty from these groups particularly vulnerable to the self-undermining effects of stereotype threat. As research has shown, low expectations don't need to be directly communicated to individuals to impair their performance (see Spencer et al., 2016); moreover, making different identities salient has different effects. Consider the following example provided by Stewart and Valian (2018): if Asian women are subtly primed with cues about their ethnicity, they experience stereotype lift, but if subtly primed with cues about their gender, they experience stereotype threat.

Stereotypes are but one of many cognitive shortcuts that people rely on to help manage the swirl of external stimuli; they are a natural way for human brains to work. When internalized, stereotypes may become building blocks for implicit bias, or what Stewart and Valian (2018) call schemas; when externalized and acted upon, they may become building blocks for microaggressions.

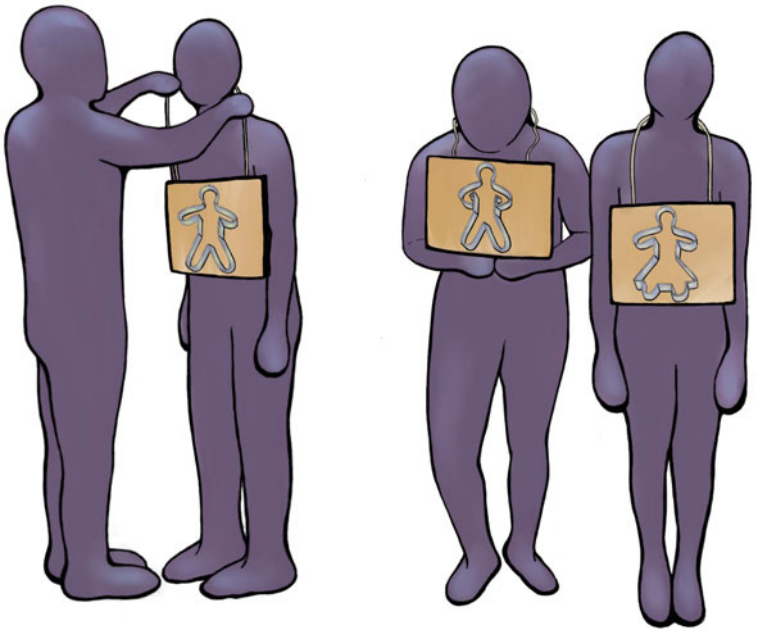

Fig. 5 Stereotyping and loss of self. Illustration by Meghan Crebbin-Coates

7.5 Implicit Bias

Closely linked to the concept of stereotyping is the concept of implicit bias, a subcategory of implicit social cognition. Implicit social cognition refers to thoughts and feelings outside of conscious intention, awareness, or control (see Greenwald & Banaji, 1995; Nosek & Greenwald, 2009; Nosek et al., 2011). When unconscious or subconscious thoughts reproduce stereotypes based on social-identity categories such as race and gender, we talk of implicit bias (Fig. 6). One common measure of implicit bias is the IAT—the Implicit Association Test, which measures subconscious beliefs by comparing how quickly we can make connections between items; for example, people very quickly link male names to the word "mechanic" and female names to the word "secretary," but not vice versa. Similarly, when presented with a random list containing masculine, feminine, and gender-neutral words and later asked to recall them, people would cluster the words by gender, sometimes even adding gendered words that weren't on the original list (Bem, 1981). The IAT reveals that when people have to make decisions quickly, virtually all of us revert to stereotypical thinking. Going against the grain of stereotypical thinking requires time for "shifting gears."

Of course, having thoughts is not the same as acting on them—possessing an implicit bias does not guarantee it will influence behavior. Yet we know that often it does.

One study showed that doctors with greater implicit racial bias were less likely to recommend an appropriate treatment for coronary heart disease to black patients than doctors with less implicit racial bias (Green et al., 2007); another showed that black convicted felons with stereotypically African features were more likely to receive death sentences than those without such features (Eberhardt et al., 2006). Studies have also revealed race and gender bias in the job application process. Bertrand and Mullainathan (2004) found that resumes with white-sounding names were 50% more likely to receive a callback for an interview than the same resumes with black-sounding names. Similarly, Moss-Racusin et al. (2012) asked 127 STEM faculty to evaluate resumes for a lab manager position that differed only in name—John versus Jennifer. Despite their identical qualifications, Jennifer was perceived as significantly less competent, less mentorable, and deserving of a lower salary than John. Consequently, had Jennifer been a real applicant, she would have faced a number of disadvantages that would have hindered her career advancement.

These are experiments, but real-world examples abound, too. Consider the "blind" orchestral audition. Shifting to blind auditions—where musicians play behind a large screen and their footsteps crossing stage are muffled by carpets or the removal of shoes—was meant to reduce bias, and it did, substantially increasing the likelihood that women would advance to the final rounds (Goldin & Rouse, 2000). Consider too, Kristen Schilt's research on transgender men (male-identified men assigned female at birth), who transitioned while on the job. The men reported getting more respect, better assignments, more opportunities for promotion, and higher evaluations after transitioning than before—but only if they were white. Transmen of color did not report such advantages (Schilt, 2006). There are countless additional examples of

gender and racial bias in the workplace, including in academic STEM fields vis a vis recruitment, hiring, evaluation, and promotion of faculty. Job advertisements, letters of recommendation, criteria for merit, interview protocols, and the like have all been rich data for challenging claims to objectivity and neutrality (for an excellent overview, see Stewart & Valian, 2018; see also Bilimoria & Lang, 2011).

Sociologically speaking, for women, the issue is not just implicit sexism (valuing men over women) but also implicit androcentrism (valuing masculinity, as a constellation of traits, over femininity, as a constellation of traits). Androcentrism helps explain why daughters who are tomboys are less worrisome to parents than sons who are "sissies" (Kane, 2012), or why women stereotypically associated with masculinity (such as "butch" lesbians) fare better in male-dominated construction jobs than do stereotypically feminine women (see Paap, 2006). "Too much" masculinity in women, however, is socially undesirable. Implicit androcentrism means that, for women as a group, "doing gender" is a balancing act: one has to embrace some aspects of masculinity to be perceived as competent and taken seriously, especially in the workplace, but too much masculinity—too much strength, assertiveness, or competitiveness—must be tempered with some femininity—deference, nurturance, empathy—in order to avoid censure and reassure everyone (oneself included, perhaps) that the gender order is still intact. Men, on the other hand, can get away with doing little or no femininity at all—although many men today reject this option, especially in relation to parenting. The balancing act creates a double bind for women workers, in that competence and femininity are seen as mutually exclusive.

The question then arises, if implicit bias is implicit—that is unconscious, subconscious, or semi-conscious, how can we overcome it? *Can* we overcome it? As Nosek and Riskind (2012) observe, simply telling people not to be biased won't prevent biased behavior if people don't recognize (a) they have biases or (b) their biases influence action. To complicate matters, believing that one is objective may actually *increase* the likelihood of biased behavior because, whatever the behavior, it is seen as stemming from a place of objectivity (Lindner et al., 2011; Uhlmann & Cohen, 2007). Although there is no sure way to eliminate implicit bias, it appears possible to reduce its incidence. The first step is to understand what implicit bias is and how it works—nothing can be accomplished unless we acknowledge it is real. Beyond that, strategies include exposure to counter stereotypes (Dasgupta & Greenwald, 2001); increasing motivation to respond without prejudice (Devine et al., 2002); following prescriptive standards that are meant to reduce bias (Johnson, 2003); comparing identity-conscious versus identity-blind evaluation strategies to ascertain whether implicit bias is a contributing factor; and ensuring a diverse group of evaluators, conceptualizing "diversity" in ways relevant to the evaluation (Nosek & Riskind, 2012).

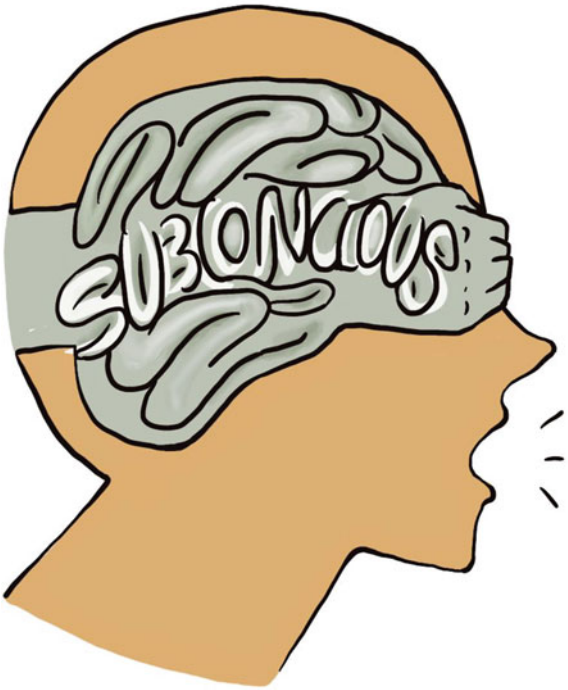

Fig. 6 Implicit bias: thoughts and feelings outside of conscious awareness. Illustration by Mengmeng Luo

7.6 Microaggressions

The study of microaggressions, like that of implicit bias, comes primarily out of psychology. Microaggressions are subtle forms of discrimination, often prompted by stereotypes consciously or unconsciously held, that communicate hostile, derogatory, or insulting messages to the target individual or group (Nadal, 2011; Hernandez et al., 2010; Sue, 2010; Sue et al., 2007); microaggressions, whether intention or unintentional, are "brief and commonplace daily verbal, behavioral, and environmental indignities" (Sue et al., 2007: 273). In effect, microaggressions are implicit biases made visible. They are so pervasive and automatic that they can be dismissed as innocuous or inconsequential, but they have real detrimental effects "because they impair performance across a multitude of settings by sapping the psychic and spiritual energy of recipients and by creating inequities" (Sue et al., 2007: 273; see also Franklin, 2014) (Fig. 7).

In their research on racial microaggressions, Sue et al. (2007) distinguish between microassaults, microinsults, and microinvalidations, each representing diminishing levels of "overtness." As the most overt, *microassaults* can manifest as verbal and nonverbal attacks, avoidance, or purposefully discriminatory action. Examples include using racial epithets, deliberately serving a white patron before someone of color, and displaying a swastika. *Microinsults* are rude or insensitive remarks that demean a person's racial heritage or identity—as when an employer asks a person

of color "how did you get your job?" (implying he or she isn't qualified and/or the job was not obtained meritoriously) or when a white teacher fails to acknowledge students of color in the classroom. *Microinvalidations* occur when a person negates or denies the thoughts, feelings, or experiences of a person of color—complimenting US-born Latinx or Asian Americans on their use of English (implying they are perpetual foreigners), or saying to a person or color "I don't see race," or "we're all just human," which invalidates the person's experience of racism in their everyday lives.

Gendered microaggressions tend to be either sexual in nature (comments about appearance or clothing) or aimed at challenging women's competence, capability, and motivation (comments expressing doubt about whether women can handle a task or assignment—also characterized in the sociological literature of "benevolent sexism.") Both forms tend to increase as the representation of women in a field or occupation decreases (Allan & Madden, 2006). Gendered microaggressions constitute subtle expressions of sexism that stand in contrast to what gender scholars call "hostile sexism," which is blatant—the use of harassments, threats, and violence to enforce women's subordination. Like overt racism, overt sexism is less socially acceptable today than in the past; it hasn't disappeared, however, but rather is driven underground and manifests in more subtle ways. As Basford et al. (2014) note, subtle discrimination creates the kind of uncertainty about perceptions of prejudice associated with anxiety and depression (see also Sue et al., 2008; Banks et al., 2006; Noh et al., 2007) as well as affecting job satisfaction and workplace commitment (see Foley et al., 2005).

Research shows that both racial and gender microaggressions tend to express certain themes of exclusion. Sue et al. (2007) identify eight different themes related to race, four of which are especially pertinent to faculty in academic settings: (1) ascribing intelligence on the basis of race, which disadvantages black and Latinx scholars relative to whites and Asians; (2) assuming color blindness/denying individual racism, which invalidates the daily, lived experience of racism; (3) believing the institution is a race-neutral meritocracy, which fails to see how the very criteria of meritocracy advantage dominant groups; (4) environmental messages of exclusion which preclude a sense of belonging, as when a department faculty consists mostly of white men, or all the buildings in an institution are named after white men.

Williams and Hall (2016), in a study gender bias experienced by female STEM faculty, identify four themes representing types of bias that hinder the advancement of women in STEM (they do not specifically use the term "microaggressions," but their findings are germane). The first theme is *Prove it Again*, in which women often have to provide more evidence of competence than men in order to be seen as equally competent. Here, women of color face a double jeopardy because their competence may be questioned on the basis of race and gender simultaneously. The second theme, *the Tightrope*, reflects the imperative that women balance the "masculine qualities" demanded of STEM scientists with enough femininity to avoid being perceived as too angry, assertive, or unfeminine. The tightrope is especially difficult for black women, who, historically, have been perceived as "naturally" less feminine than their white, Latinx, or Asian counterparts. The third and most common theme, *the Maternal Wall*, reflects the prescriptive bias that motherhood is incompatible with a science career;

having children is incorrectly assumed to derail women's commitment to rigorous scientific investigation, thereby impacting performance. Fourth, *the Tug of War* refers to the ways in which women may not support—and may even distance themselves from—other women, particularly if experiences of gender discrimination began early in their education or career. Although previous studies attributed this phenomenon to the personality characteristics of senior women, the authors attribute lack of collegial support to the overtly hostile workplace environments senior women were subjected to in the past.

Fig. 7 The cumulative impact of microaggressions. Illustration by Meghan Crebbin-Coates

8 Conclusion

Discussions of exclusion, positionality, stereotyping, implicit bias, and microaggressions are by now common features of many diversity training programs in academia. As mentioned earlier, social science and humanities scholars who have spent their careers studying the structural dimensions of social inequality are skeptical of the hefty administrative resources devoted to such training when their own research remains undervalued and underfunded. But unless STEM faculty have a liberal arts background or have deliberately taken it upon themselves to learn about systemic racism, sexism, homophobia, etc., a training or series of trainings on implicit bias or microaggressions might be the best or only exposure they get. Context also matters: academic faculty are generally committed to the ideals of diversity, equity, and inclusion in the workplace and they are generally motivated to realize these ideals. This commitment makes academia quite different from, say, law enforcement in the U.S., whose departments and agencies routinely incorporate implicit racial bias training into their protocols with little effect on stemming the tide of state violence against black and brown communities.

Race, gender, sexual orientation, and other social identity categories are not fixed or unitary. They are multiple and varied, and the identities they give rise to are linked to complex histories as well as contemporary experiences. Experiencing one form of discrimination doesn't prevent people from reinforcing other forms, any more than understanding one form of discrimination guarantees knowledge of another. Men of color, who experience racism, can be sexist; white women, who experience sexism, can be racist; heterosexual women of color, who experience both racism and sexism, can be homophobic; Asian or Latinx individuals can be anti-black, etc. Moreover, knowing about, and understanding, inequality doesn't automatically prevent discriminatory behavior, if certain biases are unconscious. Likewise, one can be consciously anti-racist in attitude and interaction while contributing to systemic racism.[5]

Interventions such as the NSF ADVANCE program are not panaceas to systemic social problems, nor are they meant to be. But incentivizing institutional transformation in the academy, in places where it is needed and in ways that faculty will accept, can make a difference. At the same time, as a feminist cultural sociologist, I hope university administrations will see the big picture, and consider programmatic diversity and inclusion efforts in STEM as complementary to and not a substitute for a comprehensive approach to transformation that supports those pockets of the university where the faculty are already both diverse and conducting important diversity-relevant work.

[5] Examples here would include putting your kids in private schools while public schools—which disproportionately serve black and brown students—languish from defunding and neglect; not objecting to the militarization of the police, which disproportionately affects communities of color; not advocating better wages for jobs and services that women and people of color disproportionately fill, including within the university.

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Making the Case for Institutional Change

Data-Driven Decision-Making

Sophie J. Barbu, Karen McDonald, Lisceth Brazil-Cruz, Lisa Sullivan, and Linda F. Bisson

Abstract Addressing barriers to inclusion requires understanding the nature of the problem at the institutional level. Data collection and assessment are both crucial for this aim. In this chapter, we describe two important classes of data: (1) data on diversity that define the potential nature of the issues at stake and the need for change, and (2) data on assessing the usefulness of new programs, processes, and policies in creating a more diverse institution. Both sets of data are important for effective decision-making. At the same time, data analyses can be challenging because issues of equity and inclusion are complex and determining the basis of comparison or the "ideal" diversity target can be difficult. Nevertheless, data gathering and analysis are critical to assess progress and to provide a basis for both accountability and efficacy. Moreover, the ability to document that a problem indeed exists will help justify the need for change and, ideally, spur corrective action.

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1 The Nature of Data Needed

Assessing barriers to inclusion in academia requires tallying numbers and advancement rates by group, but also using surveys and other vehicles to measure the sense of belonging, if any, felt by faculty from underrepresented social identity categories. The first step in assessing current levels of inclusion is to measure various aspects of diversity and inclusion at the institutional level. For ADVANCE grant awardees, the National Science Foundation requests data for faculty on gender that address the following four questions:

1. What is the distribution of science and engineering faculty by gender, rank, and department?
2. What are the outcomes of institutional processes of recruitment and advancement for women and for men?
3. What is the gender distribution of science and engineering faculty holding leadership positions in the institution?
4. What is the allocation of resources for science and engineering faculty by gender at the institution?

Expanding these questions to other underrepresented identities requires accurate measurement of current information on these identities. Ideal or target diversity is often linked to the diversity of the general population in the region served by the institution. Underrepresented minorities, or URMs, are identities with lower percentages in an analyzed population as compared to the general population. The expectation is that, if no barriers to inclusion existed, the percentages of identities across all sectors of society would be the same. Collecting data within a subgroup can also reveal systemic bias if identities are well represented at lower levels but underrepresented in leadership positions. Further, equity of salary and resource allocation can uncover bias if certain identity categories tend to have greater or lesser access to resources. However, several issues with the collection of such data and can affect the data's validity.

2 Issues in Data Collection, Management, and Assessment

Ideally, data are collected with a specific question in mind, but in reality the nature of the available data often drives which questions can be asked. At the institutional level, databases may be designed with a specific intent that does not necessarily align with the goal of measuring aspects of diversity and inclusion. Consequently, the limitations of the data need to be understood and considered in a study's design. Other issues with data include the unintentional introduction of bias, such as in choice

of categories or in the nature of the inquiries made. For example, in the specific case of measuring diversity and inclusion, diversity is only representable by the categories actually made available. Categories are often thought to reflect identities, but those identities may in fact derive from societal constructs and may not represent the breadth of diversity that exists within a given community. In addition, it is often difficult to interpret the meaning or significance of differences found among different identities without knowing the specific context or the metadata. For example, start-up packages for a new faculty member are difficult to compare directly without knowing the specific situation of the new hire, such as availability and access to existing research equipment, versus the need to invest in a new area. Differences in the number of questions that women or URM faculty candidates are posed during their job interview could represent either higher interest and enthusiasm for the presentation or a questioning of the candidates' expertise.

2.1 Qualitative Versus Quantitative Approaches

Both qualitative and quantitative approaches provide us with important information. However, the types of information these methodologies yield are different and therefore lead to different discoveries.

Quantitative research is concerned with unveiling facts about a particular phenomenon. Through the use of numbers, this method assumes a fixed reality, which can be measured. Therefore, this method allows us to answer the "*what*" questions. This research method is often used to test a theory in order to support it or reject it. Further, this allows for researchers to control for extraneous variables. Methodologically, data are collected through the use of instruments that help measure items, such as surveys. These data are then analyzed through statistical comparisons (Fig. 1).

Qualitative research, by contrast, is concerned with understanding social phenomena from the perspective of the research participant. It aims to understand the social reality and lived experience of participants by focusing on the "how" and "why" questions of a particular context. Qualitative research is an umbrella term covering a range of methods, though all involve an interpretive, naturalistic approach to their subject matter (Denzin & Lincoln, 2000). Data may be collected through participant observation, interviews, or focus groups, among other methods. The data may then be coded and analyzed thematically. Most important, data reflect the perspective of the participant as documented and narrated by the researcher. Qualitative researchers often do not hide or deny their own identities, social commitments, or perspectives, and may even consider them resources enabling the research process (Fig. 2).

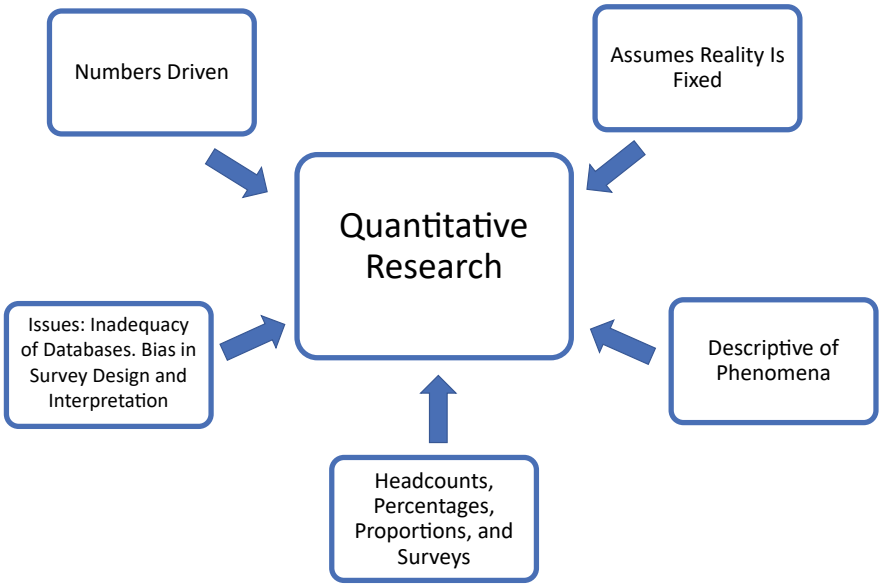

Fig. 1 Quantitative assessment of data

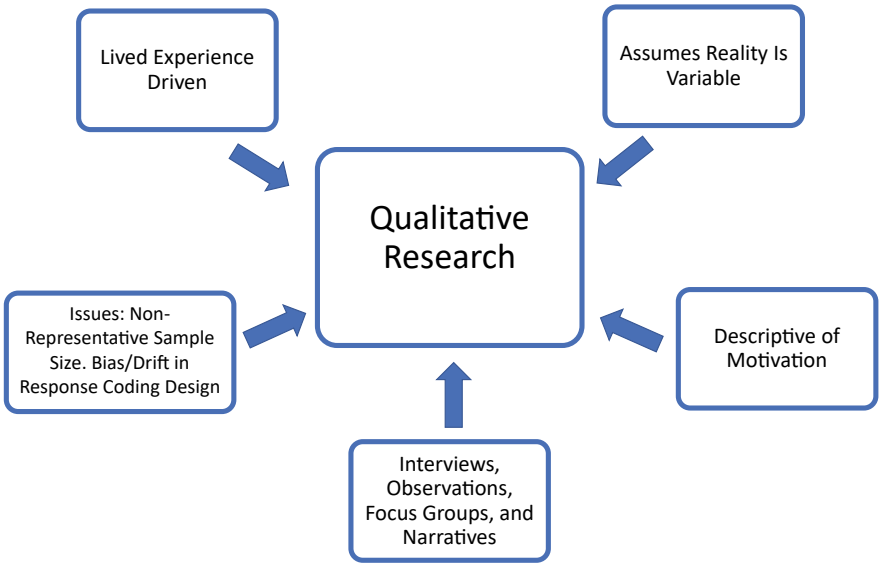

Fig. 2 Qualitative assessment of data

2.2 Data Collection Issues

The questions asked and the type of data gathered will affect how data are interpreted. For example, if a primary data variable is race and if racial data are collected, then conclusions will be viewed through a racial lens and race will be the most important factor driving the analysis. Ease of measurement and accuracy of measurement are also factors in data collection design. Race is defined in the U.S. largely on the basis of physical features such as skin color and therefore is assumed to be readily determined but in fact has low value in defining groups with shared values, experiences, and beliefs. Ethnicity is used to define groups with a common culture or nationality and can reflect shared values and traits. However, ethnicity is actually fluid, as well; subcultures, such as those in rural or urban areas, may affect how ethnicity is expressed. Therefore, the process of categorization of data collected is highly problematic, as it tends to create artificial groupings that may not accurately reflect differences among individuals and may reinforce stereotypes. Equally challenging is defining the ideal forms "diversity" should take or the end goal of inclusion. Several other issues can have an impact on data interpretation.

2.2.1 Categorization

A primary issue in measuring diversity is the process of categorization. Data on identity are based on categories used by the U.S. government, as defined by the United States Census Bureau. Individuals are asked to self-identify by selecting from a list of identity categories but individuals who select a given category may only marginally self-identify with it. The process generally provides only one to three options, typically in terms of race, gender, or age, which may or may not be central to self-identification from the individuals' perspective.

Data are often collected on race from a list of options; depending on the questionnaire or form, multiple races can sometimes be reported by an individual. "Race" has long been established to be socially constructed. There is no biological basis for characterization by race as it is largely defined on the basis of skin color, hair texture, or facial features. Sex and gender are largely reported as binary, men/male or women/female. Likewise, typically only two classifications of ethnicity are listed: Hispanic/Latino or not Hispanic/Latino. These categorizations, of course, do not represent the spectrum of identities that exist in society. Some faculty also expressed concern with categorization by surname. Individuals with Hispanic-sounding surnames, for instance, were included in the "Hispanic" category whether they identified ethnically with that category or not (see the Chapter, 'Assessing Institutionalized Bias').

Aggregation of individuals in categories can obscure discrimination of subgroups. For example, "Hispanic" is defined by the U.S. Census Bureau as "a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race." The definition states that "Hispanics can be of any

Fig. 3 The challenge of category selection. Illustration by Meghan Crebbin-Coates

race, any ancestry, any ethnicity." This would include individuals from Europe and Spain. In 2016, 17.8% of the U.S. population was Hispanic/Latino but only 3.6% of engineering faculty nationally identified as Hispanic (Arellano et al., 2018). A deeper analysis of the national data showed that of the roughly 600 faculty members in this category, only 48 were born in the United States. Thus, barriers to inclusion for native-born Hispanics may be stronger than those for foreign-born members of the same designation. As a result, aggregation of data into a single broad category can obscure the accurate assessment of bias.

Finally, the selection of identity categories itself can confound assessment of the true nature of the barrier to inclusion. Underlying barriers to inclusion may be more complex than the identity categories provided (race, gender, or age), and may also involve factors, such as privilege, access, and socioeconomic standing (Fig. 3).

2.2.2 Defining "Ideal" Diversity

Another issue with data collection centers on the felt need for an "ideal" to exist, as defined in relation to diversity and inclusion efforts as the absence of discrimination. This ideal end-goal guides data-driven decision-making but poses a problem because we do not currently have a clear outcome goal, except to increase diversity and

inclusion for underrepresented minority groups. Often the term "underrepresented minority" is meant to refer to a single identity (race), so issues unique to intersectional identities (identities held by persons of "mixed race" or women of color) can be overlooked, as can the influence of additional factors besides race when race is the only metric. In other words, use of a single identity category can ignore the impact of more-complex interactions. It also assumes that lack of "seeing self"—that is, individuals of the same, specific, defining identity—is the main obstacle to achieving the desired level of diversity.

Use of overall population demographics may not be practical if there are intersecting factors such as age and race, with race percentages varying by age groups. Also, nationally aggregated data may not reflect local employee pool demographics. For example, with respect to faculty hiring, the diversity of the national pool of doctoral degree awardees rather than of the general population is often used to assess possible bias in hiring. But it may be easier to diversify an institution that is situated in a more-diverse community than to diversify one in a non-diverse region.

2.3 Data Management Issues

In analyzing our institution's own data on diversity, especially with respect to the questions raised by the ADVANCE data assessment tool kit listed above, we discovered several local issues with data management that are important to address. We discuss these below.

2.3.1 Decentralization

At UC Davis, various administrative units have been charged with collecting demographic, hiring, and personnel data. This decentralization has led to variations in how data were collected and categorized. For example, some departments span colleges; as a result, in some cases the department is considered to be fully in one college but in other cases is considered fully in the other college. This leads to a difference in numbers of total faculty within units.

Often the specific units had their own goals in mind for data collection, so the process of collating data across units to address broader issues was challenging. For example, data on recruitment and advancement are categorized demographically, but data on start-up packages and space allocations are not. Therefore, it was tough to address question 4 above (related to resource allocation), and to weigh the potential for gender bias (or other types of bias) in resource allocation. Some data are held locally, within a college, and conventions used for data collection and categorization may differ by unit if the data are to be evaluated within the college. Units typically develop their own unique sets of questions they are trying to address, and merging these datasets can be challenging. We also discovered that personnel involved in data entry at the college level are not trained centrally to process data in a consistent

manner. Therefore, categories used for data tabulation were interpreted differently between colleges.

2.3.2 Aggregation Algorithms

Another issue with data management concerns how the data are aggregated to avoid identification of specific individuals. This can be done by grouping smaller units into larger ones, but one problem with this approach is that it can obscure local, department-specific problems. For example, gender parity varies across the STEM departments, and combining data from more-diverse larger units with less-diverse smaller ones may conceal a problem that is primarily local.

We also identified problems generated by the attempt to re-create data sets from original data. It was not clear how algorithms that aggregated data had been designed, and when individuals responsible for those algorithms leave their positions, the knowledge of aggregation procedures may be lost. In addition, datasets are inherently dynamic, so a "snapshot" taken at one point in time during the academic year can differ from another point in time. Rolling, multiyear averages are sometimes used to smooth out fluctuations, particularly in cases where small numbers would likely allow identification of specific individuals. Yet data obtained using this approach are particularly difficult to validate or confirm in retrospect.

2.3.3 Use of Terms Open to Interpretation

A final issue with data management is the use of terms open to interpretation. When combined with decentralization and lack of consistent training of data entry personnel, the same terms can be used differently. For example, the term "involuntary separation" was originally thought to mean termination for cause. With respect to faculty, this would suggest a failure to obtain tenure or to advance in rank, or perhaps the negative outcome of a misconduct charge. However, we learned that one unit used this category to document separations due to illness, when in fact that should be its own distinct category.

We also noted differences in data entry practices. A high-interest category is "retention" and the reasons faculty give for leaving a position, especially faculty in underrepresented identity categories. We learned that if faculty members did not select a reason from a predetermined list, the data entry personnel made a "best guess"—which could be wildly incorrect. It is important to understand the actual trends in retention failures. Individuals leave for many reasons: to accept a better offer (salary, position, or resources) at another institution; to better match the partner's career goals or family-of-origin needs; to resolve dissatisfaction with their current position, which may require leaving academia altogether. This latter reason is more important than the others in evaluating the inclusiveness of a campus climate.

2.4 Data Assessment Issues

Analysis and interpretation of data can be truly challenging. Categorizations of individuals have changed over time, and individuals who initially responded to categories under an older system might not respond the same way with a more-expanded set of category identifications. Cohort issues may also span changes in policy or practice. Prior to the 1996 passage of California Proposition 209 (the "California Civil Rights Initiative"), several affirmative action programs were in existence at UC Davis and drove diversity goals. These programs were terminated after the proposition was passed by the state. Cohorts hired under these different sets of conditions may therefore vary in how they are "counted" with regard to measures of diversity.

An analysis of University of California faculty salary equity, made in 2014, found that faculty hired before that year had lower current total and off-scale salaries, had been appointed at lower interval steps, and had lower off-scale salaries at the time of hire. Salaries of more recent hires were higher because of greater competition for candidates and cost-of-living adjustments. Time of hire was a more important factor than gender, race, or ethnicity. There was no connection seen between advancement through the ranks and salary equity, suggesting that faculty who sought outside positions to bolster retention efforts (including garnering off-scale salary) was more a determining factor in salary inequity than in the programmatic impact of the individual. However, the campus administration considered the incidence of salary inequity minor and not associated with either gender or URM status, indicating that no systemic bias was in play, possibly due to the prior existence of salary equity review for all advancement actions.

3 Uses of Data

Diversity data are collected and rigorously examined for four principal reasons:

1. It is vital that faculty members know their own situation and how over- or under-represented they are in terms of diversity goals. It is also important to assess diversity along the entire academic path—undergraduate, graduate, and postdoctoral—leading faculty positions, so as to learn where the blockage or barriers to inclusion arise. If undergraduate majors display the same demographic percentages as the general population but graduate school enrollees do not, then a barrier may exist at the point of application or acceptance into graduate school; or there may be other, unidentified reasons or incentives for graduates to pursue other paths. In many cases, rather than doing a comparative assessment of general population demographics, a comparison to Ph.D. graduate demographics might reveal more about problems with faculty hiring. If, for example, Ph.D. graduate and junior faculty demographics are similar, then we can reasonably conclude that the issue with lack of representation occurs not

at the point of faculty hiring but at the point of retaining diversity in graduate programs.

2. Data are important drivers first for educating the community served by the institution and then for making the case for change. Campus data demonstrated that bias was indeed operating at the point of hire for URM scholars, because the demographics of various pools of interviewees did not match the demographics of actual new hires. These data were vital to justifying the need for mandatory training in implicit bias. Comparing data across the faculty career spectrum can identify the different points at which bias may come into play. Our data suggested that, once hired, there was no disadvantage to any particular group during advancement, meaning the major barrier is indeed at the point of hire. Retention data suggest that there may be some differential loss of URM scholars. However, this seems to be a result of recruitment away from the institution by other institutions, rather than a lack of equity in offering retention packages.
3. Data are important for assessing the effectiveness of programmatic change. Surveys of the social climate for inclusion conducted both before and after the implementation of new policies and practices can define the most successful interventions as well as the best practices for creating a more inclusive climate. Our initial COACHE survey identified mentoring as being a deficiency in creating supportive academic cultures. Several programs, such as the LAUNCH program for new faculty (described in the Chapter, 'Making Visible the Invisible: Studying Latina STEM Scholars'), were initiated at the start of the ADVANCE grant. The follow-up COACHE survey at the end of the grant period showed measurable increases in satisfaction with mentoring.[1]
4. Finally, data enable more astute comparisons to programs in other institutions. Comparison institutions are, by definition, similar in research status and size of faculty. Identifying institutions and comparing self-assessments of diversity can determine those with better (or worse) track records, and, in turn, which information can be used to define and refine best practices for creating more inclusive campus climates.

4 Assessment of Program Effectiveness

Equally important to generating initial data is the measurement of the effectiveness of changes made to enhance inclusion. It is critical that such measures be designed and gathered by an outside group or evaluation team. This prevents bias in interpretation of the findings that might arise if individuals with a vested interest in the outcome were responsible for data interpretation. Also, use of external evaluation can serve to encourage participation in the review process by ensuring the anonymity of the responders.

For the ADVANCE grant, we engaged both external and internal evaluators. The external evaluator reviewed survey data and conducted interviews with individuals

[1] COACHE stands for the Collaborative on Academic Careers in Higher Education.

and administrators on campus to help provide an independent assessment of the effectiveness of programs aimed at increasing diversity, equity, and inclusion.

The internal evaluation team, composed of evaluators in the UC Davis School of Education, was independent of the ADVANCE group. They came on board at the very beginning of the grant to help guide the institutional change framework and to align both impact and outcome measures with grant goals. The internal evaluation team worked independently of and collaboratively with grant leadership to document implementation activities, successes, and challenges. The information gathered through the program evaluation was used to refine and adjust grant activities and to gauge outcomes.

Evaluation activities included surveys conducted of attendees at ADVANCE events to assess the impact of the event in terms of the delivery of information content as well as individuals' sense of belonging. The team also evaluated the impact and effectiveness of training in implicit bias through surveys of participants. This survey information was vital in showing the effectiveness of the program and was used to make adjustments to content. The internal evaluators also provided an independent assessment of the COACHE surveys on faculty job satisfaction. Finally, the external evaluator conducted interviews of key stakeholders and participants, particularly with respect to new programs offered to bolster a sense of belonging at the institution. Such third-party interviews are important in assessing program effectiveness.

5 Key Findings from Internal Evaluation

The internal evaluation team documented the success of new policies and practices as well as ongoing challenges. Most important was the documentation of the impact that implicit bias training had on all members serving on faculty search committees. Surveys were conducted after each Strength Through Equity and Diversity (STEAD) training. Collation of the data indicated high degrees of satisfaction with both the program and its content. The comments section invited respondents to indicate which methods or content worked well, and comments were used to refine the training. The team was also able to document increased mentorship and support of Latina faculty, greater job satisfaction, and an increased sense of belonging as some of the consequences of newly launched mentorship programs. The data on reported satisfaction with these programs justified their continued support. It is essential that such evaluations be conducted at arm's length by knowledgeable people with no vested interest in the outcome.

The evaluative assessments also revealed the following:

- In general, the lag time between new policy implementation and impact makes it challenging to measure immediate impact.
- If multiple processes are changed simultaneously, it can be difficult to know which one or ones had the greatest impact.

- It is difficult to sustain momentum for change under new leadership, if individuals feel uncertain about the new leaders' goals and priorities.
- Attempting to measure the inclusivity of the local campus culture climate can be challenging if specific colleges or departments have attracted few individuals belonging to underrepresented minority groups. Individuals from such groups might be dissatisfied with the local social climate but feel uncomfortable providing feedback.
- The impact of new policies and practices on campus climate among members of underrepresented identity categories can be difficult to determine over a short time span and may not be immediately measurable.

The surveys underscored the impact that mentoring can have on new faculty members' sense of belonging and ultimate job satisfaction, and also supported the continued use of LAUNCH committees. Such committees are composed of three to five senior faculty members, some of whom come from other departments than the new hire. These committees are an effective sounding board and a valuable source of advice to all new hires. More important, the committees represent a commitment to the success of the new hire, which in turn will bolster an authentic sense of belonging in academia.

6 Conclusions

Meaningful data are essential to making the case for institutional change, defining the changes needed, and assessing impact. Data, especially from surveys, can define the points in the recruitment and retention process at which barriers to inclusion exist. Data collection is essential for identifying the most successful interventions that enhance inclusion. In our case, by far the most successful tool was the development of STEAD training in implicit bias. Implicit bias was neither generally known as a phenomenon nor understood as having a negative effect on recruitment practices; this has changed as a result of the training implemented. Another summary observation is that some data are challenging to obtain in a usable format, so the campus is committed to greater centralization of data so they can be both more robust and more useful in decision-making.

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Assessing Institutionalized Bias

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Abstract Ideally, higher education systems are meritocracies in which advancement or promotion is based on demonstrated accomplishment and scholarly impact. "Merit" is believed to be associated with innate intellectual ability, dedication to learning and knowledge generation, mastery of a field of study, and recognition by others of comparable training and academic standing. Evaluations of accomplishment are dutifully (and often wishfully) believed to be wholly objective despite an abundance of evidence to the contrary. Unfortunately, implicit bias and other barriers to inclusion are pervasive within meritocracies. For members of marginalized groups, their social identity may diminish how their accomplishments are perceived and valued; conversely, the accomplishments of those with privileged identities may be over-valued. Moreover, what counts as "valuable" is itself not objective or neutral but rather reflects socially-constructed and culturally-specific priorities. Because academic merit and reward systems, as well as local cultures, can intentionally as well as unintentionally reinforce and hence perpetuate bias and barriers to inclusion, one of our UC Davis ADVANCE initiatives centered on review of all policies and practices affecting faculty advancement. We appraised the potential for bias in hiring, promotion, progression, and retention of faculty. We also evaluated the importance of culture in replicating barriers to inclusion.

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1 Assessing the Potential for Institutional Bias

Any evaluative process can reflect systemic bias and inequity. This is particularly true for assessments of accomplishment and merit. Perceptions of "quality" are often subjective. Belonging to a privileged group can lead to the unconscious phenomena of the "halo" and "Matthew" effects. First coined in 1920 by Thorndike, the "halo" effect refers to the tendency to associate a positive initial impression with favorable assessment of other unrelated traits in the evaluation of merit or accomplishment—the notion that the "good get better." For example, Thorndike (1920) noticed the strong trend to link physical attractiveness to positive assessments for other qualities like intelligence and leadership, even when the latter were not supported by evidence. A related phenomena occurs when first impressions influence "objective" evaluation of merit (Liao, 2020) or the awarding of disproportional credit (Merton, 1968). This is known as the Matthew effect—"the rich get richer." In the sciences, this is seen in the evaluation and rewarding of grants (Liao, 2020), and in the assessment of relative merit in collaborative research and other activities (Merton, 1968). The Matthew effect leads to a cumulative advantage as academic capital begets academic capital (Merton, 1988). These twin phenomena come into play during seemingly objective assessments. In practical terms, people from historically underrepresented groups may be seen as playing a secondary role in their own creative activities.

One of the programs of the UC Davis ADVANCE grant was the formation of the Policy and Practices Review Initiative (PPRI). The PPRI's goal was a thorough assessment of practices surrounding faculty hiring and promotion to determine the points at which systemic bias, inequity, or inequality might be operating. Processes for faculty appointment and advancement are described in the Academic Personnel Manual (APM), which memorializes systemwide policies used across the University of California's ten campuses. Individual campuses also have additional local procedures described in policy, (for example, APM UCD-210 and 220). Changes to either local or systemwide policies require review by the UC Davis Division of the Academic Senate. This codification provides transparency of overall expectations of faculty. In addition, many colleges and departments on any given campus have their own practices or procedures that vary slightly, but must remain consistent with both the systemwide and local policies. At UC Davis, changes to either local or systemwide policies require review by the UC Davis Division of the Academic Senate. This codification makes transparent overall expectations of faculty.

Before undertaking their work, members of the PPRI conducted an extensive review of practices and policies at other comparative institutions. We also participated in campus implicit bias training, because interpretation and application of policies can themselves introduce bias. We collectively read and discussed the National Science Foundation report on bias, and reviewed other publications regarding bias

in academia (Stewart & Valian, 2018; National Academy of Sciences, National Academy of Engineering & Institute of Medicine, 2007; Valian, 1998). The more we learned about the nature of barriers to inclusion, and especially about the neurobiology of bias, the more we realized that it is impossible to create policies that absolutely preclude bias. Rather, the subjective dimensions of seemingly objective assessments need to be acknowledged, understood, and limited in influence.

To assess the potential for bias, we created a comprehensive master grid that categorized policies by type of action—recruitment, advancement, or retention, plus workplace climate. We evaluated policies with an eye to determining whether they presented a barrier to inclusion. We also evaluated policies for the potential insurgence of implicit bias and other unconscious forms of prejudice that might negatively affect faculty advancement.

In addition to assessing existing policy, we evaluated faculty perceptions of hiring and advancement processes by holding a variety of meetings, including workshops, interactive roundtables, focus groups, public symposia, and one-on-one consultations. We also evaluated existing faculty surveys to further assess perceptions of bias in faculty advancement: the Collaborative on Academic Careers in Higher Education (COACHE) Faculty Job Satisfaction Survey, the UC Campus Climate Survey, and the UC Davis New Faculty Survey. We shared findings and held discussions with the appropriate Academic Senate Committees, and we hosted systemwide roundtables to facilitate discussion of findings and observations.

Armed with this array of information, the PPRI created a draft set of formal recommendations. These recommendations underscore how bias operates even in institutions perceived to be objectively meritocratic. Bias is learned but often unconscious, which makes understanding the processes that enable it all the more important. Bias can arise at any stage of evaluating (and consequently rewarding) merit.

2 Challenges in Assessing Policy

Determining whether a specific policy or its wording sustains bias or reinforces institutional exclusion is difficult if not impossible—the very nature of implicit or unconscious bias makes it difficult to guard against in policy formulations. How do you foreclose what is unconscious? Compounding the challenge are the criteria guiding faculty hiring and advancement, which can be vague, subjective, and open-ended. Consider "excellence"—the foundation of academic success. What is being valued under the rubric of excellence? How do you quantify/measure it? Who decides which achievements constitute excellence? When is an "excellent" performance excellent enough to warrant reward? The concept of excellence varies by field and is influenced by both local and societal-level definitions of achievement; moreover, recognition of excellence can be modified by the perceptions of others. Methods for quantifying excellence, such as citation-based measures, publication records, and external letters

of evaluation are potential vehicles for activating implicit bias. It is important, therefore, to understand the social contexts in which the concept of excellence is invoked and how it is operationalized. Transparency and consistency are essential here.

Regents special orders SP1 and SP2 (passed in 1995 and rescinded six years later) required that state university admissions and hiring processes depend heavily on quantitative assessments of merit—for example, test scores and grade point averages—under the assumption that such metrics were more equitable because more objective and less prone to bias. However, decreased diversity in the wake of these measures indicates the problems associated with trying to codify complex social issues. "Objective" measures that rely on access to resources (and therefore reproduce privilege) can in fact increase bias and barriers to inclusion by ensuring that privilege is a criterion for achievement.

2.1 Is It Bias or Choice?

The belief that merit assessment is objective posed a challenge during our review of institutional policies and practices. This, in combination with the unconscious nature of implicit bias, makes it difficult for evaluators to recognize, much less acknowledge, the subjective quality of their own assessments. Data clearly show the under-representation of specific identity categories throughout academia—for example, women and men of color. But is that under-representation due to marginalization and exclusion and/or being dissuaded from pursuing academic careers, or is it a matter of choice? Are members of these groups simply more likely to choose different, preferred career paths?

Such questions have plagued academia for more than half a century, often with regard to gender (Bernard, 1964; Rossi, 1965). For example, do women with children avoid academic careers simply because they prefer other work or because a family-unfriendly academic culture subscribes to an "ideal worker norm"? (As discussed in the Chapter, 'Barriers to Inclusion: Social Roots and Current Concerns', this norm assumes an employee unburdened by family obligations and completely devoted to paid work—a norm with a clear gender bias, given that women are disproportionately responsible for domestic labor and rarely have the luxury of being so single-mindedly focused). Arguably, the gender bias of the ideal worker norm is more explicit than implicit; what is implicit is the unconscious or subconscious accompanying belief that men are more dedicated to work than women because dedication is a masculine quality.

Teaching faculty about implicit bias and how it works, relying on data-driven research about bias, is critical for challenging the assumption that academic policies and practices are necessarily objective and meritocratic. As the faculty we consulted learned more about barriers to inclusion (including implicit bias) and their impact on hiring and advancement decisions, they increasingly recognized the limitations of seeing racial and ethnic homogeneity in the workplace as matter of choice. This is consistent with the findings and recommendations of Stewart and Valian (2018).

We therefore cannot emphasize enough the importance of data-driven training in addressing implicit bias, and the necessity for the consistent use and improvement of institutional data gathering so this kind of research can be conducted.

2.2 Policy Interpretation

Policy implementation has four components. First, policies have to be created and written down. Second, the intent of that wording has to be interpreted. Third, the policy has to be put into practice or implemented. Fourth, it has to be received/experienced by real people in real settings. In academia, often the various tasks associated with policy creation, interpretation, implementation, and reception are undertaken by different individuals representing different constituencies. As a result, the policy may not work well or consistently or as intended. For example, in a discussion we had with postdoctoral scholars about work-life integration and career choice, participants pointed out that institutional policy discourages childbearing during the postdoctoral years. We were surprised to hear this, as we weren't aware any policy with that intent. As evidence, they cited the policy that discouraged part-time appointments for postdoctoral fellows:

> Postdoctoral scholar may request appointments for less than 100% time (total of all appointments) for one of three reasons: health, family responsibilities or external employment. The postdoctoral scholar and the PI (Principal Investigator) must complete a memorandum of understanding regarding the responsibilities and duties to be expected.
>
> —https://grad.ucdavis.edu/postdoctoral/appointment-promotion

This policy was created to ensure that part-time appointments did not have the same expectations as full-time appointments. However, postdoctoral scholars who wanted to start families saw the need to secure formal administrative approval to shift to part-time status as problematic. They felt the policy served to document a lack of commitment to their career, which was never its intent. A challenge in any policy assessment is to fully understand the ways in which a policy's wording is interpreted, which may or may not match the intended meaning. A given interpretation may be "incorrect" from the point of view of the policy's makers, but even if the "true" intent is made known to those targeted by the policy, the policy can have negative effects or be perceived as having negative effects.

2.3 Influence of Local Culture

Another challenge with policy assessment arises from differences in interpretation and application by the entities charged with enacting the policy. In academia, departments are responsible for faculty review in hiring and advancement. Departments

are organized around the delivery of a curriculum and are generally limited to sub-disciplines. Departments develop their own local culture—the synthesis of values of the institution and the discipline, along with the shared principles and goals of the department faculty, students, and staff. With respect to policy implementation, local cultures may differ from one another: in interpretation, in the level of transparency of review and criteria for advancement, in the degree of faculty consensus before voting on appointment or advancement, and in the nature of the department's overall climate.

2.3.1 Interpretation

The local culture of a unit affects how policies are interpreted and implemented. Policies, particularly those associated with faculty evaluation and advancement, deliberately allow for flexibility in interpretation to enable the wide diversity of academic disciplines in a research-intensive university such as UCD. The language for assessing intellectual merit for the purposes of hiring and promoting faculty is as follows:

> Superior intellectual attainment, as evidenced both in teaching and in research or other creative achievement, is an indispensable qualification for appointment or promotion to tenure positions.

What constitutes "superior intellectual attainment" will vary by field, and thus is open to interpretation by local academic units. How is "superior" defined? Who has ultimate authority for determining if superior attainment has been achieved? This is a qualitative assessment in which phenomena like the halo and Matthew effects may play a role. In some fields, intellectual attainment is assessed solely in the context of the individual's accomplishments, and collaborative efforts are not highly valued, while in other fields, collaborative achievements are recognized as equally valuable. The required use of external evaluators in promotion actions can serve to anchor local unit interpretations within that of the field, but external evaluation may involve individuals who have not gone through the same implicit bias training as UCD faculty. Review of actions by centralized or campus-wide faculty peer committees can also ensure that local interpretations of intellectual attainment are in line with those of the general campus. The absence of such practices can lead to divergence across units in what constitutes "merit." University policy also allows flexibility in valuation of the four areas of faculty work: (1) teaching, (2) research and other creative work, (3) professional competence and activity, and (4) university and public service, with a leitmotif of reward for diversifying activities in these areas. Local units can disagree, for example, on whether one's service and diversifying activities should be recognized as "superior intellectual attainment." In our discussion with groups of faculty, several individuals pointed out they deliberately limited their discussion of service in advancement materials. They cited activities such as mentoring of junior colleagues and support of student activities and groups outside the classroom

as counting against them in evaluation. For them, intellectual attainment appeared easier to quantify and demonstrate in the other three areas of evaluation.

2.3.2 Transparency

Local cultures may also differ in the level of transparency about judgments of "superior intellectual attainment." Academic Senate Bylaw 55 (https://senate.universityofcalifornia.edu/bylaws-regulations/bylaws/blpart1.html) allows departments to limit participation in advancement actions to individuals at the same rank or above that of the faculty being evaluated. In practice, this means that assistant professors may or may not see what a successful case for promotional advancement looks like, as this would entail seeing the records of their more senior colleagues and participating in the discussion of what aspects are valued, as well as how policies are interpreted. This can be especially challenging with regard to service and diversity activities because the criteria for advancement in these areas are less clear than for research. Changing department rules on voting procedures in such cases can only be modified by a two-thirds vote of a department, thereby preferentially empowering the more senior faculty, potentially at the expense of more junior faculty. Faculty surveys show divergent views about the preferred level of transparency surrounding advancement actions within their own units.

2.3.3 Climate

The climate of a local culture, meaning the collective values, perspectives, and inclinations of the members of the unit, can also affect policy application. For example, UC Davis, like many other institutions of higher education throughout the country, has a policy of allowing extensions to the tenure clock for the birth or adoption of children. When we started our work, existing policy required new parents to request an extension of the tenure clock via their department chairs, which was then approved by the Vice Provost for Academic Affairs. Our data indicated, however, that many eligible faculty members made no extension request. At a meeting of department chairs we asked how many encouraged their faculty to take advantage of extending-the-clock policies. Roughly half said they either provided no advice or actively discouraged taking advantage of the extension.

Initially we thought these departments were not supportive of work/life balance polices, however, chairs who discouraged their faculty from extending the clock pointed out that, in their disciplines, the competition for external funding is so intense that any slowdown in one's publication record reduces competitiveness and leads to long-term negative effects on career advancement. Recognizing the need to maintain competitiveness while also rearing young children, these chairs described department cultures that focused on integrating work and life without recourse to the formal extend-the-clock policy. In follow-up discussions, faculty in those units described a suite of practices, attitudes, and accommodations that enabled work and family

integration and thus that sustained productivity in all four areas of assessment. For example, faculty highlighted the following: more flexible work schedules, the selection of child-friendly spaces for meetings, child-care during meetings, the option of online meetings, flexibility in online versus in-person teaching, being able to care for infants in an office, and avoiding scheduling meetings or receptions during times critical to picking up children from daycare. In effect, such units developed a work-around to the university-wide policy that accomplished much the same goal. This is not to suggest the original policy was unnecessary or ineffective, but that local field- or department-specific cultures affected whether and how it was used.

2.4 External Drivers of Policy Interpretation

If winning outside funding to maintain competitiveness is indeed an expected metric of "superior intellectual attainment," this raises the issue of external factors affecting policy interpretation. Even in fields where extramural support is not the norm, external pressure for creative output—articles, books, performances and exhibitions, etc.—to maintain competitiveness can be intense. Are the requirements for advancement consistent with the resources already provided or with those that may be available? Teaching is another potential factor; teaching loads are driven by student enrollment numbers, and the relative value of teaching versus research may be affected by time dedicated to teaching. In our case, this was particularly evident when we evaluated letters written by external reviewers that downgraded the level of research or creative activity if teaching loads were not similarly high at their own institution. In other words, if the teaching load of the faculty member being evaluated was lighter than that of the colleague writing the letter, the latter expected comparatively higher research/creative output. We also read letters that faulted a candidate for "too much teaching" and, oddly, what was called "too much effort in teaching." Moreover, the local culture of the external reviewer may influence how they perceive the candidate's accomplishments, as can potential implicit and explicit bias on the part of the reviewer.

2.5 Practices Outside of Policy

The existence of practices outside of policy and approved procedures poses another challenge in policy assessment. For example, the evaluation procedures for faculty advancement are clearly described in both the system-wide and campus-specific Academic Personnel Manual (APM) documents, but in the late 1990s, faculty complained that the UC Davis Committee on Academic Personnel (CAP) was including evaluative criteria outside of policy. A task force was then formed to review these complaints. It learned that a small number of departments had developed a practice of encouraging individual faculty to communicate directly with members

of CAP to influence the advancement of a colleague. Although the practice was not widespread and although it was not clear that such communications impacted CAP's recommendations, policies governing individual communication with CAP were subsequently implemented.

The task force identified an additional problem: review committees were sometimes including in their evaluation process external information outside of the official dossier for some faculty and not others. This occurred at different levels of review—department, college, and CAP—and is problematic on two fronts. First, using information beyond the official dossiers is a violation of policy; second, inconsistent application of any practice (whether sanctioned or not) is a likely vehicle for introducing or amplifying bias because inconsistencies by definition create an uneven playing field, potentially helping (or hindering) some individuals over others. If the inconsistency is consistently applied—for example, if the admission of information outside the dossier routinely benefits or disadvantages one group over others—then it becomes discriminatory.

3 Bias in Assessment of Merit

The concept of "superior intellectual attainment" is not amenable to clear, transparent metrics; "superior" is a qualitative judgment subject to the influence of bias. Moody (2012) outlines a number of cognitive errors operating in assessments of faculty that, she argues, compromise/contaminate academic evaluations. They are not so much "errors" as outcomes of normal brain function; nevertheless, they impact evaluation. Because they are implicit (that is, subconscious or unconscious rather than conscious), we prefer to characterize errors of the sort identified by Moody as "cognitive bad habits." They include the halo and Matthew effects, among other phenomena. The impact of bad habits leads to bias in evaluation and, in turn, can lead to inequity in assessment of merit (Fig. 1).

Among us, we have had extensive experience on faculty search committees and review committees, across multiple levels of the academic hierarchy. Inspired by Moody, below we summarize ten key cognitive habits that we observed on our own campus and that we believe have considerable potential to affect faculty evaluation.

Cloning: Cloning occurs when evaluators, in considering a pool of candidates, conflate "excellence" with the qualities they themselves possess. In other words, they unconsciously see excellence when they see a version of themselves. Operationally, cloning may be manifest as a preference on the part of evaluators for candidates trained at the same prior institution, conducting similar research, or possessing a shared social location or identity. A corollary of this cognitive habit is "provincialism"—devaluing those with whom the evaluator does not identify. We see this often in "pathway bias," meaning devaluing faculty candidates that may have started academic careers at community colleges rather than four-year research institutions, or

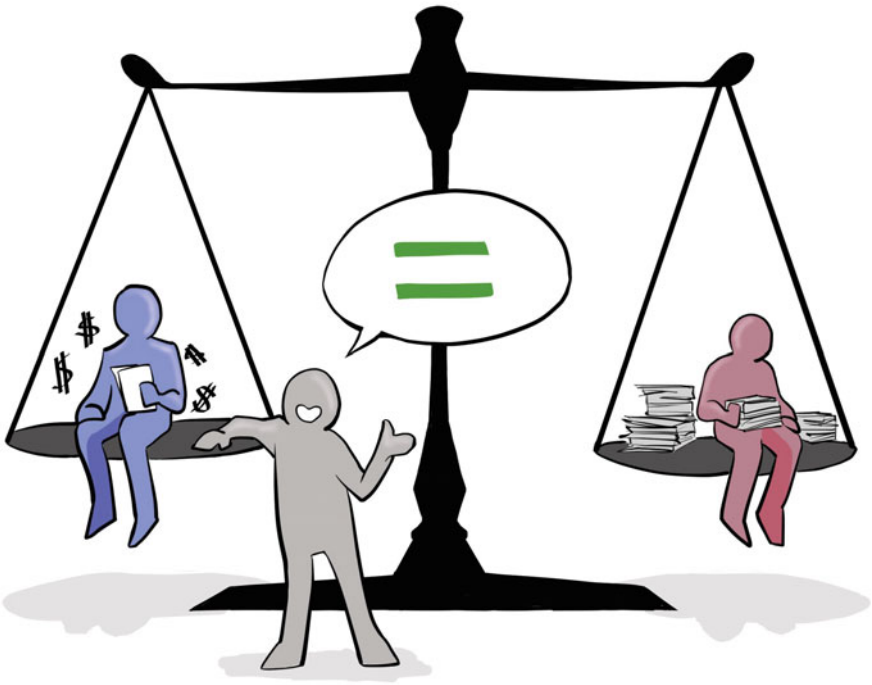

Fig. 1 Inequity in assessment of merit. Illustration by Chastine Leora Madla

at "regular" (including public) research institutions rather than Ivy League universities. Here, evaluators can conclude erroneously that such markers indicate a candidate is unqualified simply because he or she followed a different path to the Ph.D.

First Impressions: Evaluators may reach conclusions rapidly about candidates based on insufficient evidence. This can happen when external markers are taken as proxies for quality, as in the halo effect (Thorndike, 1920). Familiarity with the candidate's institution, the reputation of a dissertation advisor, or reputations of letter writers may lead to evaluators to conclude "superior intellectual attainment" regardless of the actual record of research or creative activity.

God Fit/Bad Fit: Judgments of "fit" with local culture are often subjective. Unconscious bias can play a strong role here, particularly when assessing whether someone from an underrepresented and/or marginalized group will "fit in" with the rest of the department. In this case, the "bad fit" may also be a function of the assumption that the person lacks shared values and attributes. Alternately a candidate may be viewed as being a "good fit" if a shared identity or set of values is perceived. "Fit" often cannot be determined from reading an application, yet, as Heilman et al. (2015) also found, we have seen this concept used as a criterion for selecting candidates to interview. Of course, certain dimensions of "fit" are partially articulated a priori in position descriptions. Even so, departments occasionally recommend an applicant because

the faculty feel he (or less often she) will make a "better" colleague than others in the pool (that is, he resembles the majority identity of the department) despite the fact that the person's expertise diverges significantly from the position description. Here we see one aspect of "fit" (local departmental culture) outweighing another aspect of "fit" (the actual position description).

Stereotyping: The extent to which identities are reduced to stereotypes can affect seemingly objective judgments. The stereotype effect may be either positive or negative, and thus, for example, the candidate may be presumed competent or incompetent, a team player or a trouble-maker, a leader or a non-leader. Assumptions of incompetence especially plague women of color faculty (Guttierez et al., 2012), and can appear in evaluations when similar accomplishments or work conducted receive differential rewards or levels of credit. The need to avoid stereotyping is critical when evaluating collaborative or team-based efforts. Here, competence and leadership may be entwined: if the individual (e.g., a Latina physicist) belongs to identity categories perceived as incompetent or unlikely to produce a leader, an evaluator may inappropriately attribute credit for an accomplishment to others on the team. By contrast, if the person (e.g., a white male engineer) belongs to identity categories that are "presumed competent," he may be given undue credit for collaborative works even if he himself describes a minor role. In effect, the stereotype of (in)competence reinforces a double standard.

Specific actions—speaking with a non-English accent, wearing "ethnic" attire—can also trigger stereotypical thinking, which may, in turn, affect evaluation of merit despite the fact that diction and appearance are unrelated to research. When stereotypes shape thinking and behavior, they may manifest unconsciously as implicit bias or more overtly as microaggressions (discussed in the Chapters, 'Barriers to Inclusion: Social Roots and Current Concerns', and 'Making Visible the Invisible: Studying Latina STEM Scholars').

Elitism: Elitism reflects the belief that people who are traditionally found at the top of a hierarchy (e.g., white men in STEM) are occupying their rightful place, and that, by implication, those below them are also where they belong in the hierarchy. One consequence is that the bar for gaining entry at the top may be higher for perceived "outsiders" such women and men of color. Members of these identity categories may have to work harder and perform better just to get admitted into the tier and, once there, they are more heavily scrutinized, particularly if, as discussed in the Chapter 'Barriers to Inclusion: Social Roots and Current Concerns', they are token representatives of "their" group.

Raising the Bar: Related to elitism, raising the bar means creating a higher standard for perceived outsiders in order to reconcile their inclusion into the group. To raise the bar is to enact a double standard. Let's say the desired group is "tenured faculty in the Philosophy Department" and 80% of the department faculty are white men. During evaluation, if a woman of color candidate excels in all the listed criteria, there may be an unconscious tendency to downplay her strengths and subtly "raise the bar" to diminish the competitiveness or the impact of her accomplishment. This

cognitive habit is also manifest when evaluative criteria are changed or realigned in ways that favor some candidates over others. Moody (2012) refers to this type of cognitive error as "relying on pretext" to favor or disfavor a candidate.

Bias Validation: Unconscious bias is sometimes rationalized in conscious decision-making. For example, bias may be validated when members of dominant groups are evaluated on the basis of "potential" and members of marginalized groups are assessed solely on track records or accomplishments. The assignment of personal "potential" can serve to elevate one's ranking. "Star status" is another type of non-quantifiable judgement validation in assessing merit, and is often associated with insider knowledge on the part of an evaluator who "knows" the candidate's lab, institution, or advisor, or who has directly contacted colleagues who confirm that the candidate is in fact better than his or her record. This cognitive bad habit expresses the Matthew effect (Merton, 1968) and is what Moody (2012) characterizes as prioritizing rhetoric over evidence.

Accounting for "Work Not Done": Bias can also appear in the form of evaluating work not done; by this we mean situations in which a candidate's performance is negatively assessed because actual productivity is being compared to a hypothetical *possible* productivity based on implicit beliefs about dedication to work. As already discussed in the Chapter, 'Barriers to Inclusion: Social Roots and Current Concerns', dedication to work as an index of success arose during the era of single-career couples in which, in the typical case of heterosexual marriage, husbands were breadwinners and wives were homemakers. Dedicated breadwinners put career ahead of family; sacrificing family time demonstrated strong commitment to one's profession. Dual-career couples are common in academia today and partners often share responsibility for breadwinning and homemaking (albeit not necessarily equally). Implicit adherence to the concept of dedication to work as a measure of achievement negatively impacts individuals who display commitment to parenting if evaluators use "work not done" as a criterion for advancement. For example, in one promotion case, faculty who voted against the promotion cited as justification the fact that the candidate coached his own daughter's soccer team, and that if he had devoted the time instead to his research/scholarship he would have had a "better" publication record. Because dedication to work is a masculinized concept and commitment to family is a feminized one, men who commit to family may be penalized more than their female counterparts just a women's dedication to work may be less rewarded than men's.

Defining and Quantifying Merit: This is the elephant in the room—bias is embedded in the very definition and quantification of merit. Many concepts and measures of merit originate from within dominant social groups to reward forms of achievement these groups value; moreover, they are sometimes inconsistently applied. This means women and URM scholars may be disadvantaged when judged by measures developed in the context of historically exclusive (white, male, upper-class) academic institutions. How can such measures be expanded and improved? The variety of academic programs at UCD and other research universities further

complicates definitions and quantification of merit; obviously the number of publications may be a completely inadequate measure of merit for a musician, whereas the number and importance of the venues of performances may be an inappropriate measure for a chemist—but even beyond this, are publications or performances the best or most important metrics in their respective disciplines? Another degree of complexity emerges when evaluators use criteria based on individual accomplishment in an era where many fields are becoming strongly collaborative. Adherence to traditional notions of merit represents one potential institutional bias that is proving difficult to change in any substantive way.

Bias Beyond Merit Assessment: Our review of policy focused on the merit and advancement process. However, bias can affect review in multiple areas of faculty life. Consider the importance of "discovery" to the scientific enterprise and to one's claim to be a "good" scientist. Who comes to mind when we think about scientific discovery? People from marginalized groups—particularly women of color—are not typically envisioned as discoverers. Their discoveries are often deemed provisional until confirmed by dominant-group member, and their discoveries/contributions may be ascribed to others. Lynn Conway (2018) refers to this phenomenon as "the disappearance of the others." Problems with accurate external attribution of contribution negatively impact faculty review as well as publication and grant review. Implicit "discoverer bias" can lead to a higher bar for proving novelty or merit and demonstrating ability or potential for success. Such issues are cumulative over a career and challenging to address (Conway, 2018).

4 Lessons Learned

The recognition that academic institutions must re-evaluate their evaluative criteria is not new; long after problems with traditional metrics were first identified, they persist; progress has been slow and incremental. We learned several key lessons in the process of evaluating policy. We offer these in the form of advice for those considering a similar institutional self-assessment.

4.1 The Importance of Organizational Learning

Knowledge of the bases of bias and discrimination is an essential first step to creating an inclusive academy. The acquisition of knowledge has to be wide-spread; ideally, all members of an organization from top to bottom should learn about barriers to inclusion and how they can affect faculty advancement. Only by understanding the roots and nature of these barriers can we begin to understand their impact and how to effect institutional change, collectively and collaboratively. Although many scholars outside of STEM have studied the causes and consequences of social inequality

for decades (indeed, centuries), scientists tend to believe that their own disciplines are insulated from these forces. STEM faculty tend to view themselves as "identity-blind" (for example, color-blind, or gender-blind), but the unconscious brain both sees and processes color, gender, and other identity categories. Consequently, educating all members of an organization must start with acknowledging there is a problem: existing criteria for evaluating merit and achievement are not objective because bias is real and its negative effects are not equally distributed. Beyond this, we must acknowledge that what scientists choose to study, how they study it, and who they collaborate with all present barriers (or, conversely, opportunities) for cultivating diversity, equity, and inclusion in science.

Toward that end, we created training via the Strength Through Equity and Diversity (STEAD) Committee, drawing on resources provided by the University of Wisconsin and the University of Michigan. The STEAD Committee is comprised of UC Davis faculty members who, first, educated themselves about implicit bias and other barriers to inclusion and, second, widely presented workshops to other faculty and to administrators about best practices for achieving excellence, equity, and diversity in faculty recruitment. The committee chose recruitment as the focal point for education because recruitment processes make salient the ways in which problematic subjective assessments can compete with more equitable, objective ones. The STEAD trainings address the following issues, among others: the composition of the search committees; the wording of position announcements; resources for broadening the applicant pool; strategies for widespread advertising coupled with more targeted outreach aimed at organizations, associations, and conferences serving underrepresented faculty; discussions of the language used in letters of recommendation; checklists for reviewing and evaluating applicants that employ a consistent set of parameters; and, most important, sharing the results of data-driven research about the ways in which bias can creep into every stage of the recruitment process. For example, do letter writers refer to female candidates by their first names and male candidates by the last names? Are the letters for white men longer than for white women and people of color? Are personal characteristics and qualities discussed in letters for female and minority candidates but not for white male candidates? Are members of the search committee using the prestige of the degree-granted institution as a proxy for "promise" or "potential"? Surveys of participants indicate that the workshops are highly valued and have positively affected candidate review.

4.2 The Importance of Diversity in Policy Creation and Assessment

Bias associated with membership in an identity category favors dominant social groups. It is critical to recognize this fact. Some of us (those in the STEM fields) began our work thinking we needed policies that were "identity blind"—that is, policies where identity categories would not be seen; we now agree this is impossible. If

representatives of a historically-dominant group prevail in an institution, that group's priorities will likely become the priorities expected of all members of the group, to the detriment of "outsiders." In other words, because we craft, interpret, and apply policy through the lenses of our own identity and experience, policies created by members of dominant groups (with their own priorities in mind) may inadvertently establish barriers to inclusion everyone else. A policy may be discriminatory not because that was the original intent, but because it is the natural outcome of a process that lacks sufficient diversity of perspective. Moreover, under-represented scholars do not benefit from policies that fail to recognize their social identities, because that often means suppressing an aspect of the self in order to be seen as part of the broader collective. Policies thus need to be "identity independent"—neither favoring nor disfavoring any group—but not blind to an identity if the goal is genuine inclusion. Broad consultation as well as diversity of community membership are therefore vital for policy creation and review.

4.3 Empowerment Through, Not Despite, Policy

The concept of unconscious bias is difficult for many people to accept, especially faculty in STEM fields, and so, unsurprisingly, it's difficult to design policies to recognize and prevent it. Moving up in a "meritocratic" academic hierarchy has been described by Lynn Conway as climbing a ladder to the past (personal communication). Old notions of achievement and dedication to work persist, and we continue to hold faculty accountable to them, despite empirical evidence they perpetuate inequality and do not reflect the reality of many if not most of our lives. Currently, the majority of academic STEM faculty are in dual-career relationships, and the expectation of overwork is a key reason why scholars peremptorily exit STEM fields—a phenomenon known as the "leaky pipeline" (Xie & Shauman, 2003). Although faculty as a whole recognize this problem, they have few tools to change the culture in ways that will enable alternative, more inclusive measures of "superior intellectual attainment," meaning measures that do not rely on outdated, gendered assumptions about work. One of our biggest challenges is to recognize the links between definitions of excellence, merit, organizational culture, and structures of social inequality so that when the world changes around us, we can change with it.

5 Key Recommendations

In evaluating merit and advancement actions, review committees at UC Davis, as at most institutions of higher learning, have been instructed to caution against bias. But until recently, no training in recognizing and avoiding bias was stipulated on our campus. Consequently, the Vice Provost for Academic Affairs initiated mandatory implicit bias training for all search committee chairs; this training was then replaced

by peer-to-peer learning under the Strength Though Equity and Diversity (STEAD) initiative of the UC Davis ADVANCE program. Surveys of faculty indicated that most agreed with our assessment that recruitment and advancement procedures and processes were clear and transparent, but not necessarily identity-independent as intended, because of implicit bias and other barriers to inclusion embedded in their local cultures. Our analysis of policy and practices thus yields several recommendations that focus on faculty development and support along with changing the climate of local cultures.

5.1 Checking Parental Bias

Although most policies as worded are seemingly identity-neutral, we concluded that the language associated with the parental extension to the tenure clock policy was potentially problematic.

UC APM 210-1, Section c.(4), Assessment of Evidence, includes the following statements (emphasis added):

> ***If*** there is evidence of sufficient achievement in a time frame that is extended due to a family accommodation as defined in APM—760, *the evidence should be treated procedurally in the same manner as evidence in personnel reviews conducted at the* ***usual intervals***. The *file shall be evaluated without prejudice as if the work were done in the* ***normal period*** *of service* and so stated in the department chair's letter.

This language implies that such leaves are both unusual and abnormal. Starting the first sentence with "if" also suggests that a more stringent review be done of the evidence presented. However, when we proposed changes to the language, not everyone agreed this was necessary; some felt the more serious issue was that the language was repeated in letters sent to external reviewers who might not share our same cultural context. As a result, the wording of those letters was changed:

> UC Davis encourages its faculty members to consider extensions of the (pre-tenure/review) period under circumstances that could interfere significantly with development of the qualifications necessary for (tenure/advancement). Examples of such circumstances may include birth or adoption of a child, extended illness, care of an ill family member, significant alterations in appointment. Please note that under this policy the overall record of productivity and scholarly attainment forms the basis of your evaluation. Time since appointment is not a factor in this review.

A second issue was that the parental leave policy had to be requested and approved, rather than being automatically granted. Again, as soon as we suggested that extensions to the clock be automatic, the policy was in fact changed throughout the UC system. Making extensions automatic both implied they were normative (thus removing any potential stigma implied by being granted "special" dispensation) but did not prevent or penalize faculty from opting out.

5.2 Gender Bias in Negotiation Is Real

No set policies govern negotiations of start-up employment packages for new faculty. We discovered that the practices varied by units and that women applicants often felt caught between asking for what they needed and triggering negative stereotypes of professional women as "demanding." Instead, many women asked for what they thought the negotiator would see as reasonable so as not to appear "greedy." We concluded that it would be better for an intermediary to assume responsibility for negotiations, a practice that had been adopted in some departments. In most cases, the principal negotiator on behalf of the new faculty member has been the department chair, but occasionally other faculty serve informally as intermediaries by encouraging candidates to negotiate competitive start-up packages.

5.3 Self-Promotion Versus Bragging

The faculty merit process requires faculty to write a "candidate's statement" that highlights their accomplishments over the review period and assess their own impact as scholars. There are two pitfalls to this process. First, external reviewers may view self-promotion differently depending on the candidate's social identity category. In STEM fields, as pointed out by Lynn Conway (2018), white men are deemed, unconsciously, as natural "discoverers". When others claim a discovery, the claim may be viewed with skepticism, and their contributions may be diminished as a consequence; moreover, evaluators can view their attempts to take credit negatively.

Second, and related to this, acts of self-promotion may be seen as "bragging." This concern is not gender-neutral because of stereotypical assumptions that women should be caring, compassionate, and self-effacing, not self-promotional. Whether or not self-promotion is comfortable for a candidate may also be culturally-specific—Asian women, for example, may feel pressure to conform to cultural stereotypes that they are especially docile and accommodating. Concerns about "bragging" can work in the reverse, too. White male scholars sensitive to being stereotyped as "jerks" who are "naturally" inclined to brag may avoid self-promotion in an effort to counter the stereotype. One solution here is for department chairs and other faculty to clearly highlight the achievements of a candidate in ways that are consistent with but go beyond the candidate's own self-narrative, so that the responsibility for promoting achievements are dispersed across multiple actors and levels of authority. Chairs and other colleagues can also draw attention to achievements and contributions that a candidate him or herself may gloss over, thereby strengthening a case. Online ballots with space for faculty commentary enable chairs to directly incorporate the promotional language of colleagues in order to further lessen the burden of promoting the case on the individual candidate. Of course, these interventions depend on chairs and their faculty understanding the existing social biases that distinguish promotion from bragging.

5.4 Rethinking "Superior Intellectual Attainment"

Operationally, we found that evidence of "superior intellectual attainment" was defined differently by various local cultures. In some units it was limited exclusively to research. In those cases, the prevailing culture did not view teaching, professional activity and competence, or service as relevant to the review process; rewarding faculty for contributions to diversity and mentoring was even seen as incompatible with superior intellectual attainment. To encourage recognition of teaching and service, the UC Davis campus changed its existing process to a "Step Plus" system of academic advancement. Faculty were explicitly instructed to consider outstanding attainment in each of *four* categories—research, teaching, service, and diversity activities—during the process of evaluating candidates for advancement. Although relatively new, some faculty say this altered review process has indeed enabled greater reward for non-research activities. Prior to the implementation of the step system and helping to pave the way, policies in the APM made "contributions to diversity" a criterion for faculty advancement.

5.5 Accountability for Changing Local Culture

According to University of California policy, accountability for the local (that is, department) climate rests with department chairs. However, at the time we began our assessments of policy, scant resources were available for chairs to learn how to assess current levels of inclusivity and how to develop strategies to make departmental climates more inclusive. We recommended that chairs be equipped with the tools needed to be effectively accountable—workshops, new chair orientations, online reference material, suggestions for best practices, and experts available for consultation. Creating inclusive local climates is a concern not just for UC Davis but for all ten campuses within the UC system; consequently, a suite of tools, training guides, and support methods has been developed. When assessed for their performance, chairs are expected to report on issues related to climate, although not all departments use these issues in their evaluation of chairs.

The mandatory implicit bias training for search committees actively recruiting faculty has served to create local expertise in identifying this and other barriers to inclusion at the department level. Bias training enables local discussions of inclusive climate within departments. We therefore recommended that all faculty receive training in recognizing implicit bias, a recommendation closely linked to unimplemented mandatory training recommendations discussed decades ago by the UC Davis Senate Committee on Affirmative Action and Diversity. Sexual harassment training is now also mandatory for all faculty and is done online. Although we did not explicitly request that harassment training include information about spotting and avoiding implicit bias, the course now does so. The general availability of knowledge about

barriers to inclusion will, ideally, help department chairs ensure a more inclusive identity climate for all faculty.

Local culture also shapes practices associated with mentoring. The UC Davis COACHE (Collaborative on Academic Careers in Higher Education) Faculty Job Satisfaction Survey from 2013 (a component of our ADVANCE program) indicated that faculty believed mentoring for junior colleagues was deficient on our campus. Subsequently, the ADVANCE program leadership recommended that each recruitment search plan include a strategy for mentoring new faculty members.

6 Concluding Thoughts

The social origins of implicit bias and its unconscious application together make crafting policies to prevent it challenging, if not impossible. We therefore recommend a two-pronged approach—making sure that policies and reward structures are as identity-independent as possible, while at the same time providing broad training and extensive awareness about the nature of barriers to inclusion. Understanding the role of cognitive "bad habits" and the influence of phenomena like the halo and Matthew effects on assessment can diminish the impact of those types of bias in assessment. It is important that the group of evaluators also be diverse as this has the potential to dilute the impact of cognitive bad habits in objective assessment. We acknowledge that UC Davis as an institution may be more open to adopting inclusive strategies than some other institutions. However, there is still considerable room for improvement and much work to be done.

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Leadership and Organizational Structure

Linda F. Bisson, Denneal Jamison-McClung, Laura Grindstaff, Linda Katehi, and Mary Lou de Leon Siantz

Abstract Achieving diversity, equity, and inclusion (DEI) in an institution requires a strong and lasting commitment from organizational leaders. Given the magnitude of the challenges, that commitment must be organizationally embedded such that changes in leadership do not lead to changes in commitment or to backsliding as new initiatives emerge and potentially gain favor. Leadership is essential to establishing the overall vision of a new institutional culture as well as accurate and responsive communication of that vision. It is also necessary to build committed teams with relevant expertise. The organizational structure must reflect the involvement of experts but also be broadly inclusive of the community in question and establish mechanisms for learning, communication, and open discussion. This chapter describes the role of leadership in institutional transformation as well as elements of team assembly and design, along with the critical role of communication.

Keywords Visioning · Communication · Team assembly · NSF ADVANCE · Leadership challenges

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1 Introduction

Creating a more inclusive institutional culture is not a simple matter of implementing a few new policies. It requires a deep understanding of the existing culture and how systemic bias and other forms of inequity are manifest across the organization. Any approach must be data-driven but at the same time recognize the uses and limitations of that data; it must also encourage broad participation across the institution. For this to happen, clarity and consistency of communication is key, with communication being understood as bidirectional. Addressing inclusivity is complex; it necessitates assembling groups of individuals with specific areas of expertise who then must be organized into an effective structure for sharing knowledge that will generate new organizational processes.

The initial role of teams of experts is visioning—creating a cohesive view of what the "transformed" institution will look like, what changes will be needed (and, just as importantly, what changes will not be needed), how change can be implemented, and a flexible approach to implementation. It is frustrating but true that there is no definitive roadmap to follow and the desire to discover the "correct" path may hobble or derail potentially successful programs and/or undermine core goals. Central to sustaining organizational structures is the willingness and ability to assess the impact of initiatives and abandon those that don't work. The core vision should not be merely aspirational, but strategic, focused, and doable. Leaders of the organization must visibly participate in shaping and coordinating these efforts.

2 The Role and Importance of Leadership

Leadership can refer to those in a position of power who control resources; it can also refer to those deeply committed to institutional transformation. Both types of leadership are essential to achieving diversity, equity, and inclusion (DEI). Leaders of transformation can be distinct from leaders of the organization, but they must work closely together. Those leading organizations may be driven primarily by loyalty to the organization, which is not necessarily a bad thing unless transformation efforts are perceived as threatening or undermining that loyalty. For example, academic institutions are commonly thought to be meritocratic, and some members will view efforts to make the institution more inclusive—expanding the definition of merit, or defining merit in new ways, for example—as a threat to the notion of meritocracy itself. There is no necessary conflict between loyalty and equity, but it is important to be clear on this point and to nurture cooperation between those loyal to the organization as it is and those passionate about change.

2.1 Organizational Leadership

Institutional transformation efforts will fall short if not supported at all levels of administration and leadership. Efforts must bear the hallmarks of sincere commitment and not the appearance of chasing resources, championing the "cause du jour," or wanting to seem current by copying what other organizations are doing. In addition, the commitment should have clear goals and parameters—what is to be accomplished? Is change aspirational or realistic and achievable? Moreover, the commitment of leadership needs to be visible across the community. Visibility can be underscored by allocating needed resources to accomplish goals but also by devoting time and energy—are leaders themselves willing to do the work, or, is change something merely assigned to others to address? At the same time, the labor expended by leaders who are rank-and-file faculty rather than administrators must be recognized and compensated—indeed, this is an aspect of the "needed resources" mentioned above.

Institutional leaders play a vital role in establishing goals and expectations. They serve as stewards for others involved by asking questions such as: What are we trying to do? Are our goals realistic? What are the metrics of success? What is expected of those leading the transformation? What is expected of organizational leadership? What is expected of the community? What is the plan for sustaining the efforts of all involved (especially important if the process is driven initially by external funding sources that are finite)?

Institutional leaders must understand the issues and magnitude of the task of addressing systemic bias and inequity. What should be done in the context of existing organizational culture? How do circumstances/local culture differ across the organization/campus? They need to demonstrate a clear knowledge of the issues, make the case for change, and not mandate behavioral changes they are unwilling to undertake themselves. Leaders in administrative roles will field many competing demands for resources for this or that other initiative; they must be able not only to articulate the foundational importance and benefit of achieving diversity, equity, and inclusion but also to defend its priority. They must be aware of potential conflict between those loyal to existing institutional practices and those embracing equity through change. In academic institutions, the goal is to make the meritocracy more equitable, not replace it. Messaging on this point is critical.

2.2 Assembly of Expertise

Expertise with respect to institutional transformation may or may not overlap the expertise of incumbent organizational leadership, but overlap is not essential. Developing a plan of action to address inequity may be better lead by experts in specific areas. Our own organizational structure required such targeted expertise.

First and foremost, the experts recruited must embody and embrace the vision and goals of the process and respect the expertise of others in order to forge a working team or network. Experts in the disciplines that routinely study systemic bias in the workplace (or forms of social inequality more generally) may be natural allies and/or collaborators. In our case, we worked with faculty in the social sciences (notably sociology and psychology), humanities, and education. Experts in organizational processes and culture should be involved, as should experts in data analysis and survey research. The latter, especially, can help make a data-driven case for change and assess the impact of change. Members of historically marginalized groups who have navigated organizations presumed to be meritocratic are also key participants, as they may have the clearest view of the systemic issues at stake. In the context of higher education, it is important for these experts, like other leaders, to underscore the difference between meritocracies based on exclusive (narrow) versus inclusive (expansive) criteria. The *culture* that has built up around most academic meritocracies is problematic, not the concept of meritocracy or accomplishment per se. Finally, the assembled experts should be broadly representative and include diverse, intersectional voices and perspectives.

3 Communication

Terms like "systemic bias", "inequity" and "inequality" have been widely used but at the same time are poorly understood outside of the academic disciplines that specialize in studying them. Yet explanations may be steeped in inaccessible disciplinary language, making general understanding of what is needed to create a more equitable and inclusive institution murky to a more general community. At worst, terms may be misunderstood and stymie progress. Clear, consistent, and accurate communication, rooted in empirical data, is crucial for securing widespread support.

The goal of any communication strategy should be establishing trust by reaching out to the entire community and listening to questions and concerns; do not expect others to come to you to learn factual information. Making the case for change is but one step; another is to operationalize what is meant by "change" and how it will be achieved. What steps will you take and how will you know if they have the desired outcome? A plan for regular updates to the community/campus and opportunities for input should be built into any communication strategy. As well, communication strategies should appreciate the different ways in which people access information. Organizational norms governing electronic communication should be incorporated into any strategic plan for sharing information about on-going efforts. Different stakeholders are best engaged by different messaging approaches, in terms of message content, frequency, and origin-point. For example, in an academic environment, image-rich social media platforms may be most useful for reaching student stakeholders, while emails with links to relevant webpages and shared online resources may be most useful for reaching faculty.

A vital component of any communication stream is that it be open to feedback (including criticism) commentary, and differences in opinion among the target community. Communication works best as a two-way street. Criticisms deserve to be heard and should be discussed with all transformation team leaders to ensure broad transparency as well as informed, courteous, and substantive responses. In complex, hierarchical organizations such as universities, institutional transformation can only succeed if the specific concerns of stakeholders at various levels of the hierarchy, with different experiences of the organization, are heard and understood by the entire leadership transformation team. Seek information about who will and will not support change, what makes easy or hard, and where points of resistance originate. Consistent, effective messaging that actively addresses criticisms can only happen if the leadership team is appropriately diverse and includes individuals who have experience with the organizational units/cultures from which criticisms emerge.

In addition to criticisms, which may be proffered unprompted from concerned individuals and groups, general surveys of participants in trainings, workshops, symposia, and other events are invaluable in terms of defining the success of communication efforts and gathering a representative range of feedback (negative, neutral, and positive). The results of surveys should be shared with participants in a timely manner and regular updates on overall progress are important for engaging stakeholders in the on-going work of organizational transformation. Frequency of communication should be carefully considered—both too much and too little will be counterproductive to community engagement. It isn't necessary for everyone to read every communication, but make an effort to ensure that you reach a critical mass of people in each stakeholder group, so that information can diffuse uniformly across the organization. This is one way to recognize and cultivate "local expertise" in a communication strategy.

Finally, the communication strategy should make clear who is speaking and on behalf of which initiative, constituents, or program. To establish trust, transparency, and legitimacy, individuals should be visible and named, not hidden behind unattributed messaging. There will be community members who disagree with the disciplinary experts, for a variety of reasons. For example, unconscious or implicit bias can be a challenging concept to accept, as the differences between conscious and unconscious learning and their interaction are not widely known. Likewise, many academics, especially in STEM, may not understand the differences between attitudinal, interactional, and structural inequality, believing that racism or sexism is merely a matter of attitude and/or behavior. A critical component of any transformational process is peer-to-peer learning and creating a broader knowledge and understanding of the barriers to inclusion across the community. Anyone who is content to dismiss others because "they just don't get it" should not be part of the communication process. Public conversations and formal messaging should never dismiss alternative views, but rather welcome and discuss them in light of the overall vision for change. Prioritize constructive dialogue first and foremost in any communication plan.

4 The Importance of Organizational Structure

Addressing systemic bias through institutional transformation is a complex process. Leaders of the organization and leaders of transformation must come together as a core team and take responsibility for delegation, coordination, communication, implementation (action), and evaluation. They must identify appropriate colleagues to form working groups (subgroups, or sub-teams), of experts that can communicate strategies and outcomes to the broader community. Time is precious and must be used effectively, particularly when there are many moving parts requiring coordination, making clear timelines indispensable to a strategic plan. Since different working groups each have their own arenas of expertise, they need to learn from each other, meaning they have to be able share information and provide feedback across groups. Sub-teams also need access to data and data assessment. All this requires clear channels and processes of communication as well as transparent reporting structures. To facilitate cross-team interaction, we developed a multi-pronged organizational structure tied to the goals of the ADVANCE initiative.

4.1 The UC Davis Advance Program Components

As stated in our application: *The UCD ADVANCE program is rooted in the premise that a multiplicity of perspectives derived from both gender and cultural diversity can increase our institution's contributions to STEM research by seizing the advantages that a heterogeneous group of talented individuals can bring to problem-definition and problem-solving.* More simply, this means that problems are more creatively defined, analyzed, and solved when a diversity of perspectives are sought, respected, and included. Although our focus has been on inclusion in STEM fields and professions, the approaches we took are applicable to other fields and organizations. Figure 1 shows the sub-goals of the ADVANCE program.

4.2 The ADVANCE Initiatives

As shown in Fig. 2, the ADVANCE award funded a five-year program with five interlocking initiatives: (1) Social Sciences Research, (2) Mentorship and Networking (3) Inclusive Campus Climate, (4) Policy and Practices Review, and (5) the Center for Advancement of Multicultural Perspectives on Science (CAMPOS) (Fig. 2).

The Social Sciences Research Initiative (SSRI) focused on analyzing the experiences of Latina scholars in academia. The SSRI team interviewed a sample of Latina STEM scholars across the U.S., including the recipients of the prestigious President's Postdoctoral Fellowships awarded by the Office of the President of the University of California. Many of these scholars went on to highly successful careers in academia,

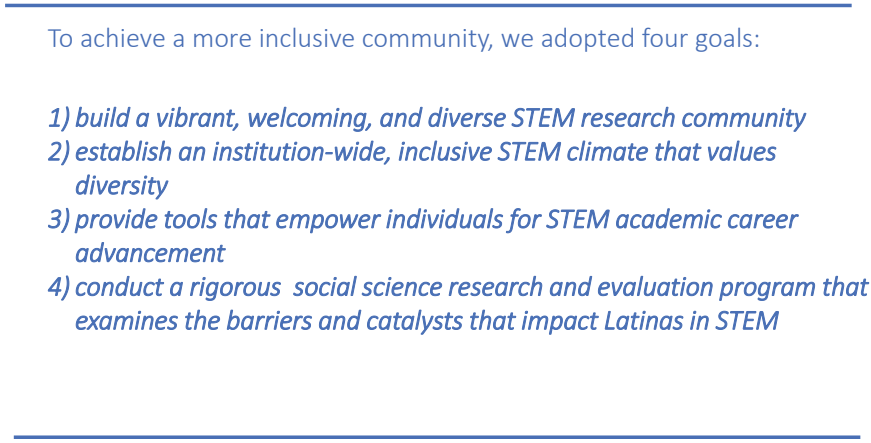

Fig. 1 Goals of UC Davis ADVANCE

although not without overcoming significant barriers. The aim of the SSRI was to document the women's experiences of adversity and resilience in order to inform the other DEI initiatives (here and at other universities). Simultaneously, we launched the Mentorship and Networking and Inclusive Campus Climate initiatives, which relied heavily on known successful strategies for creating a more inclusive workplace for women in STEM. The Policy and Practices Initiative (PPRI) was formed to assess the level of existing institutionalized bias against underrepresented faculty, particularly in faculty evaluation, as tradition and inertia can solidify norms and practices that perpetuate bias.

Our boldest and most innovative initiative was the founding of CAMPOS. The vision for the Center was two-fold. We aimed first to provide a community of support for individuals from historically underrepresented groups—or "excluded identities," as we came to think of them—and second, to showcase the role of multicultural perspectives in STEM fields. Scientists often assume that the scientific enterprise is objective and value-free, "uncontaminated" by the perspectives and experiences of its individual practitioners. This is, of course, untrue—how one views the world influences how one studies the world, including what questions get asked, the urgency attached to those questions, and in the ways the answers are valued or deemed significant. Academic Search Committees nominated CAMPOS scholars based on their potential to bring multi-cultural perspectives to STEM, their demonstrated commitment to DEI teaching, research, outreach, and their expressed desire to contribute to a diverse, equitable and inclusive research community.

The organizational structure for the initiatives engaged many people—approximately 80 (Fig. 3). It enabled both faculty and administrators to be informed of and included in all activities of ADVANCE, and this broad ownership of the program, combined with transparent communication, facilitated its success.

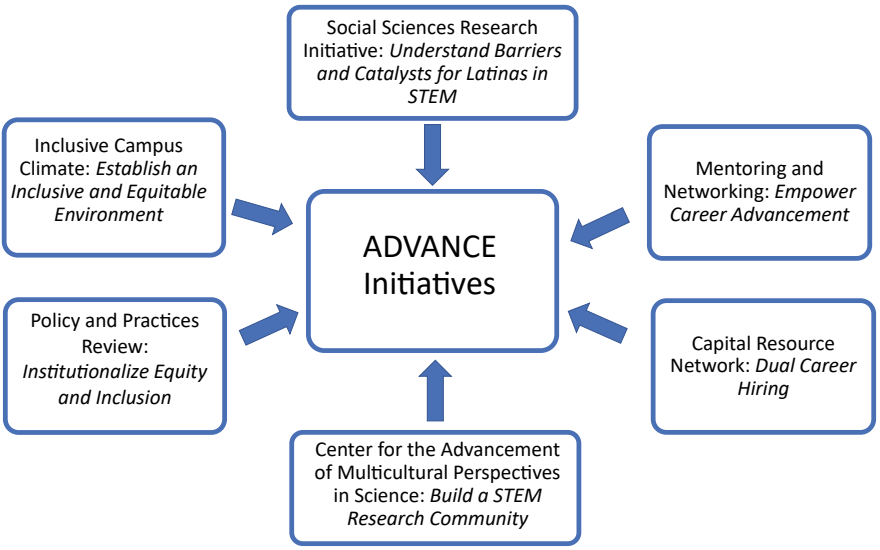

Fig. 2 Organization of the ADVANCE grant initiatives

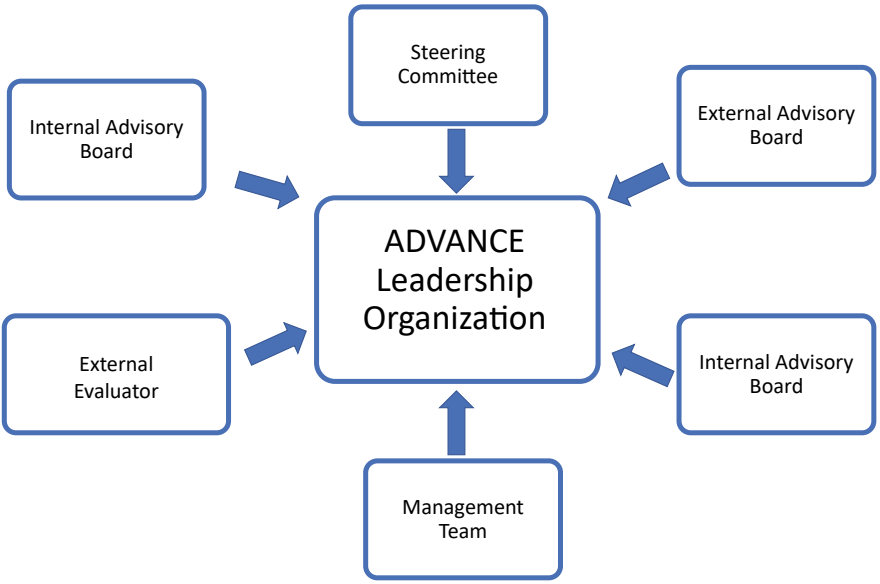

Fig. 3 ADVANCE leadership organization

5 Lessons Learned

Even the best laid organizational plans have limitations and confront roadblocks. Key challenges include getting everyone on the same page with respect to the need for change and the process of change. Debate is desirable, but not to the extent that it prevents action. When bringing together sub-teams of experts, articulate a clear decision-making structure for moving ahead when there is disagreement between sub-teams in order to prevent conflicts before they arise. Organizational leaders are best-positioned to do this, because they are part of the broader effort but not embedded in a specific sub-team. Consensus, not unanimity, should precede action. Time taken to work on effective communication strategies, team building, and communal learning is time well spent. Realtime evaluation of all three interventions is also important, and will benefit from tools such as team retreats, surveys, and mandatory or expected participation. Choice of sub-team leaders matters as does the need to refresh leadership. At the same time, remember that challenges are inevitable because they arise from the work being done by human beings with different personalities, perspectives, and experiences.

5.1 Challenges of Resource Allocation

In large organizations, a perennial problem is that individuals may chase resources provided by a program without commitment to its actual goals. Further, such individuals may assume—perhaps quite vocally—that other share a similar absence of genuine commitment, which is demotivating and potentially alarming. It is vital for organizational and team leaders to monitor and counter misinformation regarding resource allocation in order to maintain morale and ensure that sub-teams can focus on project goals. Effective organizational leaders are astute communicators who provide needed resources for change without centering the transformation process on the provision of resources; rather, the emphasis is on overarching goals and outcomes—in our case, a more diverse, equitable, and inclusive institution.

5.2 Challenges of Learning

Another challenge is the need to forge a universal understanding of the barriers to diversity, equity, and inclusion. Learning opportunities for the community are important, but hard to implement on a “one process serves all” basis. Best practices for defining learning outcomes, developing materials for internal and external distribution, and building repositories of project information (e. g. websites, shared folders with various levels of stakeholder access) should be delineated by the team before sub-teams begin sharing information broadly. Because people have varying levels

of understanding of, and experience with, barriers to DEI, it is critical that leaders develop (1) agreed upon terminology, (2) phrases that accurately describe institutional challenges, and (3) a common understanding of the link between project goals and activities. Aside from a shared theory of change, graphic depictions/road maps for sub-team activities and their interrelatedness are useful tools to get everyone on the same page.

Managing learning situations so that individuals without experience of (or belief in) systemic bias do not dismiss those with such experiences and beliefs is essential but challenging. Maintaining respect for different perspectives can also be challenging. Team members tasked with educating internal and external stakeholders on foundational knowledge of DEI issues, project goals, and related organizational data must navigate a myriad of responses to content and be prepared to navigate varying degrees of understanding and support. Stakeholder training workshops and public presentations should be informed by peer-reviewed literature and focus on data-driven analyses, not opinion. Even so, we have seen data-driven peer-reviewed studies dismissed as opinion by audience members who disagree with the conclusions but offer no counter empirical evidence of their own. Some terms have different meanings to different people; be aware of this when trying to secure buy-in or reach consensus. If people are misunderstanding, find another way to explain the process, situation, or phenomenon. Never dismiss someone as "unable to get it." Approach learning from a community perspective, not from a "blame-game" perspective in which only certain individuals or groups are deemed responsible for systemic bias (or, conversely, only certain individuals or groups are capable of recognizing and "fixing" it).

5.3 Challenges of Engagement

People get bored even if the issue at hand is significant. It isn't easy keeping a large group of people committed to change and the process of achieving it. Periodically reporting out successes is invaluable for maintaining engagement, as is seeing positive returns on investments of time. We have found that people are not seeking rewards or pats on the back so much as real progress toward goals. Having rigid timelines for progress can backfire if it looks like progress has stalled. It is important that all involved understand the nature and magnitude of institutional transformation, and that, consequently, there is no easy fix. Also, a plan to renew committees and term limits for team members can serve to "refresh the engagement" as well as broaden the base of ideas and human energy from which to draw. For those with limited time to invest, it's challenging to maintain commitment to a difficult process. Team turnover is not necessarily a bad thing if is it factored into the organizational structure. The timing, length, and frequency of internal and external meetings/events should be frequent enough generate meaningful participation, decision making, and continuity of purpose but not so frequent that participants burn out or cannot participate due to other demands on their time. Topics must actually be tackled, and genuine progress

made on the collective agenda. Since advancing diversity, equity, and inclusion is a process of collective problem-solving, focusing on one sub-issue or initiative (getting it launched or resolved, for example), can be more productive than constantly shifting priorities.

5.4 The Challenge of "Non-spokespeople"

As learning and awareness grow within the community, individuals emerge who think they "get it" and can be spokespersons for the "cause." They are often motivated by enthusiasm for the vision and prospect of a more equitable future based on genuine equality. However, they may lack knowledge of the details of sub-team projects and activities, including their outcomes and assessments, so their messaging may "drift" from core goals or disseminate misinformation. A constant stream of accurate information should be part of any communication strategy. Misrepresentation should be corrected as quickly as possible. For example, even though the "M" in our CAMPOS initiative stood for "multicultural," many assumed that, because the SSRI was focused on Latinas as a target population, multicultural meant "Latina." CAMPOS scholars who were not Latina were often asked why they were affiliated with the Center. Clearly, we needed to better communicate that while ADVANCE goals began with Latinas, they expanded over time to include a range of historically underrepresented groups, identities, and perspectives.

5.5 Challenges of Leadership Integration

As we have emphasized, organizational leaders may not have the same expertise as transformation leaders, yet they must form a team and cooperate on goals, especially regarding resource allocation and management, as well as expected programmatic and initiative outcomes. Never assume that an organizational unit or specific group of stakeholders knows something or ought to know something. Communication should be ongoing, broad, dynamic, and evaluated. We periodically surveyed administrators about their knowledge of ADVANCE initiatives and objectives in order to vet and improve communication strategies. It is imperative to be clear about who has final decision-making authority for particular issues in different academic units. In a model that recognizes different spheres of influence within the organization, leadership of specific initiatives or programs will fluctuate. In such a distributed model, there are three types of roles—leaders, participants, and interested sideliners—depending on the topic or issue at hand. The people filling these roles change as the topic or issue changes, as does the salience of any given role; ensuring seamless team transitions can go a long way in advancing project goals.

5.6 Challenges of Management

In complex organizations, responsibility for addressing matters of diversity, equity, and inclusion is often distributed across units, with each local unit having its own parallel group or program. It is daunting to navigate an institutional landscape in which different "helping" programs from different layers of the campus (student clubs, departments, colleges/schools, central administration) are targeting different stakeholders (students, staff, faculty, community) using limited resources and requiring collective attention. Get everyone on the same page early on to make sure goals are fully aligned/understood in order to create a collective vision and agenda for transformation. Campus-wide strategic planning toward a common agenda can be time-consuming but worth the effort (see Fuco & Lockhart, 2018).

5.7 Challenges of Sustainability

Another major challenge of institutional transformation is how to sustain progress given the magnitude of the problem of addressing systemic bias and other barriers to inclusion. As the term clearly implies, systemic bias is systemic—it is everywhere within the institution. Yet organizational leaders have many, pressing, often competing, priorities and may ease up on or sideline the commitment to DEI as a result, intentionally or unintentionally. Since bias is systemic, efforts to address it must also become systemic and not solely dependent upon the continued focus of organizational or unit leaders. Commitment must extend from individuals to the community as a whole, with defined mechanisms of transparency and accountability for sustainability.

In the case of the UCD ADVANCE program, successfully sustaining DEI efforts has required and will continue to require significant institutional resources; it also required integrating grant-funded activities into permanent administrative units having oversight of academic affairs and DEI issues. It is essential to develop a "sustainability roadmap" for organizational leaders which clearly delineates the minimum requirements for personnel and financial resource-allocations to support project sustainability. From the outset, project managers will need to keep careful records that include "in-kind" contributions as well as "budget line item" support in order to paint an accurate picture of what is needed to sustain project momentum through leadership changes or other significant organizational restructuring.

6 Broadening This Process to Other Types of Organizations

The organizational efforts and processes used to initiate and sustain institutional transformation as described here were designed for our own community—a research-intensive university within a system of higher education. However, the logic of the organizational structure we propose is more broadly applicable. Many organizations operate as meritocracies where accomplishment and advancement are linked and where assessment of individual merit may be exclusive rather than inclusive. Although many organizations do not have disciplinary expertise on DEI issues, there are plenty of people and resources to help develop organizational vision, goals, and strategies.

Most organizations likely contain internal expertise on local culture as well as individuals who feel marginalized within the organization. Respect their experiences and perspectives. Implementing hiring practices with the sole goal of increasing diversity and assuming that diversity will automatically lead to inclusion is problematic, and the same goes for retention and promotion practices; a deeper effort to understand the forces blocking inclusivity is vital. How is "merit" being defined—of what does it consist? How is it being measured? If teamwork is expected, who assesses merit for individuals on the team? Are certain voices routinely silenced? Are certain perspectives routinely ignored? Often those within the organization deeply familiar with organizational culture will have the best suggestions for modifying it. Moreover, know that vetted processes designed to encourage broad engagement of the workforce as well as equitable hiring and promotion practices exist and can be customized for local implementation.

Having a clear and transparent communication strategy that articulates the goal of inclusiveness is as important for non-academic as for academic institutions. Maintaining commitment and focus is a substantial but not insurmountable challenge.

7 Conclusions

Institutional transformation is complex and requires an engaged leadership committed to the task. Given the magnitude of the issues being addressed, commitment to sustainability must be imbedded within the community. Communication is critical—it must be done well, often, and responsively. The vision for change must be more than an aspirational goal, but one that is achievable by the organization or institution in a timely manner.

Generic Recipe for Institutional Transformation—Inspire and build Your Team!

(1) For organizational leaders:

   a. Understand DEI issues on a deep level/have access to accurate institutional data and its context in comparison to similar institutions

b. Commit to the needed resource allocations and communication strategies when faced with competing priorities
c. Be comfortable mediating conflicts that may arise between project sub-teams and organizational stakeholders.

(2) For the transformation team composed of action-oriented subgroups led by respected colleagues:

a. Have expertise in critical knowledge domains
   i. Institutional data collection, analysis and evaluation
   ii. Project management and strategic communications
   iii. Finance/resource allocation management
   iv. DEI disciplinary expertise (e.g., health sciences, social sciences, cultural studies)
   v. Local context and its DEI challenges/existing institutional resources.
b. Engage representatives from key internal stakeholder groups /organizational units
   i. Internal advisory board/unit leaders (e.g., deans and department chairs)
   ii. Sub-team leaders and members (e.g., faculty and staff engaged in DEI work and/or representing organizational units).
c. Partner with stakeholders and collaborators external to the organization
   i. External project evaluator
   ii. External advisory board composed of DEI experts
   iii. Community members (e.g., regional groups with an interest in DEI activity at the institution)
   iv. Traditional and social media
   v. Funding agencies and philanthropic groups supporting DEI efforts.
d. Identify/collaborate with external funding agencies and philanthropic groups to achieve DEI research goals
   a. Support innovative perspectives in team science research
   b. Create projects to attract youth from underserved communities into higher education
   c. Explore minority supplements to existing funded research projects.

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Diversity, Demographics, and the Latinx Experience

A Long-Term Vision on Faculty Diversity at UC Davis

Raquel E. Aldana and Josephine M. Moreno

Abstract The sustainability of ADVANCE, beyond its early successes at UC Davis, largely depends on whether it can propel the types of transformational changes needed to fulfill ADVANCE's own aspirations. One of these aspirations is to change the face of STEM at UC Davis. Transformational change must consider the pipeline of Latinx and other underrepresented students into all doctoral programs, including but not limited to STEM. This chapter addresses the need to expand on the ADVANCE initiative to grow the pool of doctoral underrepresented minority (URM) students at UC Davis and nationally, as well as to promote their integration into successful careers after graduation, as professors, scientists, or professionals who go on to become leaders in government or industry. At UC Davis, these efforts have already begun in earnest and include visionary changes to revamp recruitment practices for graduate students, transform graduate admissions practices, and improve mentoring of students during and after completion of their programs. This chapter explores these efforts at UC Davis and summarizes the lessons learned from their implementation.

Keywords Graduate student · Holistic review · Graduate admissions · Faculty pipeline · Diversity · Equity · Inclusion

1 A Brief History of the Academic Diversity Project at UC Davis

At UC Davis, the project of diversifying the faculty began about two decades ago and intensified considerably with the support of a National Science Foundation ADVANCE grant in 2012. The ADVANCE grant allowed us to institute a series of innovations that have steadily advanced our academic diversity goals. The hiring of underrepresented minority (URM) persons—that is, members of groups that have

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been denied access or who suffered past institutional discrimination—as ladder-rank faculty occurred sporadically and with modest results before 1996, the year that California voters adopted Proposition 209. Prop 209 banned discrimination and prohibited affirmative action programs that use race and other factors such as gender in academic hiring. In academic diversity profiles at UC Davis, we have generally included in the URM definition ladder-rank faculty who identify as Black/African American, Native American, and Latinx/Chicanx (See the UC Davis Diversity & Inclusion Strategic Vision, 2017).

Within a few years after the adoption of Prop 209, then-Chancellor Larry Vanderhoef expressed to the Academic Senate at UC Davis his concern about significant decreases in the hiring of women. He asked schools and colleges alike to recommend strategies both for increasing the hiring of women and minorities and for improving campus climate (Rockwell, 1999). Women made up 16% of hires in 1997–98; those figures rose to 40% in the early 2000s, then bounced around until recently when they stabilized somewhat.

Women currently make up between 45 and 51% of hires. Between 1997 and 2016, the proportion of hires that were people of color (a term that includes faculty of Asian descent) has ranged widely between 18 and 41%. Recent reports disaggregate the picture further. During the recent recruitment period of 2011–2016, most schools hired a higher proportion of people of color than were actually available in the workforce. Individual differences exist between colleges in terms of the proportion of applicants versus interviewees. In most professional schools and colleges within UC Davis, women applicants and Black/African American applicants lagged behind availability. By the time of their interviews, the proportion of women again resembled the availability pools, but the same was not true for Black/African American interviewees who continued to lag behind. In turn, this resulted in small numbers of Black/African American candidates hired. For almost all colleges and schools, the proportion of Latinx/Chicanx applicants, interviewees, and hires exceeded their proportion in the pool. UC Davis received its NSF-ADVANCE grant in 2012, and the success in hiring Latinx/Chicanx candidates is due to the Center for Advancing Multicultural Perspectives in Science (CAMPOS) that constituted an important initiative under the grant.

2 Challenges in Diversifying Faculty

Despite these steady and recent gains, progress toward diversifying the faculty at UC Davis has been frustratingly slow and has failed to keep pace with either the growing diversity in California or the changing composition of the student body. In 2018, UC Davis's undergraduate student profile consisted of 31% Asian, 23% White, 22% Latinx, 17% International, 4% Black/African American, and 1% Native American. Yet, the corresponding statistics for UC Davis ladder rank faculty for 2018 was 14% Asian, 54% White, 5% Latinx/Chicanx, 20% International, 3% Black/African American, 1% Two or More Races, and <1% American Indian (Figs. 1 and 2).

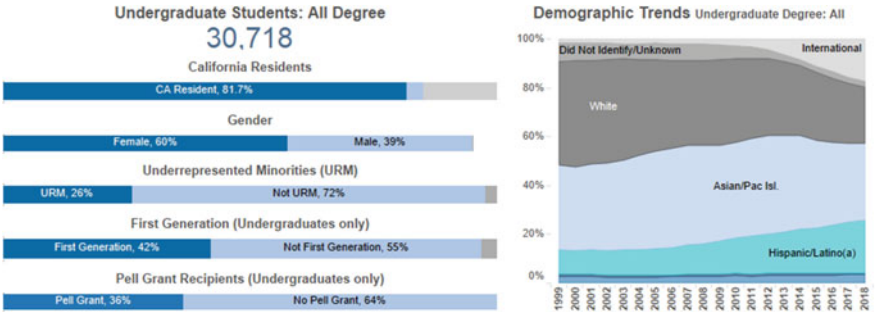

Fig. 1 UC Davis Fall 2018 enrollment of undergraduate students: residency, gender, first gen, pell recipients, and race/ethnicity. *Source* UC Info Center

UC Davis's slow progress toward diversifying the faculty has various explanations. One is the campus's legacy of having a predominantly white ladder-rank faculty, which means that opportunities to diversify the faculty depend largely on the availability of new hires. Alternatively, the number of new faculty hires can also depend on openings that arise from faculty attrition, such as departures or retirements, or accommodations made for student growth whenever funding is available. At UC Davis, growth driven by undergraduate students has not been an issue. In 2018, a record 95,207 applicants sought admission into UC Davis as freshmen or transfer students; consequently, UC Davis's enrollment capacity of 39,000 has been easily met (May, 2018a). In contrast, over the same period, the campus has experienced modest revenue growth (based on small and temporary increases of in-state funding as well as imposed caps on nonresident tuition). Concurrently, campus expenditures have increased as a result of, for example, higher costs of funding salaries and benefits for faculty and staff (May, 2018b). Moreover, UC Davis has experienced a slow pace of ladder-rank faculty departures or retirements (Kaskle et al., 2012).

Once hired, faculty at UC Davis tend to stay for many years. The dates at the bottom of Fig. 3 represent the dates of hire for all ladder faculty currently working at UC Davis and show that although the campus has been hiring with greater diversity in recent years, the legacy of homogeneity in the academic pool has a long-lasting effect. The dates of hire for those faculty working at UC Davis in 2018 reach back to 1966 with nearly 11% of those who remain (185 of 1711) having stayed 30 years or longer and another 17% of those who remain (291 of 1711) having stayed between 20 and 30 years.

The combination of slower-than-predicted capacity to hire new faculty to accommodate student growth, plus the sluggish pace of retirements, has resulted in fewer opportunities to diversify the faculty through new hires (Figs. 4 and 5).

A second important explanation for the slow progress in diversifying the UC Davis faculty is the lack of diversity in the available pool for ladder-rank academic hires, particularly among new URM and women Ph.D.'s working in STEM fields. The diversity of the availability pool among graduate students unfortunately lags behind national, state, and campus demographics (Fig. 6). Nationally, over 54,000 people

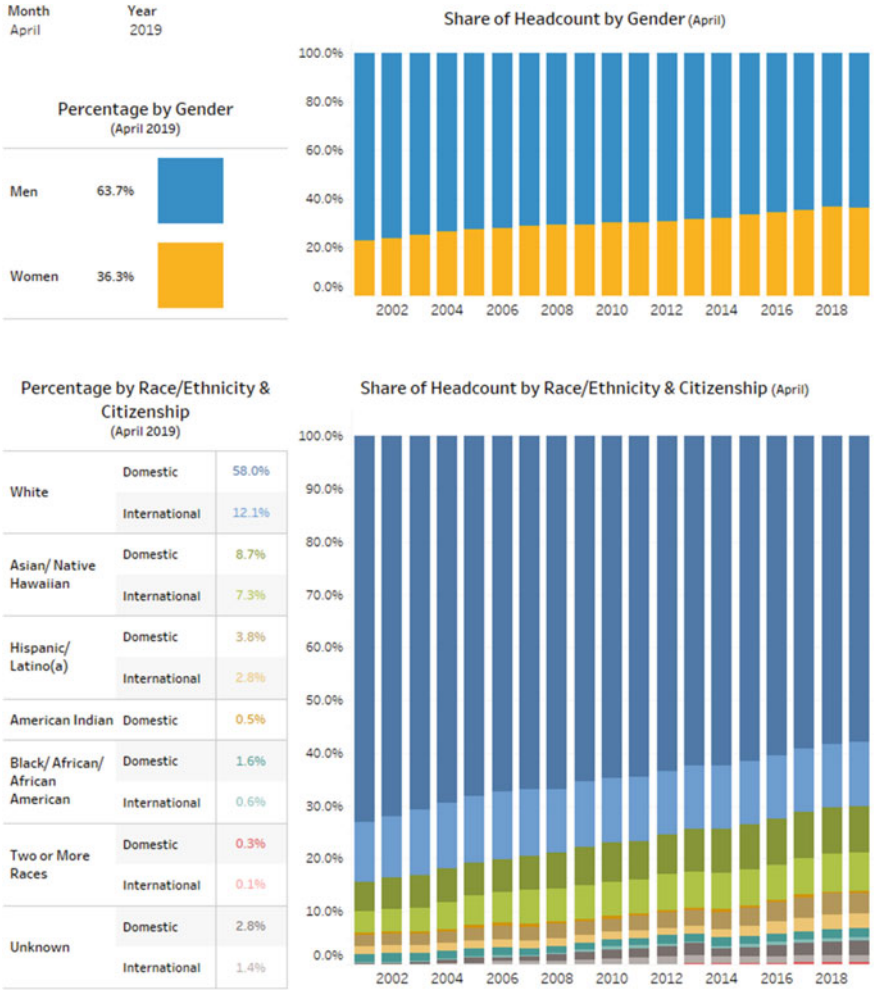

Fig. 2 UC Davis April 2019 ladder-rank faculty profile: gender and race/ethnicity and citizenship. *Source* UC Info Center

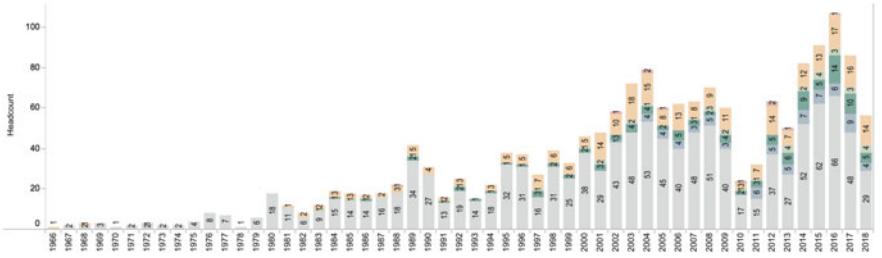

Fig. 3 Hiring year snapshot for UC Davis ladder faculty employed on October 2018 (with ethnicity). *Source* UC Davis academic affairs/budget and institutional analysis

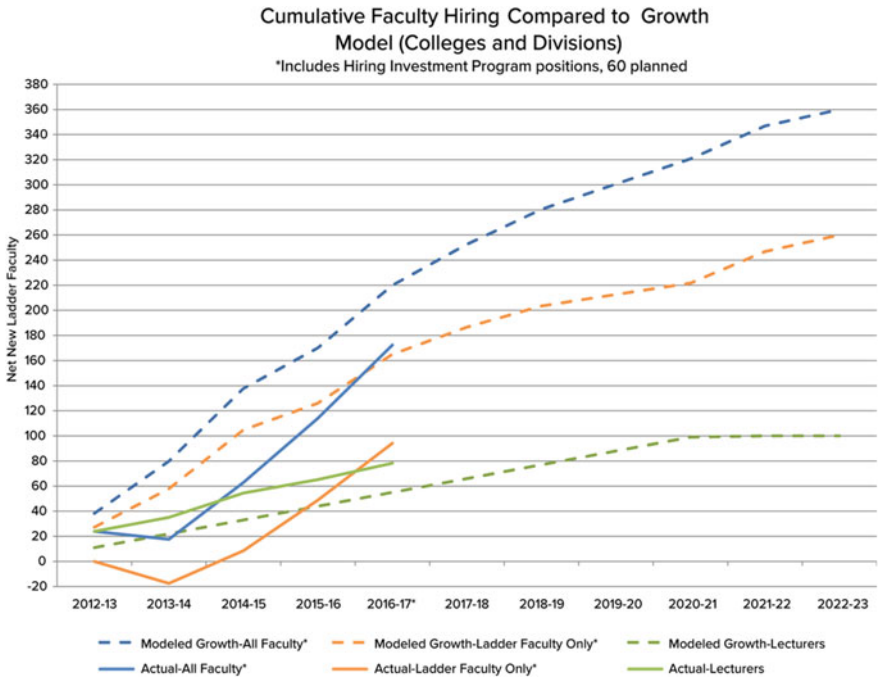

Fig. 4 Ladder faculty recruitment and hiring trends, colleges, as of 2017. *Source* Budget overview: 2017 new department chairs workshop, September 19, 2017, by Ralph Hexter and Sarah Mangum

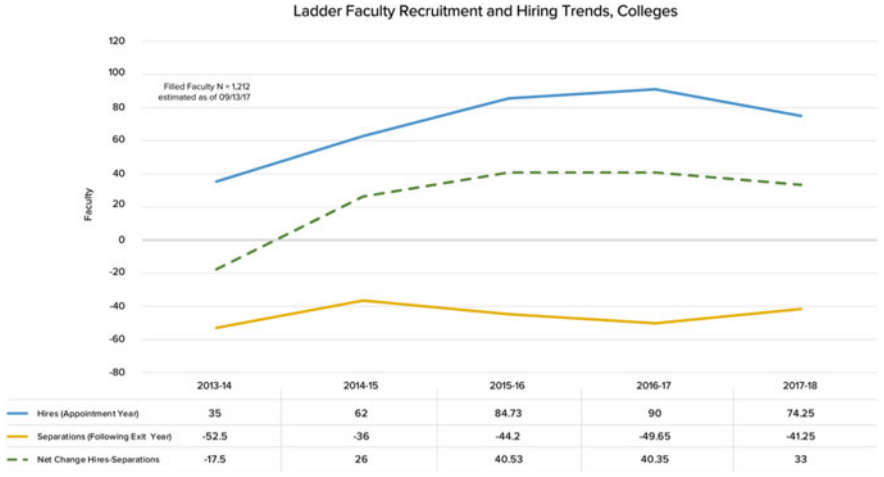

Fig. 5 Cumulative faculty hiring compared to growth model as of 2017 (colleges and divisions). *Source* Budget overview: 2017 new department chairs workshop, September 19, 2017, by Ralph Hexter and Sarah Mangum

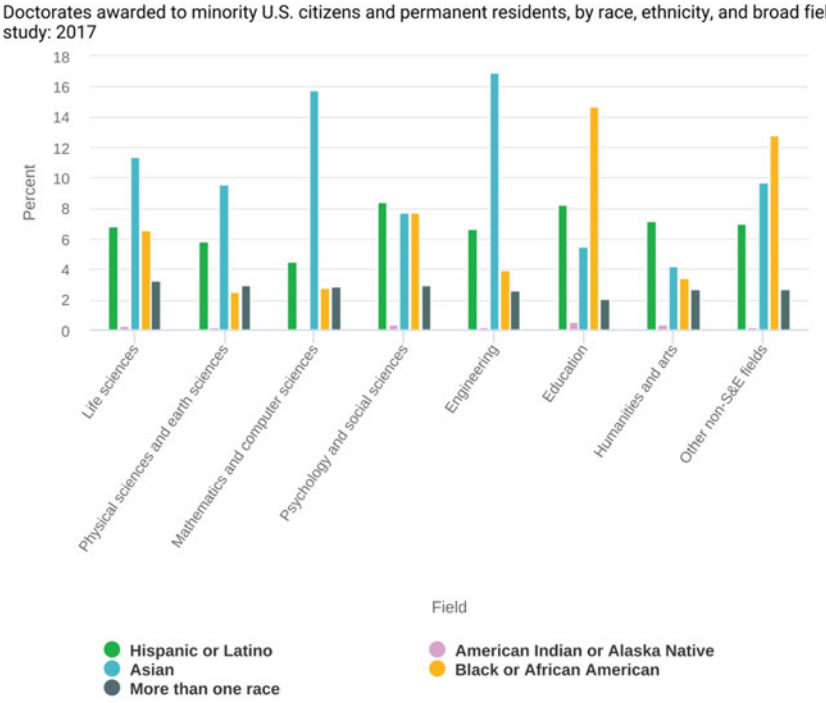

Fig. 6 Doctorates awarded to minority U.S. citizens and permanent residents by race, ethnicity, and broad field of study: 2017. *Source* National Science Foundation, National Center for Science and Engineering Statistics. 2018. *Doctorate Recipients from U.S. Universities: 2017*. Special Report NSF 19–301. Alexandria, VA. Available at https://ncses.nsf.gov/pubs/nsf19301/

earned doctorates in 2017, a growth of more than 10,000 over the past 10 years. Of those, 5% (2540) were earned by people who identified as Latinx/Chicanx, 4% (2409) as Black/African American, and under 1% (103) by American Indian or Alaska Native (Fig. 6). Thus, to fully comprehend the academic diversity project in American higher education at large, it is imperative to consider the development of URM *doctoral* students.

UC Davis Interventions and Innovations in Hiring and Retention

For more than a decade, UC Davis has committed to hiring faculty coming from diverse backgrounds, achieving this by instituting several significant, process-based interventions. These interventions have included mandatory diversity statements from all applicants, monetary incentives, and mandatory implicit bias training for

faculty hiring committees. Additionally, an Associate Vice Provost for Equity and Inclusion reviews all shortlists to ensure that those invited to interview reasonably reflect the diversity of the available pool of applicants as measured by the number of Ph.D.'s in the field (Fig. 7).

In 2018–2019, based on a grant from the University of California to advance academic diversity, UC Davis adopted several additional innovations to improve the hiring process. Among these are efforts to conduct open searches targeting faculty committed to embracing campus diversity and inclusion values, and to start the selection of candidates with an assessment of the diversity statement (see https://academicaffairs.ucdavis.edu/advancing-faculty-diversity-pilot-project). Early results show their great promise to increase the pool of faculty of color across many fields.

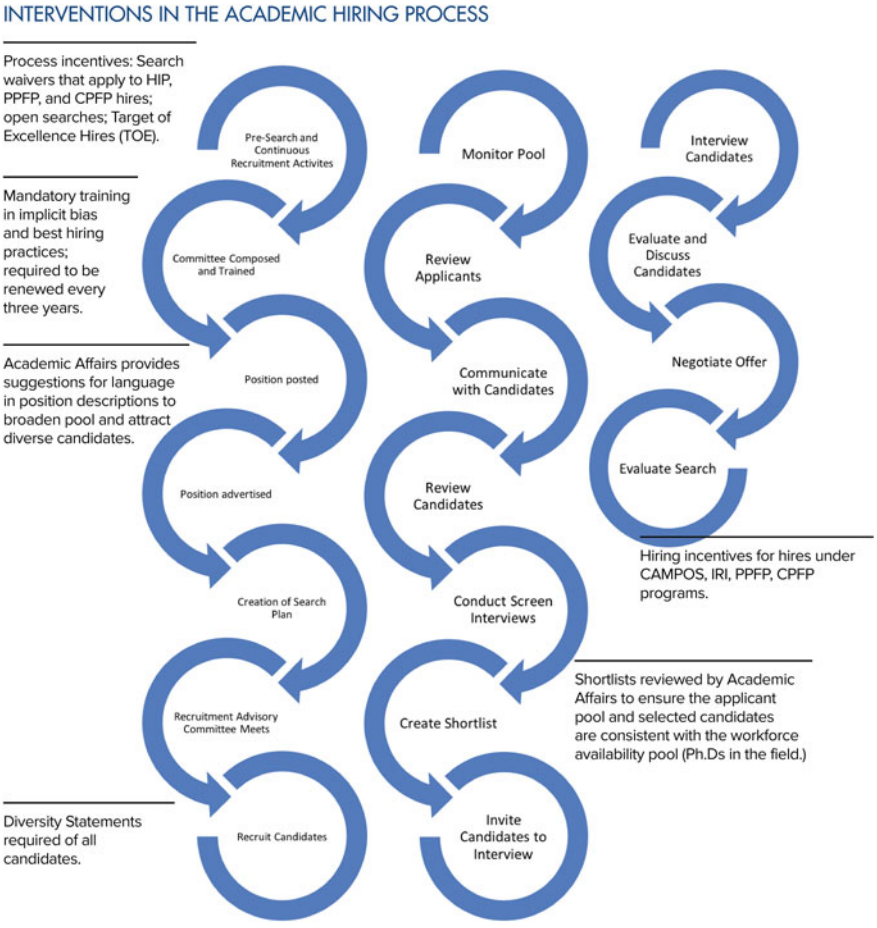

Fig. 7 Current interventions to promote diversity in the academic hiring process

In response to the representational imbalance of Latinx/Chicanx in STEM education (White House Initiative on Educational Excellence for Hispanics, 2014), the National Science Foundation encouraged UC Davis to focus its ADVANCE grant on expanding the representation of Latina faculty in STEM. Accordingly, over the last eight years since the implementation of ADVANCE, UC Davis has hired 25 faculty across 20 STEM academic disciplines whose research, teaching, and service bring multicultural perspectives to science. (For a full list of CAMPOS scholars, visit https://diversity.ucdavis.edu/scholars). More than 50% of the new hires are Latinx/Chicanx and overwhelmingly women. This is a significant achievement given UC Davis's starting place in 2012 when only 33 Latinx/Chicanx (4%), 16 other URM (2%), 134 Asian (15%), and 238 women (26%) were among the 919 ladder-rank faculty who taught in either the College of Agricultural and Environmental Sciences, the College of Biological Sciences, the College of Engineering, or the Divisions of Math and Physical Sciences and Social Sciences (representing most of the disciplines considered science, technology, engineering, and math, or STEM). Nonetheless, Latinx/Chicanx, URM, and female faculty remain disproportionately underrepresented among STEM faculty at UC Davis. Today, in 2019, at UC Davis, 52 Latinx/Chicanx (5%), 24 other URM (2%), 167 Asian (16%), and 327 female (32%) ladder-rank faculty are among the 1038 ladder-rank faculty in these same colleges and divisions.

3 Connecting the Hispanic Serving Institution (HSI) Project at UC Davis to the Academic Diversity Project Through the HSI Graduate Pipeline

The history of Hispanic[1] Serving Institutions (HSI) represents a move toward equity for Latinx/Chicanx students in higher education. In contrast to Historically Black Colleges and Universities (HBCU), HSIs, as defined under federal law, relate the "fit" between the demographics of the local population and the demographics of the student body in the region's colleges and universities (Laden, 2001). According to federal law, HSIs comprise colleges and universities that (1) are an eligible institution; and (2) have an enrollment of undergraduate full-time equivalent students that is at least 25% Hispanic at the end of the award year immediately preceding the date of application (Title 20—Education, 2015).

Eligibility is determined by two factors: (1) enrollment of at least half of HSI students who are also low income (eligible for need-based financial aid) and (2) who also demonstrate low resources as measured by a comparison of per-undergraduate student expenditure of the institution seeking eligibility, as compared to the national average per-undergraduate student expenditure at similar institutions (Title 20—Education, 2015). Moreover, colleges and universities applying for HSI eligibility

[1] Hispanic, Latino/a, Latinx and Chicanx are used interchangeably. All refer to persons of Latin Amerian or colonial Spanish heritage.

may seek a waiver of the second factor but not the first (Eligibility Designations & Application for Waiving Eligibility Requirements, 2019). The determination of the threshold enrollment numbers relies on the methodology employed by the Integrated Postsecondary Education Data System (IPEDS), maintained by the Center for Education Statistics (NCES). IPEDS uses a methodology that filters Latinx/Chicanx students into three separate categories based on their immigration status. Only those eligible for financial aid under federal law, including U.S. Citizens and lawful permanent residents, are classified as "Hispanic/Latino." In contrast, DACA students (in the Deferred Action for Childhood Arrivals program) are classified as "Nonresident Aliens," while undocumented students are filtered into a category of "No Race/Race Unknown" (IPEDS Data Collection System, 2019–20).

Narrowly focused, HSIs direct federal funding opportunities to undergraduate education at under-resourced institutions. An entire body of scholarship exists today that has shifted the HSI framework to more-robust conceptions of equity or service (Garcia, 2018). UC Davis, in developing a set of values related to its own HSI-initiative, also borrowed the term "Rising Scholars" to describe the full range of students who might benefit from our efforts and to signal a move away from a "student deficit" framework toward one that embraces institutional transformation and acknowledges the cultural and personal assets that students bring to our campus. The "Rising Scholars" initiative also suggests that, as HSIs have grown 98% in the past 10 years to 523 colleges and universities (2017–18), they have begun to occupy even elite spaces in higher education, shifting the academy toward defining what the role of research-intensive HSI institutions can and should be.

Most of the 17% of all institutions that meet the HSI definition are small (62% of HSIs enroll fewer than 5000 students). Public two-year institutions make up 42% of HSIs, whereas public four-year institutions make up 25%. Most of these institutions are located in California, Texas, Puerto Rico, and New York (69% together). At HSIs, 46% of undergraduate students are Latinx, while 66% of college-going Latinx attend an HSI. Only the following 14 institutions are HSIs which, according to their Carnegie Classifications of Research Institutions, also have very high research activity (denoted R1) (Fig. 8).

Even though UC Davis is not yet formally designated a HSI, in fact it serves more "Hispanic" students (6361 in 2017–18) than do HSI-designated R1's UC Santa Barbara (5851), UC Santa Cruz (5851), University of Illinois at Chicago (6058), University of Nevada Las Vegas (6215), and CUNY Graduate School and University Center (352) (Excelencia in Education, 2019; IPEDs, Carnegie Classifications). The impact of R1s on the HSI landscape has significant potential, in part because of the large numbers of students that these institutions educate.

The entire University of California system, which boasts a total of five HSIs, can play an important role in contributing to the academic diversity pipeline for its 10 campuses. It can also link our academic faculty diversity project to key goals such as increasing a sense of belonging, teaching excellence, research innovation, and public service—all of which attempt to fulfill UC Davis's original land grant mission to serve the diverse peoples of the state. In addition to the campuses listed above, UC Merced is a HSI (but is considered an "R2," according to Carnegie Classifications). UCLA,

Fig. 8 List of HSI research institutions

UC San Diego, and UC Davis are each emerging HSIs and have come very close to reaching the full status. UC Berkeley also recently announced its commitment to attain HSI status in the next decade. The only campus not technically eligible for HSI status under the narrow federal definition is UC San Francisco, since it is largely a graduate and professional school.

As the UC-wide vision to become "Hispanic-Serving" is constructed, graduate and professional education are likely to be included. In 2013, 66 of 370 HSIs offered doctoral degrees; in 2017–18, 119 now offer doctoral degrees, with 54 located in California, the most of any other state (Excelencia in Education, 2019). While the number of HSIs offering graduate programs is growing, the key to understanding the pipeline to faculty careers is the actual number of Latinx students who go on to pursue doctoral degrees. Thus, the pipeline begins with undergraduates who earn bachelor's degrees and who later enter doctoral programs where the pipeline narrows considerably, allowing even smaller numbers of Latinx students the privilege of pursuing the highest possible levels of education.

The growing Latinx population in the United States and Puerto Rico drives the pool of applicants to all doctorate-granting institutions, including UC Davis; yet only a small proportion of that population makes it to college, goes on to earn a bachelor's degree, and eventually advances into a graduate program.

- Of the total U.S. population of 326 million, 18% or 59 million, identify as "Hispanic.," (https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk, Drawn on April 25, 2019).
- In the United States, 48 million persons 25 and older, or 14%, held a bachelor's degree in 2018 (U.S. Census Bureau, 2019).
- "Hispanics" holding bachelor's degrees numbered only 4.4 million: 9% of all bachelor's degree holders, 7% of 59 million Hispanics, and only 1% of the total U.S. population.

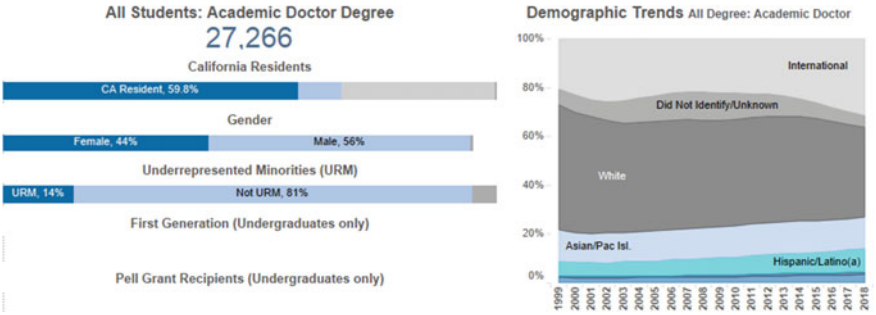

Fig. 9 UC Davis fall 2018 enrollment of graduate academic students: residency, gender, and race/ethnicity. *Source* UC Info Center

These degree holders comprise the domestic pool who apply to graduate school. The same 2018 U.S. census data report that a mere 193,000 Hispanics hold doctoral degrees. These few Latinx scholars who actually pursue and successfully earn doctoral degrees contribute to a very narrow pipeline available to grow the numbers of Latinx faculty.

The University of California offers nearly 500 doctoral programs in all major fields of study, nearly all of which are classified at the highest levels of research activity by the Carnegie Classification of Research Institutions. Within the UC system, the number of students educated is truly impressive. In fall 2018, more than 280,000 students were enrolled across all higher-education levels, of which 26% identified as URM and 21% as Hispanic/Latino(a) (UCOP, 2019) (Fig. 9). Further delineated, UC educated more than 222,000 undergraduate students, of which 29% identified as URM and 22% identified as Hispanic/Latino(a). In academic doctoral programs, that is, those programs considered most likely to be pathways to the professoriate, 27,266 were enrolled. Of those, 14% identified as URM and 10% identified as Hispanic/Latino(a). The "leakiness" of the pipeline is concerning, but the number of URMs in the academic pipeline, at just over 3800, nonetheless affords an increasing sense of belonging among URM graduate students and later advancement into faculty and researcher roles (UCOP, 2019). Academic doctoral programs also attract a high number of international students to the UC system: 31% in 2018. While international students may have different challenges and pathways, their participation adds to the overall diversity of UC graduate programs.

In the last two decades, the University of California has also trained tens of thousands of health professionals in the state, including thousands who are health professionals of color. The following link provides an interactive chart of all the UC-educated health professionals in California, broken up by field and demographics that include race and ethnicity: https://www.universityofcalifornia.edu/infocenter/uc-health. Moreover, five of the 21 American Bar Association–accredited law schools in California are part of the University of California; in 2018, combined, they enrolled nearly 1400 students, almost half of whom were students of color. For a list of California law schools, visit http://www.calbar.ca.gov/Admissions/Law-School-Regula

tion/Law-Schools. Consider the student profiles data reported by each of the five UC law schools for their entering classes in 2018: UC Berkeley has 314 students, 46% students of color; UC Davis has 206 students, 53% students of color; UC Hastings has 313 students, 48% students of color; UC Irvine has 229 students, 50% students of color; and UCLA has 311 students and 41% students of color. As well, the number of UC-trained California public school teachers is nearly 30,000, over half of whom teach in lower-income schools and collectively teach more than two million students (https://www.universityofcalifornia.edu/infocenter/uc-trained-california-public-school-teachers).

Thus, the University of California system plays an important role in increasing the diversity of the academic pipeline nationwide. UC Davis is an example of only one institution that Latinx and other URM students may select to pursue a doctoral degree. The UC system is not only considered a driver of innovation, but also a means of social mobility, educating large numbers of first-generation college-goers, children of immigrants or the economically disadvantaged. Today UC Davis offers far more than its original agricultural and "mechanical arts" training. Contemporary strengths include agricultural and environmental sciences, biological sciences, education, engineering, health sciences, letters and sciences, management, and veterinary science fields.

The establishment of additional HSIs in California and across the United States speaks to the significant needs of the Latinx population throughout the country. Moreover, given the small number of research-intensive institutions that are HSIs, contextualizing UC Davis among its HSI counterparts demonstrates a nuanced understanding not only of the specific issues one institution faces but also of issues and opportunities among research universities that educate large numbers of Latinx students.

4 Implications of UC Davis's HSI Initiative on Academic Diversity and Graduate Pathways to the Professoriate

The process of envisioning what HSI status would mean for UC Davis as a land-grant research-intensive university was launched in July 2018 when Chancellor May established the HSI Taskforce. The taskforce was charged with making recommendations to improve the success of all UC Davis students, including UC Davis Latinx/Chicanx students, and to identify the reforms and resources necessary to achieve these goals. It completed the report on March 29, 2019, which was publicly released on May 7, 2019. The Taskforce organized its 52 recommendations under four principal goals:

1. Prepare and attract to UC Davis a broad profile of Rising Scholars (a term we adopted from White (2016), to embrace an asset-oriented view of students who are first-generation college students, URM, and/or low-income),
2. Ensure that Rising Scholars have the opportunity to learn, succeed, graduate, and thrive,

3. Fulfill UC Davis' Hispanic Serving mission by elevating students to industries with critical workforce needs, preparing and educating all students to serve in a multicultural society, and
4. Harness the collective strengths of the University of California as a system to transform higher education.

Each of these goals and recommendations, moreover, was grounded in four important values and the guiding principle that institutional transformation would acknowledge UC Davis's legacy as a predominantly white, elite institution which has largely operated to marginalize the very students now being classified as Rising Scholars. In other words, the HSI Taskforce report sought to reexamine and address institutional structures and practices—such as implicit bias and lack of diversity—that have served as barriers to success for these students.

The first value rested on equity as informed by Chicanx/Latinx demographics in the state of California, the unique civil rights history of that population in the state, and the persistent disparities in nearly all the social indicators for Chicanx/Latinx communities (Aldana & Reed, 2019). The second value rested in the use of the term "Rising Scholars" to refer to the profile of HSI students—largely first-generation college students, low income, and URM—and intentionally shifts away from deficit-thinking explanations of academic achievement gaps and toward structural explanations; i.e., opportunity gaps versus achievement gaps. The third value was informed by an extensive literature connecting a sense of belonging to academic achievement for URM groups. And last, the fourth value stems from UC Davis's land grant mission, which encompasses serving rural and underserved communities through teaching, research, and service. As the Report states,

> Through the HSI initiative, we envision UC Davis as a culturally responsive learning community that fulfills the mission of a Research 1 and land grant university, closing the equity gap in higher education; enabling all of its community members, including Rising Scholars, to thrive and reach their full potential; and elevating our excellence in public service and scholarship. (Aldana & Reed, 2019, p. 7)

A few of the recommendations that highlight the centrality of the academic diversity project to the UC Davis HSI vision are as follows:

- Commit to increasing the number of Rising Scholars who enter graduate and professional programs by (1) supporting the implementation of holistic admission practices across all graduate and professional programs and groups that desire to recalibrate their admissions practices; (2) creating and resourcing a role in Graduate Studies charged with developing outreach and recruitment strategies for bringing Rising Scholars into graduate programs; and (3) collaborating with the University of California Office of the President (UCOP) to establish formalized efforts to reach and recruit Rising Scholars across all 10 campuses for graduate programs (Aldana & Reed, 2019, p. 53);
- Establish institutional incentives to empower faculty and staff with the skills they need to effectively teach, mentor, innovate, lead, and build positive campus climates and learning environments by, among other things: sustaining Rising

Scholars in the pipeline to the professoriate, supporting the conditions for teaching innovation, and building a framework (either inside or outside the current budget model) for public scholarship and research that places a value on high-touch, high-impact outcomes for Rising Scholars (Aldana & Reed, 2019, p. 55);

- Fulfill our Hispanic Serving mission by elevating students to industries with critical workforce needs and by preparing and educating all students to serve a multicultural society. This requires, among other things, (1) creating bridges between communities and academic departments to position our students, alumni, and faculty to meet the needs of under-resourced communities and industries and (2) working with students, faculty, and staff to cultivate compassion, humility, and social awareness (Aldana & Reed, 2019, p. 57); and
- Harness the University of California collective strengths as a system to transform public education by, among other things, (1) developing a 10-campus Rising Scholars "pathways to the professoriate" initiative that innovates around outreach to undergraduate students, holistic admissions to graduate programs, outreach to graduate students, and incentivizing postdoctoral fellowship programs, and (2) addressing the ongoing crisis in representation of Chicanx/Latinx faculty by increasing funding for existing recruitment and hiring strategies (Aldana & Reed, 2019, p. 58).

Many of these recommendations align several other important strategic vision plans at UC Davis, including Chancellor May's "To Boldly Go" Strategic Plan and the UC Davis Diversity and Inclusion Strategic Vision (Aldana and Reed, pp. 62–63). More important, many significant initiatives are under way at UC Davis that complement the recommendations mentioned above, and others are now being explored.

The remaining portions of this chapter will focus mostly on UC Davis efforts to-date to sustain the academic pipeline, situating it in the context of our HSI framework. Also, we intentionally address some of the barriers that persist and must be overcome if we are to reevaluate our present and reimagine our future. Where are we now in achieving some of the recommendations identified above, and where do we want to be?

5 Challenges in Diversifying Graduate Programs

The ADVANCE program, which focused on diversifying UC Davis faculty, has received increasing attention, as have programs that require faculty hiring committees to be trained in equitable and inclusive hiring practices. Moreover, the increasing diversity among undergraduates is promising, particularly for California's large Latinx population. However, the link to faculty diversity depends on training graduate students from diverse backgrounds. A significant challenge here is that the pipeline narrows as URMs apply, are admitted, and eventually accept admission offers, with the number of Latinx applicants decreasing at each step.

- At UC Davis, the number of applications received from 2009 to 2017 averaged 10,200 per year for academic master and doctoral degrees, increasing from 8,181 to 11,111 during the nine-year period.
- Of the total, URM *applications* averaged 675 over the same time frame, increasing from 415 to 757, or 5% and 7% of the total number of master's and doctoral applications, respectively. The number of URM *admissions* grew slowly from 2009 to 2017, averaging only 212 a year for academic master and doctoral programs at UC Davis. The totals increased from a low of 129 to 262 during this same nine-year time span.
- Latinx *applications* numbered 701 in 2017: only 6% of the total number of 11,111 applications in the same year. In 2017, *admissions* from the 701 Latinx applications resulted in only 257 admissions, or 8% of all admissions in the same year. The final outcome is that acceptances numbered only 122, or 10% of all "yes" responses in 2017.

Latinx admissions in 2017 reflected a very slow increase from previous years, and far fewer than the percentage of the Latinx population in California or United States. The data in this paragraph are drawn from a UCD Graduate Studies' Analysis and Policy report dated April 16, 2019. These data suggest the number of Latinx with bachelor's degrees is growing, but far fewer seek graduate degrees. Moreover, the winnowing effect through personal election and faculty gatekeeping (Posselt, 2016) in the graduate admission process reduces Latinx applicants even further, resulting in the small number of Latinx graduate students who enroll at UC Davis each year.

Enrollment of Latinx graduate students is, of course, not the end-point of developing future faculty; financial considerations and graduate student success also play significant roles. Funding for graduate students is a substantial factor that decreases the number of Latinx persons who enroll if the level of support is not competitive. At UC Davis, graduate students admitted into STEM fields are more likely to be offered a financial "package" that pays fees and tuition (both in-state and nonresident) and that provides a monthly living stipend. However, for many students in humanities, arts, social sciences, and certain other fields, funding consists largely of teaching assistantships during which they devote their time to undergraduate teaching activities, with the payment of fees, tuition, and a stipend governed by collective bargaining. If a graduate student is offered a research assistantship for one or more years, nonresident tuition is also paid as a benefit of employment, particularly for the first year. This situation can be significant for nonresident domestic students who may be expected to pay nonresident tuition while they establish California residency in their first year on campus.

While some university fellowships are offered for all URMs, they are extremely limited, with only 19–23 fellowships awarded to both new *and* continuing diversity students each year. These are largely single-year fellowships; with only the UC-wide Eugene Cota Robles Fellowship is a multiyear offer that every year awards only 5 or 6 new graduate students two years of support at UC Davis. These graduate funding opportunities demonstrate the tenuous nature of admissions and enrollment that depend on whether Latinx students are offered funding that realistically pays a

large percentage of their costs to pursue a graduate degree. The financial offer is also a factor in their success in completing their academic master's and doctoral degrees.

In addition to limited availability of fellowships to support Latinx student success, graduate students also face issues such as cohort and peer competitiveness, microaggressive climates, or their own feelings of self-worth, all of which can thwart successful completion of their graduate degrees. Enrolled Latinx graduate students encounter extremely competitive environments among peers. Often the first generation in their family to earn a bachelor's degree, Latinx graduate students may not be aware of presumed, but uncommunicated expectations within their seminars or graduate programs. Students report microaggressive environments that are fraught with assumptions, negative comments, and lack of support by peers and faculty alike for their ideas, personal experiences, research topics, and sometimes even their use of Spanish when it differs from formal, book-learned Spanish. Their personal self-worth can be low at the start, when students compare themselves to others who may speak more formally, have grown up in middle- to upper-middle-class families, or have attended highly-ranked undergraduate institutions. The phenomenon of "stereotype threat" can set in when students perform poorly due to the communication of an expectation of stereotypical low-group performance by others (Steele & Aronson, 1995). Thus, graduate student success is typically fraught with challenges that must be successfully navigated to attain doctoral degrees in a climate that can be unsupportive and even distinctly negative.

6 UC Davis Best Practices in Growing and Recruiting the Graduate Pipeline

With all these challenges to successfully complete graduate school, UC Davis is employing strategies to support Latinx graduate students. In fall 2013, Graduate Studies created and hired two graduate diversity officers (GDOs), professionals who address and coordinate graduate URM recruitment, admission, and retention or success—one officer covering STEM fields and a second for Humanities, Arts, Social Sciences, and Education fields. Since 2013, Latinx graduate applications, admissions, and enrollment have increased 25%, 40% and 40+%, respectively. With Ph.D.'s in hand, experience as tenure track faculty, and many years of professional experience, both of UC Davis' current GDOs are committed to all three aspects of Latinx graduate students'—and, more broadly—URM success. Facilitating mentorship, holding productive dialogues on race and ethnicity, understanding equity and unconscious bias, and developing grant leadership are cornerstones of their work.

One well-known approach to increasing Latinx doctoral students at UC Davis is to build pipelines by means of formal as well as informal programs and groups. Formal groups allow for direct support of pipeline programs in which Latinx undergraduates participate to learn about graduate school and to experience rigorous preparation for graduate studies. Pipeline programs are common in all disciplines at the state and

national level, such as California's UC LEADS programs and the Ronald E. McNair Scholars, respectively. At UC Davis, specific graduate preparation programs, such as the Undergraduate Research Program and Mentorships for Undergraduate Research in Agriculture, Letters, and Science (MURALS), include URM undergraduates and prepare them for graduate school. Yet these and other graduate preparation programs reach only a small number of Latinx undergraduates each year, suggesting the need to scale up efforts to train larger numbers of Latinx undergraduates who desire to pursue graduate-level studies.

A second situation is the bias against a homegrown pipeline of Latinx graduate students. Faculty and staff regularly advise UC Davis undergraduates to attend graduate school at another institution in order to develop a more varied educational profile and set of experiences. However, many Latinx student foresee financial and cultural barriers to leaving home that may also reflect professional aspirations of giving back to their communities. Consequently, while UC Davis supports and hosts certain pipeline programs, many UC Davis Latinx students may be reluctant to leave California because of their strong cultural ties. Alternatively, when UC Davis hosts programs that draw students from outside the region to their campus pipeline programs, participants represent a mix of in-state and nonresident students which can increase the number of Latinx applicants from these programs. For example, UC Davis is a partner on the HSI: Pathways to the Professoriate grant, led by PI Marybeth Gasman at Rutgers University. HSI Pathways coordinates three HSIs and six research institutions, collaborating to guide and mentor a total of 30 Latinx students each year. In fall 2019, four HSI Pathways, Latinx scholars selected UC Davis for their doctoral studies among all three of the participating HSI institutions: California State University Northridge, University of Texas El Paso, and Florida International University.

Both examples of pipeline programs represent formal initiatives that develop undergraduate Latinx talent for graduate school. However, "building a pipeline" need not be limited to educating and preparing UC Davis Latinx students for graduate studies; it can also involve coordinating and collaborating within and across larger systems (such as University of California and California State University systems) and even regionally, to encourage the interchange of talented Latinx students. UC Davis would benefit from these efforts to train and admit talented Latinx students from the UC or CSU system to dramatically increase the numbers of Latinx graduate students, while aligning with faculty and staff advisors who encourage undergraduates to attend another institution for graduate school in order to acquire broader educational experiences.

In addition to supporting pipeline programs, UC Davis employs a graduate diversity team to focus on targeted recruiting efforts. Five full-time professionals, led by the two GDOs, employ recruiting strategies to lead and assist with campus pipeline programs, reach out to peer programs, recruit at national conferences, and guide electronic outreach and recruitment efforts. These and more expansive electronic outreach and graduate preparation efforts show great promise in developing Latinx talent.

Although preparing Latinx students for graduate school is key to increasing doctoral student numbers, Latinx families should also be incorporated into their children's success. In many Latinx first-generation families, parents may initially hesitate to allow a son or daughter to move away, particulary far from home to pursue even a bachelor's degree. Most realize that earning a college degree has value and is associated with well-paying jobs. But if Latinx undergraduates are the first to earn a bachelor's degree within their families, pursuing a graduate degree is a lesser-known option compared to becoming a physician, lawyer, or perhaps dentist, professions with twice the enrollment of academic programs.

UC Davis recognizes the value of family culture during undergraduate outreach events and campus visits, usually inviting the whole family to participate. But similar efforts are unfortunately uncommon among graduate outreach and recruitment activities. Given the need to increase undergraduate programming to learn and prepare for graduate school across large numbers of Latinx undergraduates, not only could graduate outreach begin early, it could also be offered when families come to visit UC Davis. Moreover, delivering information in Spanish would signal that the University understands the value of directly engaging with Spanish-speaking parents and family members. Consequently, Latinx parents would learn about graduate school alongside their children and together discuss options based on common understandings. In addition, involving Latinx faculty and role models in graduate information efforts can provide inspiration for Latinx students as they consider their futures. Although specific professional careers with high-earning potential are best known, a balanced approach to available options that includes academic and professional fields alike would help Latinx students and their families make informed decisions together about pursuing graduate degrees.

For both Latinx undergraduates and their families, understanding the relevance of graduate education to careers and future earnings deepens their knowledge about graduate education and its potential for both occupational advancement and long-term employment benefits. Deliberately demystifying what graduate school actually is—that is, why someone would want to attend such a school; master's versus doctoral degree tracks; and differences between academic and professional degrees—would provide a foundation for further exploration. Degree relevancy is very meaningful for Latinx students and their families, and could be successfully communicated through undergraduate career-exploration efforts that connect career aspirations with doctoral studies. Specifically connecting STEM graduate programs to relevant careers within academia and industry could help turn the dream of earning a PhD into a reality.

Latinx success in graduate school is critical to finishing the doctoral degree and to being successful on the academic job market. When provided with sufficient funding, Latinx students can thrive in graduate school environments that include culturally sustaining and applied STEM curricula, a range of relevant research opportunities, and diverse faculty role models and mentorship. Understanding the connection of curriculum to the overall structure of the doctoral program and to scientific outcomes and breakthroughs convey to Latinx students why the degree is worthwhile, particularly for students who might be second-guessing their decision to pursue one.

For both new and continuing Latinx graduate students, securing valuable and relevant research opportunities can be a difficult process, one that inhibits learning and reduces competitiveness. Although each graduate program or faculty has its own way of "advertising" its research expertise and making research opportunities known, formal rather than informal approaches benefit both Latinx and URM graduate students in STEM fields and help prevent stalling before finding a research direction. For example, graduate programs that expect students to reach out to individual faculty about advising and research opportunities might include a rotation of faculty through graduate courses to discuss their subfields, development of sustained research projects, and research possibilities. As a result, every graduate student would have access to similar information about gaining research experience and working with specific faculty. A second, more common approach, but one not consistently employed across STEM fields, is for new graduate students to rotate among faculty research labs, thus being exposed to a multiplicity of research options they can revisit after completing their lab rotations. This second, more-formal approach would provide a wide view of research opportunities within students' graduate programs. Both strategies offer Latinx scholars exposure to research opportunities as well as potential faculty mentors, thereby reducing the possibility they will languish at the university without direction or healthy faculty mentorship.

7 Admission with Equity

In recent years, UC Davis has seen exponential growth in its Latinx undergraduate population, which is a result of an intentional strategy in undergraduate admissions. However, due to a very different admissions model, increases in enrollment by Latinx graduate students are relatively low. Undergraduate admissions are led by a team of top-level administrators and admissions professionals, but an analogous infrastructure does not exist for the majority of graduate and professional programs at UC Davis, much less in higher education as a whole. Since the passage of Prop. 209 in 1996, the University of California, with its commitment to public education and access, has slowly developed undergraduate admissions practices that combine qualitative and quantitative metrics to consider holistically applicants' background and preparation. The development of holistic admission practices, coupled with the strategies and skills of well-trained, year-round professional staff, has resulted in an increasingly diverse, prepared, *and* competitive undergraduate student body.

Undergraduate admissions practices contrast starkly with those of graduate admissions, which are the purview of faculty senate members within each graduate program or group. Admitting graduate students is considered a component of faculty self-governance, thus faculty may resist any attempt to modify the process by others.

Broadly speaking, graduate admissions committees meet annually, often with limited to no training, to review applications and decide whom to admit and fund,

with departmental and disciplinary cultures at play. The first review may be accomplished with as few as one or two persons, who quickly narrow the number of applications to be read. Particularly in STEM fields and within some professional schools, it is within this first round of review that standardized test scores, overall grade point averages (GPAs), and undergraduate institutional prestige are heavily considered, thus contributing to the elimination of nearly all women and URMs in STEM (Miller & Stassun, 2014). Moreover, graduate admissions committees and leadership regularly change from year to year. Consequently, there is little time to develop new or even to update ongoing graduate admissions policies and procedures in a landscape that prioritizes faculty research above teaching and service. Consequently, UC Davis' undergraduate admissions are founded on a structural model that is inherently different from how graduate admissions take place at the university and at similar research institutions.

Although most graduate admissions processes occur as described above, a new equitable and inclusive approach to the graduate admissions process is taking root at UC Davis, one based in scholarship and faculty involvement and demonstrating promise for all fields, including STEM. The *Alliance for Multi-Campus Inclusive Graduate Admissions* (AMIGA) (https://www.projectamiga.org/; https://www.projectamiga.org/) teams two University of California graduate divisions—at UC Davis and UCLA—to collaborate with graduate program chairs, faculty, colleagues, and staff to incorporate holistic review methods into their graduate admission processes. With support from the Andrew W. Mellon Foundation, the project is an outcome of a seed grant that examined holistic review and its potential to support equity, inclusion, and diversity at four UC campuses.

The AMIGA project addresses ways that current graduate admissions processes can raise barriers to accessing graduate education. Participants collaborate to pilot more inclusive and equitable graduate admissions, drawing on scholarship and sharing best practices that include addressing faculty development to do the following:

- Achieve diversity in a Prop 209 environment,
- Contextualize GPAs,
- Develop and use rubrics,
- Deemphasize or eliminate standardized test scores, and
- Reduce unconscious bias.

Participating departments and programs aim to understand how a broad range of admissions criteria predicts successful outcomes in graduate education. Ultimately, AMIGA's goal is to develop new holistic graduate admissions methods that spark conversations about student diversity and the role of universities in fostering equity and inclusion and that lead to evidence-based institutional change, resulting in increased graduate student diversity. A second initiative, *California Consortium for Inclusive Doctoral Education* (C-CIDE) partners five UC campuses and promotes holistic review through faculty development in a small number of STEM fields. In addition UC Davis' participation, four additional UCs participate- UC Berkeley, UC Irvine, UC Santa Barbara and UC San Diego.

Both the AMIGA and C-CIDE projects are having a powerful effect in introducing and supporting holistic graduate admissions processes campus-wide, including in STEM fields. With nearly three years of advocating for holistic graduate admissions campus-wide, UC Davis is beginning to experience admissions successes and increases in both Latinx and URM graduate student numbers.

The large number of international graduate student applicants to UC Davis ultimately also influences the number of domestic URM graduate students admitted each year. In the 2017–2018 academic year, graduate students identified as 40% white/Caucasian, 30% International, 14% Asian American, 10% Latinx/Chicanx, 3% Black/African American, 1% Native American, and 1% who identified as Other. Similarly, UC Davis faculty is 27% international. With its significant numbers of international faculty, learning-development modules on Prop.209 and domestic race and ethnic issues may be warranted because of faculty's in experience with the U.S. educational context.

URM graduate students face unique challenges, but the challenges are even more complex when students are also first-generation or undocumented or both. While UC Davis has only a few years of data about first-generation applicants and admittees, the data are instructive. First-generation graduate applicants are on the rise, from about 1,000 in 2016 to 1,541 in 2019. Of UC Davis' first-generation students in 2018, some 43% come from URM groups. Moreover, first-generation students are admitted at lower rates, but enroll at higher rates when admitted. Interestingly, first-generation graduate students are twice as likely to take out student loans. Taken as a whole, these data imply the need to consider how first-generation applicants can be identified, and how students who are both first-generation and URMs can be supported, given the complex circumstances both groups encounter.

Beyond the category of first-generation applicants, a growing number of undocumented students are applying to graduate school at UC Davis and at similar research institutions. Although their status is not easily identified and their numbers seem relatively small at present, the numbers and needs will only continue to grow. Already, Graduate Studies, Campus Counsel, the AB540 and Undocumented Student Center, and individual graduate programs and groups at UC Davis have encountered challenging questions related to their admissions, California residency, financial support, ability to work, and legal methods of support. These undocumented graduate school applicants are largely Latinx students who have lived most their lives in the United States and have dreams similar to those of other children of immigrants: dreams to access higher education and then to prosper. UC Davis, along with other UC campuses, are quickly learning the extent of support in the current moment, but are also strategizing and planning how support can expand in future years. At the very least, UC Davis needs to identify multiple models of financial support for undocumented students, no matter their statuses.

Increasing financial support for graduate students and improving the climate of their social and academic environments have long been compelling goals for campus leadership. With the new UC Davis Graduate Student Center at Walker Hall opening in 2020, Latinx as well as URM graduate students will have access to study, meet, and gather in a convivial space with peers from across campus.

The campus's pioneering initiatives to address graduate student diversity promise to increase the numbers of Latinx graduate students in STEM and to diversify the academic pipeline as a whole. The initiative to employ graduate diversity officers to address recruitment, admissions, and success is building talented pools of URM applicants and supporting them as graduate students. A second initiative, UC Davis's holistic graduate admissions project called AMIGA, can potentially influence faculty to embrace critical improvements in how applicants are evaluated and admitted, which in turn can open the doors to more Latinx women and URM students in STEM fields. Finally, envisioning and then erecting the Graduate Student Center at Walker Hall demonstrates the UC Davis' commitment to both graduate student success and the larger UCD community.

8 Lessons Learned and Reflections for the Future

The convergence of ADVANCE's institutionalization with UC Davis's HSI vision developed in 2018 has created an opportunity to reflect on how the University of California, and UC Davis in particular, can deepen its commitment to a broad academic diversity project. This has involved extending the focus on pre-hiring to the graduate and professional student pipeline, and also looking more closely at post-hiring, to consider how diversity and inclusion are connected to equity in higher education. That is, it must ask several critical questions: What is the role of an academic diversity project in creating a sense of belonging for all students, both undergraduate and graduate? How is such a project connected to teaching excellence and innovation that considers culturally-sustaining curricula, pedagogies, and even assessment practices? How is such a project connected to improving the ability of higher education to adequately prepare future leaders and professionals so they can fill persistent gaps in the workforce? How is such a project changing which research questions are prioritized and how that research is conducted to ensure it addresses the needs of underserved communities?

Quite frankly, at UC Davis and even at most institutions nationwide, we are still at the very beginning of responding to these difficult questions. Anecdotally, we certainly know that many faculty of color—though not necessarily all of them, and not them exclusively—are doing equity work for our students, undergraduate and graduate alike. They often feel overwhelmed by that awesome responsibility and undervalued in their contributions. It is vital, then, to clarify that an academic diversity project, if it is to be serious, must move beyond simply hiring a handful of faculty of color slowly over time and must ask, instead, how the university simultaneously must grow in ways that integrate and then cultivate the new voices and values brought by a more-diverse academic workforce and student body.

There is no question that growing the academic diversity pipeline, such as is already occurring at UC Davis, promises to increase the available pool of more diverse faculty nationwide, while at the same time attempting to change an institutional culture that seeks to redefine *why diversity matters*. As demonstrated in

this chapter, for example, holistic admissions, when well done, promises to increase graduate student diversity and change the culture of who is excellent and belongs in the academy. Similarly, questioning the impact of long-held values—such as a bias against a homegrown graduate pipeline—seen through an equity lens focusing on, for instance, access and community values, calls for reexamining why graduate and professional education matters in the first place. Such efforts are not solely about cultivating a diversity of viewpoints but also about fostering a professional and academic trajectory rooted in family and community.

When an academic diversity project is connected to equity goals, it becomes crystal clear that the project is simultaneously increasing representation and changing culture. An approach to academic diversity that is solely a "numbers game" is achievable, but it will never lead to deeper change. As described in this chapter, many graduate students at UC Davis, not unlike faculty of color, are grappling with academic isolation and lack a sense of belonging that likely compromise their own trajectory—and possibly ensure their future exit from the faculty pipeline if they find they cannot see themselves thriving in that role.

9 Conclusion

The implications of seeking cultural changes alongside the academic diversity project often means that those changes, in addition to being intentional, must be methodical and must involve key stakeholders in the project. For this reason, while an effective holistic admissions process in graduate education requires many champions, ranging from funders to higher-education leaders, in the end it must be a faculty project. Faculty who educate graduate students must learn to recognize and value the various contributions that students who have traditionally been left out of the academic pipeline have something to offer. That is, beyond becoming just like them, their very presence and diversity in fact redefines excellence.

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Latinx Communities and Academic Trajectories

Lisceth Brazil-Cruz, Laura Grindstaff, and Yvette G. Flores

Abstract This chapter will focus on why the Latina experience is critical to understanding current efforts to diversify the academy in the United States. We discuss the demographic realities of Latinx representation in higher education, the various ways in which Latinx scholars are marginalized, and what's currently known about "best practices" when seeking excellence and inclusion through institutional diversity. We stress the importance of intersectionality in understanding and addressing the underrepresentation of Latina scholars in STEM.

Keywords Latinx · Diversity · Intersectionality · Academia · Discrimination · Marginalization

1 Latinas in STEM

According to U.S. Census projections, the Hispanic/Latinx population in the United States will increase from 58 million in 2016 to 119 million in 2060 (Flores, 2017; Krogstad, 2014). Despite this dramatic change, the numbers pursuing degrees in STEM fields is not growing at the same pace (Hess et al., 2013; Sonnert et al., 2007). As we'll explain in more detail later in this chapter, the Census uses the term *Hispanic* to refer to people presently in the United States from Spanish-speaking countries. *Latino/a* is sometimes preferred, particularly in California, because it more

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broadly refers to people of Latin American ancestry, including Brazil. In recent years, the term *Latinx* has emerged as a more inclusive alternative because it specifically encompasses those who are nonbinary, genderqueer or genderfluid, and transgender. From 1996 to 2004, Latinx student enrollment in STEM increased by 33%, yet such students are less likely than their white counterparts to earn a degree or certificate in STEM; data from the Higher Education Research Institute (Hurtado et al., 2010) indicates that only 16% of Latinx students who were enrolled in college in 2004 as STEM majors completed a STEM degree, which means that 84% did not. This underrepresentation can be observed throughout the educational pipeline, leading to dismal numbers of Latinxs with doctorate degrees eligible to enter academia. The same is true for other people of color. As of 2013, only 6400 women of color with STEM doctorates held assistant, associate, or full professorships in universities, compared to 19,400 white women, 20,500 men of color, and 65,100 white men nationwide (Hess et al., 2013).

To increase the STEM workforce, Congress passed the America Competes Act in 2007 to authorize the development of more STEM programs at various educational levels. This same act was revisited in 2010 and established the President's Council of Advisors on Science and Technology; it incorporated additional requirements to strengthen the STEM educational pipeline for underrepresented minorities, primarily by funding programs aimed at attracting, keeping, and graduating underrepresented minorities in STEM fields. Later, the National Science Foundation was authorized to provide more funding to minority-serving institutions, such as Historically Black Colleges and Universities (HBCUs) and Hispanic Serving Institutions (HSIs).

Although the data show more Latinxs enrolling and graduating in STEM fields over time, the numbers of Latinas in academia remain low (Garcia, 2017). Research on Latinas in STEM is on the rise, but it rarely focuses on the low number of Latina academics specifically. In order to gain comprehensive knowledge about the many obstacles Latinas face in their pursuit of STEM-related academic careers, we need additional research to examine the factors both inside and outside the academy that facilitate (or hinder) their entrance into faculty positions. Likewise, we need more programs early in the pipeline that prepare undergraduates for doctoral studies; students, especially low-income and first-generation students, often lack the knowledge and resources to navigate the graduate school application process. Thus, faculty guidance and mentorship at this stage are essential for a smooth transition from undergraduate to graduate school.

2 Identity Terminology

To begin understanding the experiences of underrepresented students with Latin American heritage, we must acknowledge the diversity of identities within the Latinx community. *Hispanic* is defined by the U.S. Census as referring to "a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race." The Census further states that "Hispanics can be of any race,

any ancestry, any ethnicity." This includes individuals from Europe and Spain. By contrast, *Latina/o/x* refers to a native, inhabitant, or descendant of a Latin American country (Salinas & Lozano, 2017). The collective term *Latinx* is an identifier for a person of Latin American origin or descent and is used as a gender-neutral or nonbinary alternative to *Latino* or *Latina*. For example, people from Brazil would identify themselves as *Latina/o/x*, but would not necessarily consider themselves Hispanic.

Chicana/o/x is a chosen, political identity typically embraced by Mexican-Americans in the United States. Although *Mexican–American* and *Chicano/a* are sometimes used interchangeably, the latter term holds different meanings in various parts of the Southwest. *Chicano/a* became widely used during the Chicano Movement by Mexican-Americans to express pride in a shared cultural/ethnic and political identity. *Chicanx* is used as a gender-neutral or nonbinary alternative to *Chicano* and *Chicana*. *Raza* (meaning "race") is a term to unify the experiences of underrepresented and underserved Latinx communities in the United States, as well as those at the intersection of two or more racial or ethnic groups—Afro-Latino, for example. For many Latinx people, culture and language are at the foundation of their identity and affect the ways in which they interact with and navigate institutions.

Hispanic is the term typically employed in U.S. demographic data; therefore, researchers seeking to analyze *Latinx* must use data gathered under the *Hispanic* umbrella, which includes foreign- and national-born people of Latin American countries as well as those born in Spain or of Spanish ancestry. The qualitative social science research on Latinas in the U.S. academy that we have undertaken as part of the ADVANCE program at UC Davis (described in the Chapter, 'Making Visible the Invisible: Studying Latina STEM Scholars,') focuses on individuals who, for the most part, identify as Latina. As indicated in Fig. 1, we feel this distinction is

Key Finding #1:

To begin understanding the experiences of underrepresented students with heritage from Latin American countries, we must acknowledge the diversity of identities within the Latinx community.

Fig. 1 The Latinx community is diverse

important, because the experiences of Latina scholars, both positive and negative, differ from those of European descendants.

3 Latinx Educational Pipeline

The notion of an educational pipeline or pathway provides a useful analytical tool for viewing student progress as a continuum leading from elementary school into higher education. Rather than treating K–12 schooling and postsecondary education as separate entities, the pipeline (or pathway) enables us to see the patterns of student progress in terms of key transition points. The work of Pérez-Huber et al. (2015) as well as Yosso and Solórzano (2006) shows that the Latinx educational pipeline or pathway does not produce a student body representative of Latinx in the country.

Statistics gathered in 2006 by Yosso and Solórzano show that of 100 Latinx starting elementary school, only 46 would graduate from high school; of those high school graduates, only 26 would enroll in college. Of those 26, only 17 would go to a community college and nine would start at a four-year institution. Of the 17 who started at community college, only one would transfer to a four-year institution. Of those at a four-year institution, eight would graduate with a degree, two would attend graduate or professional school, and a scant 0.2 of the original 100 will earn a doctoral degree (Yosso & Solórzano, 2006). The researchers published a revised analysis of this pipeline in 2015. Of the 100 Latinas and Latinos starting elementary school, 63 women and 60 men obtained a high school diploma. Thirteen women and 10 men obtained a bachelor's degree. Only four women and three men then obtained a graduate degree. Lastly, 0.3 women and 0.3 men obtained a doctorate degree (Yosso & Solórzano, 2006). In a model of the pipeline in which students are disaggregated by country of origin, across the different nationalities, Chicanos or Chicanas and Salvadorans fare worse than Cubans and Puerto Ricans, who have higher educational attainments, as summarized in Fig. 2.

Note that these data reference the total numbers of Latinx students and not those who are specifically in STEM fields. We know little about the experiences of Latinxs either already working in STEM or interested in STEM fields. A study by Patricia Gándara found that Latinas are less likely to get a degree in a STEM area than are other women: only 3.5% of B.A.'s awarded in STEM fields in the United States in 2010 went to Latinas; only 17% of all bachelor's degrees awarded to Latinas in 2010 were in STEM, compared to 20% for black women, 23% for white women, and 33% for Asian women (Gándara, 2006).

A number of factors contribute to girls' and women's apparent lack of interest in science, including gender and race stereotypes. The literature finds that gender stereotypes start young, and that negative stereotypes lower girls' aspirations for science over time (Ambady et al., 2001). According to a study by Joan Williams and her colleagues, only 14% of teenage girls say they want to become a scientist. As the authors point out, gender and race stereotypes permeate both work and academic environments. They found that 65% of Latinas in STEM reported having to provide

Key Finding #2:

Latinas are less likely to get a degree in a STEM area than other women; Cubans and Puerto Ricans have higher educational attainments than Chicanos/Chicanas and Salvadorans.

Fig. 2 Latinas are less likely than are other women to get a STEM degree

more evidence of competence than others so as to prove themselves, which is a rate fairly consistent with their female colleagues from other ethnicities, and that both black and Latina women reported having been mistaken for either administrative or custodial staff. These findings reflect the apparent belief on the part of colleagues and coworkers that being a woman and being a scientist are incompatible (Williams et al., 2016). Such beliefs constitute a form of microaggression endured by women—particularly women of color—in STEM environments.

4 Challenges Facing STEM Latinx in U.S. Educational Institutions

Recruitment

From elementary to high school, American students do not perform as well as their global counterparts in science and mathematics. On international science and mathematics comparison tests, Americans in K–12 scored consistently at or below average; the national average test scores in 2015 were consistently lower than those of a number of developing countries (Kena et al., 2015; Russell et al., 2007; Swenson, 2015). Thus, part of the challenge facing U.S. institutions in encouraging students to pursue careers in STEM is to tackle a lack of education, training, and retention in STEM fields (Allen-Ramdial & Campbell, 2014; Kuenzi, 2008).

Current efforts in education may be insufficient to generate lasting interest in STEM. Approximately 37.6% of non-underrepresented minorities and 34.8% of underrepresented minorities declare STEM majors as freshmen in college, yet a majority—consisting of disproportionately underrepresented minorities—drop out of their STEM majors before finishing their undergraduate studies. Even fewer

continue in STEM fields at the graduate school level (Allen-Ramdial & Campbell, 2014).

Among the possible challenges for underrepresented minority students are lower personal expectations and feelings of marginalization in STEM fields, a sense of cultural disconnection and isolation, lack of academic and social support, low socioeconomic status, and sociocultural forms of class disadvantage (Allen-Ramdial & Campbell, 2014; Kates, 2011). As a result, many U.S. institutions have sought to address the increasing demand for scientific development and innovation by recruiting international students and workers, mainly from China and India (Chellaraj et al., 2008). Although this approach may eventually satisfy the need for a trained STEM workforce, it does not encourage students in the U.S. to pursue STEM fields, nor does it provide needed support for those who do (see Fig. 3).

Various programs and educational movements have been developed to improve STEM education nationwide. An example is the McNair Program, which encourages underrepresented minority (URM) undergraduates to seek research opportunities with sponsoring faculty and provides mentorship regarding graduate programs. However, most participating programs are underfunded, limited to certain locations, and disproportionately unavailable to the most underprivileged students.

Given the power of stereotypes to lower aspirations, research has shown the importance of ingraining STEM into an inclusive curriculum during children's elementary school years. Foundations for a STEM career must be laid early in the educational path of students, making it even more critical for colleges and universities to engage in the targeted recruitment and retention of women in STEM through, for example, mentoring and development programs. For Latinas, barriers to STEM are exacerbated by the lack of Latina role models (particularly role models in STEM), lesser access to educational capital, and a limited network of STEM professionals to serve as mentors.

Key Finding #3:

From elementary to high school, U.S. students do not perform as well as their global counterparts in science and mathematics.

Fig. 3 U.S. students underperform in STEM

Retention

Role models are instrumental to the development of STEM students; indeed, the need for faculty of color in higher education has been emphasized in the literature for decades. This is not just because they mentor students of color; they also give those students a voice in the university system (Antonio, 2002; Ceja Alcalá et al., 2017; Mickelson & Oliver, 1991; Piercy et al., 2005; Washington & Harvey, 1989). Latinx and Chicanx faculty are more likely to introduce and orient Latinx and Chicanx students to postgraduate information than are other faculty, although at the same time this creates a service burden for both faculty and students who may lack the breadth of resources that their white counterparts enjoy (Ceja & Rivas, 2010; Zambrana et al., 2017).

Research has found that students of color feel more comfortable approaching faculty of color because they share similar backgrounds, regardless of their academic interests or fields of study (Ceja & Rivas, 2010; Ceja Alcalá et al., 2017). Essentially, having fewer faculty of color on campus can be a deterrent for Latinx students, lessening their likelihood of attending graduate school, as emphasized in Fig. 4. Despite the grossly inadequate representation of faculty of color in higher education, however, Latinx students remain proactive in seeking guidance to pursue advanced degrees(Ceja & Rivas, 2010; Ceja Alcalá et al., 2017). Access to faculty of color in higher education not only has positive outcomes for students of color, it also exposes *all* students to URM faculty as "experts" who belong at the institution.

Quantitative research has documented the extent to which women and Latinas are underrepresented in higher education and, in particular, in STEM fields. For instance, Latinas represent only one percent of all occupations in computer science and engineering (Tornatzky et al., 2006; Taningco et al. 2008). But this research is generally unable to unpack and analyze the nuanced, on-the-ground reasons as to how and why Latinas end up in the careers they do, or how their personal, familial,

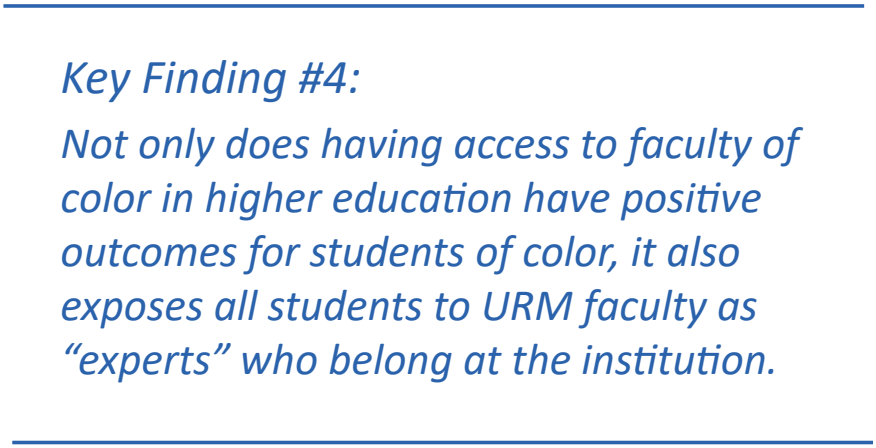

Fig. 4 All students benefit from the presence of URM faculty

and educational experiences shape their opportunities and the educational and career choices they make. Qualitative research, rather than quantitative research, is much better suited to investigate these issues.

5 The Importance of Qualitative Research

Qualitative research prioritizes the underlying factors contributing to the existence of a particular phenomenon (Merriam & Grenier, 2019). Using a range of techniques, qualitative researchers can explore why people think, feel, believe, and behave in the ways that they do, thus generating new forms of knowledge. In-depth, semistructured interviewing is one such technique. This type of interviewing is time-consuming because research participants are invited to talk at length about their lives. In the interview-based study we conducted of Latina STEM scholars under the auspices of the ADVANCE Social Science Research Initiative (outlined in more detail below), participants often stated that they had never before been asked to talk about their experiences in academia. Likewise, transcribing and analyzing interview data are time-consuming because the meaning of people's own accounts is not always immediately self-evident. However, it is through interviewing, transcribing, and analyzing that we can begin to discern patterns of similarity and difference across cases and to see emerging connections— between various events in a participant's life as well as among participants with similar backgrounds. The sheer volume of data generated is immense and extremely rich.

The content-rich data generated by in-depth interviews enable an intersectional analysis not possible using only quantitative measures—in our case, an analysis of the intersection of gender, ethnicity, class, and language in reproducing social disadvantage. Such data can also reveal the microaggressions frequently experienced by marginalized groups, which we know shape the experiences of Latinas in STEM (see Zambrana, 2018).

6 Insights from the Literature

The benefits of qualitative research are especially relevant for conducting research with Latinas, whose numbers among STEM academics, as we have seen, are very small. When it comes to interviewing, different approaches yield different advantages. In structured interview research, each participant is asked the same questions with the exact same wording(Corbetta, 2003); this limits the time spent and potential subjective biases of the researcher, while giving her control of the topics and questions. Of course, "bias" can be built into topics and questions from the start, as is the case with any survey-style research. Structured interviews are typically preferred in sociodemographic data collection in which questions and responses are relatively straightforward (Doody & Noonan, 2013). In unstructured interviews, researchers

start with open-ended questions that invite participants to respond in great detail and therefore to play a more collaborative role in shaping the information gathered. Although prompts are established beforehand to get the conversation going, there are no restrictions on how participants respond or what they can talk about. Semi-structured interviews are the most common among qualitative social scientists, and what we have used in our own research. They rely on a set of predetermined questions that are asked of all participants, but the researcher is free to rephrase them, seek clarification, ask follow-up questions, or ask questions off-script to explore important topics that emerge in situ (Doody & Noonan, 2013; Fontana & Frey, 1994; Mason, 2011).

Depending on the type of research being conducted, it can be important to consider key demographic or cultural characteristics of *both* researchers *and* research participants—qualities such as age, race, gender, nationality, religion, language, and the like (see Twine [2000] for a good discussion of these issues). For example, studies have shown that Latinas have a more difficult time answering questions on the subject of sexuality when being interviewed by men compared to women. Additionally, interviewers should be able to speak the language of preference to accommodate participants. Although rigorous standards exist for data collection, analysis, interpretation, and reporting qualitative data generally (Creswell, 1998; Emden & Sandelowski, 1998; Lopez et al., 2008), and although research exists on cross-language contexts involving language barriers (Squires, 2009), few guidelines are in place specifically for conducting translinguistic qualitative research or for research with bilingual participants who may code-switch, meaning they may switch from one language to another or one style of speech to another depending on the topic of discussion and/or depending on their relationship to the interviewer. What we *do* know is that rephrasing or paraphrasing questions to match participants' level of knowledge, while remaining true to the research goals, can make both researcher and participant more comfortable with the research protocol at hand.

In our project, given the gender and racial/ethnic backgrounds of the research team (consisting of two bilingual Latina scholars and one English-speaking white scholar), we paid special attention to researcher positionality, often discussing and reflecting on our similarities and differences as together we coded and analyzed the data. It became evident early on that we brought different perspectives to the material and that our emerging interpretations were richer as a result of working collaboratively. As we note in Fig. 5, feminist scholars have long urged researchers to reflect on their position in the research process and on the power relations inherent in the production of knowledge (Fonow & Cook, 1991; Harding, 1987, 2004; Harding & Norberg, 2005; Sultana, 2007). At a large research-intensive university such as UC Davis, hierarchies of power exist in relation not solely to race and gender, but also to academic rank, title, and discipline. All three of us researchers are qualitative scholars in social science fields on a science-dominant campus, and only two of us have tenure-stream jobs—aspects of marginalization that we felt quite keenly at times as members of the ADVANCE effort.

Another concern of qualitative researchers is the degree of trust between researcher and participants. Trust is essential when conducting interviews because participants'

Key Finding #5:

Feminist scholars have long urged researchers to reflect on their location in the research process and on the power relations inherent in the production of knowledge.

Fig. 5 Power relations inevitably shape knowledge production

willingness to talk about their life experiences may depend in part on the quality of the researcher–participant relationship being established. Issues of privacy, anonymity, and confidentiality may also requires attention, especially in projects where participants feel vulnerable to being identified. These issues may arise because either the target population is small or it feels at risk of exposure for some reason (for example, being a victim of abuse, a political activist, an undocumented worker, or a member of a stigmatized group). In such cases, researchers should be prepared to ensure anonymity by omitting or altering any possible identifying information, while maintaining the integrity of the data and the project's goals.

When the target population is relatively small but geographically dispersed, simply finding potential participants can pose a challenge. A logical strategy when studying professionals is to seek out relevant professional organizations and associations. For example, we contacted several professional Latina STEM organizations to help disseminate information about our research and to facilitate the recruitment of participants. Interviewees could then suggest additional contacts within their networks, allowing us to grow our pool of interviewees through "snowball" sampling. As for conducting the interviews, we spoke with people in-person whenever possible, but otherwise, and more often, over the phone. Although face-to-face interviews are more commonly discussed in the literature, phone interviews provide a virtual space for communication in which topics can be explored in-depth and may even foster a welcome sense of security or anonymity when discussing sensitive topics(Mealer & Jones, 2014; Prasad, 2015).

A growing literature has recently been exploring the benefits of conducting "culturally competent" qualitative research with Latinx populations, much of it stemming from community-engaged research (Flores et al., 2011). In this tradition, scholars and members of a community strive to collaborate equitably in studying issues affecting that community, with community involvement encouraged at every

stage of the process, ranging from formulating research questions to disseminating results. With regard to Latinx populations, we see increasing calls to integrate Latinx cultural values into the research process. This means constituting culturally competent research teams that can minimize culture- and language-based biases and misunderstandings and prioritize Latinx values in identifying topics of concern, developing research protocols, recruiting participants, incentivizing participation, informing consent, and gathering data (whether through interviews or some other method).

Many educational studies with Latinx use what are called *testimonios* as a methodological, pedagogical, and activist tool in studying inequality and challenging social injustice (Bernal et al., 2017). Testimonios ("testimonials," meaning bearing witness) are first-person narratives that center the experience of the narrator; in educational contexts, they unveil the many and varied educational inequities that Latinx and Chicanx students face, highlighting students' resiliency and resistance in response (Bernal et al., 2017; Pérez-Huber & Cueva, 2012). The use of testimonios challenges conventional assumptions that "the researcher knows best" and that objectivity is enhanced by distance; instead, the participant is herself a researcher of sorts, and her "findings" stem from her position in the midst of, and in companion with, a collective experience that may encompass marginalization, resistance, or oppression (Bernal et al., 2017).

Another widely used approach in research with Latinas goes by the name of "transformative mixed methods" (Mertens, 2010). Mertens claims that mixing quantitative and qualitative approaches is necessary if research is to generate social change. In her view, whereas qualitative data provide relatable perspectives that humanize research, quantitative data root those perspectives in a broader framework and generate credibility through the use of statistics and other quantitative measures, which is important for community members and scholars alike (Mertens, 2010).

7 Gaps in the Literature

Most of our knowledge about Latinas (often collectively called "Hispanics") in STEM is based on demographic data indicating that, in both industry and academia, representation for this group is particularly low. Additionally, we know that there are low numbers of Latinx College students enrolled in STEM fields, indicating continuing underrepresentation both in the industry workforce and in the academic pipeline. According to the U.S. Department of Education, only two percent of the STEM workforce is Hispanic, whereas almost 20% of the country's youth population is of Hispanic descent. In 2010, Hispanics accounted for 16% of the U.S. population, yet they received only eight percent of all STEM certificates and degrees awarded nationwide. These demographic data are for Hispanics as a whole; they are *not* disaggregated by culture, nation, or immigration history, and they include people from Spain as well as national and foreign-born Latinx from Mexico and from both

Central and South America. Thus, we do not have accurate data on URMs; we only know that the existing numbers are inflated by foreign-born international Latinx.

Qualitative research can enrich demographic data by highlighting the *experiences* that lead to demographic outcomes. For example, it has revealed the marginality experienced by scholars of color, including underrepresented minority faculty in the United States, as they navigate often-hostile environments. So far, however, little qualitative research has examined the experiences of Latinas in academia, with even less examining the experiences of Latinas in STEM.

This literature, then, still leaves us with much uncharted territory. Taking into consideration the changing demographics of the country and the need for a diverse STEM workforce, we are left with some questions:

- What catalyzes an interest in science, leading Latinas to pursue an academic career in STEM?
- What interpersonal, familial, and sociocultural conditions have helped (and, conversely, hindered) Latinas in their pursuit of STEM careers, including their aspirations for parenting?
- What role do mentors and institutional support systems play in expanding the opportunities for Latinas in STEM?
- What are the everyday work experiences of Latinas in STEM fields at various stages of their educations and careers?
- How do Latinas in STEM experience the challenge of work-life balance in academia?

To answer such questions, it is imperative that researchers employ an intersectional approach. Intersectionality is an analytical tool for understanding the ways in which different social locations—gender, race, age, ethnicity, socioeconomic status, sexual orientation, and so on—intersect to shape both individual experience and the broader systems of power that individuals must navigate. To gain a deeper understanding of Latinas in STEM, therefore, we must analyze their experiences through an intersectional lens that accounts, at a minimum, for gender, class, and ethnicity, as well as differences of national origin (domestic vs. international) and language.

8 The Social Science Research Initiative

The Social Science Research Initiative, SSRI, is one of five ADVANCE initiatives at UC Davis. It aims to understand the career-path experiences of Latinas in STEM fields through two research studies whose findings helped shape the UC Davis ADVANCE program activities and will guide future funding. A central goal of this initiative is to attain a nuanced understanding of how Latinas progress in STEM, from their childhood through their academic careers. We examine holistically the obstacles and barriers as well as sources of support that shape the trajectory of Latina scientists in order to inform the campus recruitment and advancement of Latina STEM

ladder-rank faculty, promote innovation in STEM fields, and contribute to a STEM workforce that is more representative of the demographics of California.

The first project was a quantitative survey of a sample U.S. Latina doctoral students. This survey documented respondents' perspectives on the barriers to entering and succeeding in STEM careers in academia, on ways to remove such barriers and better facilitate entry and eventual career success, and on the overall experience of Latinas in STEM doctoral programs. The project focused on graduate students because they represent the future of the Latina professoriate; we were particularly interested in the perspectives of those who are first-generation college students or first-generation graduate students. Our findings reveal that a majority of Latina graduate students have faculty advisors who are untenured, leading to funding insecurity, minimal or inadequate mentoring, and a longer time to completion of qualifying exams and eventual dissertations.

The second research project, ongoing, studies the career trajectories of 20 Latina STEM faculty, three other faculty of color in STEM fields, and 13 Latina social science faculty through in-depth, semi-structured interviews. This study seeks to understand the personal, familial, cultural, and structural influences that shape the pathway into and through an academic career. The interview protocol covers the lifespan of participants, beginning in childhood and ending at the present moment, to document how each life-stage is critical in its own right in building the foundation needed to pursue a successful career in academia. A deeper discussion of this study is presented in the Chapter, 'Making Visible the Invisible: Studying Latina STEM Scholars'.

9 Conclusion

This chapter argues that understanding the ways in which Latinx communities are marginalized is critical to diversity and inclusion efforts in the U. S. academy, particularly in STEM. Demographic data underscore the need to attract and maintain Latinas in STEM before and during their undergraduate education, thereby increasing the number who can enter graduate programs and subsequently pursue academic careers. Laying a foundation for resilience and success includes nurturing a scientist identity, enabling access to URM role models and programmatic supports, and better preparing students, post-doctoral scholars, and junior faculty alike for the institutional climates and cultures they will encounter. Finally, we must understand, value, and account for the ways in which gender, race, class, and other dimensions of difference and inequality intersect to structure one's experiences and opportunities, within and beyond the university. Such an intersectional approach is at the core of the Social Science Research Initiative as it seeks to understand the career pathways of Latina scholars in STEM.

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Making Visible the Invisible: Studying Latina STEM Scholars

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Abstract This chapter focuses on the experience of conducting collaborative, interview-based research on the career pathways of Latina STEM scholars in the United States. In addition to outlining our key findings, we address the process of conducting the research and explain why the Latina experience is crucial to understanding current discrimination practices. We discuss the theoretical foundations of our methodology and the importance of qualitative, in-depth interviews as a specific form of knowledge-production, as well as topics such as researcher ethics, positionality, confidentiality, emotional labor, and the advantages and challenges of interdisciplinary collaboration.

Keywords Latina · STEM scholars · Interview-based research · Methodology · Researcher positionality · Emotional labor

1 Introduction

The Social Science Research Initiative (SSRI) of the UC Davis ADVANCE program was tasked with conducting integrated, empirical studies of the experiences of Latina STEM scholars in the academy. The goal of the research is to inform the diversification efforts of STEM faculty, with a particular emphasis on Latinas and Hispanic

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women. An early emphasis of the initiative was an interview study of the career paths of both STEM and non-STEM Latina scholars, ranging from faculty recruitment through mid-career, who had participated in the University of California President's Postdoctoral Fellowship Program (PPFP). Given the limited numbers of Latinas in the PPFP pool, we expanded the recruitment to include Latina STEM scholars across the United States who were not recipients of that fellowship. In addition, we interviewed scholars participating in the Center for the Advancement of Multicultural Perspectives on Science (CAMPOS) at UC Davis. Interviews with women in all these groups explored the barriers the women encountered, as well as the cultural, familial, and institutional sources of support they received while pursuing careers in STEM. This information was then made available to the other ADVANCE grant initiatives to inform the development of CAMPOS programs along with general campus recruitment efforts.

As stated in the Chapter, "Latinx Communities and Academic Trajectories," Latinx are a young and growing population in the United States. However, because Latinx students face significant barriers and disadvantages in the educational pipeline, few pursue postgraduate studies, particularly in the sciences. Moreover, although there is increased interest in understanding the barriers to STEM careers for women generally, few studies have examined the barriers for Latinas and other women of color specifically (Zambrana et al. [2015] is an important exception). Therefore, we sought narratives from Latinas who had pursued STEM careers in order to understand their pathways, as described in their own words. Given our small sample and the limited information available on Latinas in STEM, we chose qualitative methods—pecifically, semi-structured interviews—which covered a range of topics pertaining to the women's past and current experiences as well as future career aspirations.

Feminist scholars underscore the importance of examining the multiple, intersecting factors that can deter women from pursuing STEM fields (Flores, 2017; Moss-Racusin et al., 2015; Muhs Gutierrez et al., 2012) and have pointed especially to the ways in which social-identity categories such as gender, social class, and race or ethnicity can shape opportunities, both personal and structural. Likewise, scholars have identified the importance of formal support programs, along with less-formalized systems of support from teachers, peers, and even family members, as being protective factors and even bridges to success. Given the diversity of the Latinx population, an intersectional framework as described in Fig. 1 was critical to the development of our interview guide and the analysis of the data. In particular, we were interested in the role of *nativity*, or national origin, in the academic trajectory of the women: To what extent, we asked, did the experiences of immigrant women who came to the United States to pursue postgraduate education differ from those of Latinas who migrated here with family members seeking greater economic opportunities and from those of Chicanas or U.S.-born Latinas? And what effect did social class, geographical location, type of schooling received (public, parochial, private), and presence or absence of family support have on our subjects' choice to pursue a STEM career? Although ability, citizenship status, and sexual orientation are also potential intersectional factors to consider, they did not emerge as significant axes of difference in our project. That these factors did not arise is not necessarily an

Key Concept #1:

Feminist scholars underscore the importance of elucidating the multiple, intersecting factors that can deter women from pursuing STEM fields and have pointed especially to the ways in which social-identity categories such as gender, social class, and race/ethnicity can shape opportunities, both personal and structural.

Fig. 1 The first key concept

indicator that they weren't operating in our interviewees' lives. Among the Latinx community, both citizenship status and sexuality can be difficult to discuss, especially for aspiring professionals.

In the first years of the ADVANCE program's development, the SSRI team consisted of two advising members, Dr. Adela de la Torre and Dr. Mary Lou de Leon Siantz; six undergraduates; and the core team, composed of postdoctoral scholar Dr. Lisceth Brazil-Cruz and faculty members Dr. Laura Grindstaff and Dr. Yvette Flores. The team represented a diverse array of disciplines, including sociology, clinical psychology, education, Chicano/a studies, nursing, and economics. The core team, which conducted all but two of the interviews and did all the coding, analysis, and writing, hailed from education (Lisceth), sociology (Laura), and psychology (Yvette). We considered interdisciplinarity to be an essential element of the research, because each discipline brings a unique and enriched view to both the collection and the analysis of the data. It allowed us to consider various perspectives, develop nuanced analyses, and gain a more holistic view of the experiences shared by interviewees. Interdisciplinary approaches have become increasingly valued in academia while also posing some distinct challenges (Jones, 2010), some of which we discuss below.

The two core team faculty members traded off serving as directors of the SRRI initiative, and over the seven years of the grant (five years, plus two years' no-cost extension) they received two course releases each. A normal load for social science faculty is four courses per year (in addition to research and service obligations), so instead of teaching 28 courses over seven years, they taught 26. The postdoctoral scholar was employed at 50% time and in the last year of the grant was employed at 100%; she provided organization to the team and was in charge of Institutional Review Board (IRB) protocols and scheduling, in addition to collaborating with the faculty team members on all aspects of the research. She also supervised and mentored the undergraduate students working on the project, all of whom were in

STEM fields. Under Brazil-Cruz's guidance, the undergraduates summarized the demographic information of our interviewees and helped present the research at conferences. Each of the core team members took turns leading the development of manuscripts derived from the data.

2 Methods

2.1 Developing the Interview Guide

Before the interview guide was created, and to help generate ideas for it, we held three focus-group interviews on our campus—one interview with six Latina faculty in social science and STEM disciplines; and two focus-group interviews, each with five Latina graduate students in STEM). Given the small numbers, the interviews were conversational and purely exploratory. The main findings revealed participants' preponderant feelings (either current or past) of isolation in their graduate departments, the effect of "impostor syndrome," and problems with mentoring. Students cited the lack of adequate mentoring guidance to help them advance academically, while faculty noted the lack of adequate time or compensation for the mentoring efforts they expended. Some participants stated that it was the first time they were ever asked about their experience in graduate school. An unintended benefit for the graduate students of taking part in the focus groups was the sense of community the groups helped to create, as students were able to compare and validate their experiences and also connect with others on campus in similar situations.

To develop our interview guide, we reviewed a number of existing guides and consulted with Dr. Ruth Zambrana, an expert on race and gender inequality in academia from the University of Maryland. Dr. Zambrana shared a guide she had developed and gave us permission to edit it to better suit our purposes. The final document drew primarily from this guide along with one developed by a member of the core team (Laura) during a past project focused on women in STEM in the University of California system. It consists of questions related to personal background, current living situation, postdoctoral experience, career path after completion of doctorate and postdoctoral studies, current work environment, work-life balance, experiences of bias or discrimination, and the ideal partner for a STEM scholar. Once the interview guide was developed, we piloted it and began conducting the interviews, followed by transcription and coding.

2.2 The Sample

As mentioned, the focus of the study was to understand the educational paths of Latinas in academia. Accordingly, the first set of interviews was conducted with

Latinas who had participated in the President's Postdoctoral Fellowship Program funded by the University of California Office of the President, UCOP. The PPFP was established in 1988 to encourage women and minority Ph.D. recipients to pursue academic careers at University of California campuses. This highly competitive program offers a variety of fellowships and faculty mentoring opportunities to those who are conducting research at one of the 10 UC campuses. We reasoned that a prestigious and longstanding minority program would be an ideal place to identify potential interviewees, given that our target population was small and geographically dispersed. When we began the study, the total sample size of the PPFP fellows was 537. Of these, 58 fellows were Latina; 35 of the 58 were in non-STEM fields and 23 of the 58 were in STEM fields. We contacted all 23 and experienced non-response from eight; an additional six declined participation as they either lacked the time or preferred not to revisit their graduate school or subsequent employment experiences. We then interviewed 10 Latina STEM fellows from the PPFP pool. Simultaneously, we sought to interview the CAMPOS faculty scholars who were being hired at UC Davis, as part of the ADVANCE Program's plan for institutional transformation. As mentioned, CAMPOS aims to create diverse and inclusive environments that are mentor-rooted and career-focused for Latina STEM scholars. CAMPOS aspires to model and originate a prototype for achieving excellence through diversity in each UC Davis STEM school and department, while at the same time raising the overall stature of the campus both nationally and globally. The goal was to hire four scholars per year over four years, for a total of 16.

Even with the combined participation of PPFP fellows and CAMPOS scholars, we had a small sample, so we realized we needed to expand the pool. We conducted an online search of STEM department websites for universities and colleges both in California and across the country. We also reached out to professional organizations such as the Society for the Advancement of Chicanos/Hispanics and Native Americans (SACNAS) and placed advertisements in targeted social media. As time went on, the team attended various conferences attended by Latina STEM scholars with the goal of recruiting more participants. These conferences included the Latina Researchers Network (LRN), Society of Hispanic Professional Engineers (SHPE), and Understanding Interventions (UI). Initial contacts put us in touch with others in their own networks, in a strategy known as "snowball sampling." All potential participants were invited, via email, to be interviewed. In total we interviewed 36 women; 15 were immigrants while 21 were U.S.-born, of either Mexican or Puerto Rican origin. Only 22 of the 36 were scientists, the rest were social science scholars.

When possible, we conducted interviews in person, but the majority were conducted over the phone. Interviews lasted from one to two hours each, and were audio-recorded. We gave each woman a pseudonym to ensure anonymity. Since verbatim transcription of interviews is incredibly time-consuming, we outsourced that component to the extent possible. Initially, we relied on student researchers, but their pace was slow so we hired a professional service. Although faster, this introduced problems of its own (discussed below). Each interview yielded roughly 20 to 30 single-spaced pages of transcribed text.

2.3 Analysis—The Grounded Theory Approach

The limited information regarding Latinas' experiences in STEM fields and the factors that contributed to their interest in science led us to choose Grounded Theory as our analytic approach. Most traditional research entails collecting data in order to test hypotheses based on existing theory. Introduced by Glaser and Straus in 1967 and developed by qualitative scholars such as Charmaz (2014) and Strauss and Corbin (1997), Grounded Theory is a research approach that uses data to *generate* theory. That is, the theory evolves from the data collected and is used to guide the further analysis of data, rather than simply providing a precondition for testing data. The team was fortunate to attend a workshop at the UC Davis Medical Center featuring a participatory seminar on the use of Grounded Theory Methods taught by Dr. Charmaz herself. Grounded Theory offers rigorous methods to code and analyze qualitative data—in our case, the interview transcripts.

To begin organizing and analyzing our transcripts, the core team had to develop a code book—a coding document, based initially on categories suggested by the interview guide but evolving to reflect varying subcategories and themes emerging from the transcripts themselves. We engaged in an iterative process of constant comparison, which entails moving back and forth between data collection and analysis. We began to code interviews even before we finished conducting interviews, and the ongoing coding helped us see and understand the content of interviews in new ways. In other words, the experience gained in the interviews helped refine the codebook, and this refinement continued throughout the coding process, as new thematic categories emerged or others were reconsidered or condensed.

The process of analyzing the data in this manner involves three levels, or types, of coding. The first is open coding, in which the researcher begins to divide the data into similar groupings and forms preliminary categories in relation to the phenomenon being examined (e.g., family values regarding education). This is followed by axial coding, in which the researcher starts to organize the categories that have been identified into broader groupings (e.g., early educational experiences). These groupings resemble themes and are generally new ways of seeing and understanding the phenomenon under study. Afterward, selective coding takes place in which a researcher organizes and integrates the categories and themes in a way that begins to articulate a coherent understanding or theory of the phenomenon of study (e.g., educational values are seen to be less consequential than social and cultural capital in shaping early educational experiences).

Given the length of our transcripts, coding was time intensive and continuous, lasting more than three years. During this time, we shared our preliminary findings, including themes emerging from the data, with other ADVANCE initiatives. These included the importance of early mentoring, the interconnection between mentoring and institutionalized support programs for minority scholars, the high incidence of narratives of persistence and resilience, significant class-based differences between international scholars and domestic minority scholars, the importance of family and community, and the critical role played by scholars' spouses and partners in either

furthering or hampering their careers. We also presented these findings at national conferences, including Association for Women in Science (AWIS), Understanding Interventions (UI), American Education Research Association (AERA), National Association for Chicana and Chicano Studies (NACCS), and internationally at the International Society of School Psychologists (ISSP) in Tokyo and AERA in Toronto.

3 Positionality and Research Ethics

In the context of research, positionality refers to the researcher's awareness of her social location, or *position,* in relation to the study and to the individual participants involved. Postcolonial feminist theorists pay particular attention to positionality in terms of culture, class, gender, age, religion, sexual orientation, and childhood lived experiences (Mohanty et al., 1991; Patai, 1983; Wolf, 2018). The positionality of the research team—how we understand the effects of our own social locations on our research process—affects every methodological decision. Of utmost importance, positionality, summarized in Fig. 2, also concerns the recognition of researchers' privilege in relation to that of participants. In this particular study, the research team was composed of academics interviewing other academics; on the one hand, this "flattened" certain power differences because we were all professional women, while on the other hand it revealed salient differences in class, culture, nationality, and immigration history, in addition to rank and disciplinary affiliation. The positionality of researchers vis-à-vis one another is no less important. To give a personal example, although all three of us are academics, we differ in rank and job security, we are multigenerational, and we represent various geographical and cultural

Key Concept #2:

Positionality refers to the awareness of the researcher's position in relation to the study and to the individual participants involved.

Fig. 2 The second key concept

backgrounds—all of which proved indispensable (positive) characteristics when we coded and analyzed the data.

By contrast, although four of the five members of the broader SSRI team were Latina, they differed in terms of nativity; three were immigrants, with two being Mexican-born and another originally from two Central American countries. One researcher was U.S.-born, of Mexican origin. The one non-Latina researcher also was an immigrant. Four of the researchers grew up speaking Spanish and experienced educational disparities. Among the three of us comprising the core team conducting the interviews and analysis, the Latina researchers (Yvette and Lisceth) were mindful not to assume common ground with interviewees based solely on a shared ethnic identity—especially because of class differences; none of us had the same economically privileged backgrounds enjoyed by some of the international scholars being interviewed. Thus, we were abundantly aware of the diversity of Latinas and took care to avoid presumptions of similarity. Likewise, we frequently engaged in side-conversations about unconscious bias. We read and reread transcripts carefully to examine how we asked questions and whether we were making unwarranted assumptions during the interview process.

Some of the women we interviewed were well-established academics who held administrative appointments; others were well-known scientists whose narratives could be identifiable; and many were junior faculty members whose academic careers were just beginning. Given the small numbers of Latina STEM scholars in the United States overall, participants asked several times about confidentiality. Even after reviewing the protocol and consent form approved by our Institutional Review Board (IRB), some participants expressed concern that other faculty or even the chairs of their departments could identify them by their responses. This was particularly concerning for women who had histories of difficulties with mentors, colleagues, or supervisors with whom they had worked previously, or who were experiencing challenging situations in their current position. As a result, confidentiality and anonymity were critical components of the research protocol. All the women wanted assurances that their information would be held in strict confidence. Confidentiality typically means that no one but the research team has access to the data and that data will not be shared in raw form unless legally subpoenaed (a highly unlikely scenario in research such as ours). Anonymity means de-identifying participants when summarizing, paraphrasing, or quoting aspects of their interviews.

To ensure anonymity, we assigned each interviewee a pseudonym; when publishing results, we withhold or change the names of institutions and fields of study; we also omit or alter personal details as necessary while retaining the integrity of the analysis. It helped that all of us on the core team were social scientists, not STEM scholars, because it reduced the likelihood we would know individuals in interviewee's departments, programs, or fields of study. However, the Latina academic community is small, and the paths of interviewers and interviewees might cross at conferences or on campus. And it did sometimes happen that one of us knew someone discussed by the interviewee. Thus, it was important to assure participants that their information would be protected to the fullest extent possible, in terms of both confidentiality and anonymity.

CAMPOS prides itself in providing a safe space for junior faculty to seek resources and support as they navigate academia. Therefore, to safeguard the scholars' privacy and confidentiality, they were interviewed in a location of their choosing. Most important, no one affiliated with the CAMPOS leadership conducted interviews with the scholars or had access to their audio files or transcripts; rather, the three of us conducted the interviews and coded all of the transcripts. Moreover, given the use of pseudonyms, we were unaware of whose transcript was being coded.

4 Challenges Encountered

The first major challenge we encountered was simply finding women to interview. Recall that of the 537 PPFP scholars, only 23 were Latinas in STEM. Of these 23, fully one-third declined to interview because they either they felt too burdened by work or they simply did not wish to revisit their past experiences. The second major challenge was transcription, as mentioned earlier: We requested and received funds from the ADVANCE program to hire a professional transcriber in order to speed the process along, but the person chosen was not bilingual and proved unfamiliar with the target population. Several of our interviewees code-switched from English to Spanish or used Spanish language terms that were transcribed incorrectly; as a consequence, we had to go over large chunks of some interviews and make corrections. The transcriber also had difficulty with the accent of some of our interviewees and was unfamiliar with acronyms they regularly used, again requiring us to listen to the audio files and correct transcription errors. Obviously, this was time-consuming. A third challenge was the coding itself.

Initially, the three of us coded independently; over time, we realized that collaborative coding was critical so that we might understand cultural and linguistic nuances, verify meanings that were culturally embedded, and reach consensus over those meanings. Our interviewee responses often fit multiple categories (for example, "experiences of gender discrimination" and "motherhood penalty"). Thus, entries would need to be coded in multiple domains. We needed to agree on the "correct" domain before an interview response could be coded. The conversations we had while coding were helpful, as we explored emerging themes that could enrich the process of data analysis, but overall the coding was extremely time- and labor-intensive. Each transcript took roughly 10 hours to code and correct, and sometimes longer, depending on the number of transcription errors.

A fourth and more substantive challenge was understanding and negotiating our positionality vis-à-vis our participants. As mentioned previously, some of our interviewees were immigrants. The three of us were immigrants, as well, although from different countries and with different migration histories. This information was not initially known among us, but emerged during the coding process. We soon realized we had to carefully examine our coding decisions in order to avoid a presumption of similarity, particularly because several of our interviewees were South American immigrants from more-affluent backgrounds than any of us. We were conscious that

our class differences might influence our interpretations. Likewise, as demographic differences in the sample became more salient, the Latina/Mexicana members of the team (Yvette and Lisceth) were cautious not to assume greater similarity with the domestic STEM respondents. We wondered out loud: What difference did our differences make? Although the interviews themselves were conducted primarily with regard to availability (which member of the team was free when the interviewee herself was free), we wondered whether an immigrant Latina interviewee would be more comfortable with the immigrant Latina interviewer. Would a younger scholar be more comfortable sharing information with Lisceth, as a postdoctoral scholar, rather than Laura or Yvette, as senior faculty members? There was no way to know in advance, yet we engaged with these questions as we read the transcripts and continued coding. Most of our interviews were done over the phone, but some were done in person. Did that make a difference in quality and depth? In the early stages of analysis, it appeared that phone interviews were longer and more detailed, although we lack a sufficient number of in-person interviews to make a comparison.

A fifth challenge, and perhaps the largest one, was how to navigate the emotional demands of the interviewing process, both positive and negative. Since it was the first time that most of the interviewees were being asked questions related to career trajectories, it became evident that they felt thankful for the opportunity to share their experiences with us, and to learn that we actually cared about those experiences. When painful personal or professional information was shared, it was important for participants to know that Yvette, a clinical psychologist, was available to them should they need to debrief or get support. Although the interviews were informative and rewarding, for interviewers and interviewees alike, they were also sometimes painful, as we listened and learned about experiences ranging from discrimination, sacrifice, and disappointment to persistence, resilience, and ultimately success. As interviewers, we realized we could personally relate to the experiences of the women we interviewed, particularly their narratives about gender discrimination in academia. In addition, Yvette and Lisceth could personally identify with some of the narratives of racial and ethnic discrimination.

Arlie Hochschild has described the often-invisible, emotional work that women do as "feeling management," and called the appropriation of that feeling management by employers in the workplace "emotional labor" (Hochschild, 1983). For the three of us on the core team, a significant aspect of our emotional labor was the creation of a safe space where Latinas could talk about their lives, their academic trajectory, their struggles, and also their achievements. As we listened to their stories, their narratives often resonated with our own painful academic journeys. As interviewers, part of our emotional labor was hearing about upsetting, triggering, or painful narratives; for instance, hearing women say they avoided having children because early in their education they were told that they had to choose between being a scientist and a parent—a forced choice men typically are not expected to make. It was painful to hear about the "second shift," in which women must do domestic work at home after long days of paid work; it was upsetting to hear of childhood experiences of racism at school, or of sexist comments from colleagues or advisors at work; we sympathized with their efforts to honor family commitments while putting in long hours at the

lab, with their feelings of isolation and not "fitting in," with the burden of being the financial safety net for extended kin. Yet if we were triggered by their struggles, we were also inspired by their resilience. As we heard their stories, we aspired to listen compassionately and objectively, holding our own feelings in check. It was important, we thought, to separate their narratives of emotional labor from our own. As a result, we often needed to debrief with each other.

Another dimension of our emotional labor occurred as a result of our being social scientists working within a STEM-dominated initiative. It became increasingly clear that we needed to voice our experiences within the larger ADVANCE project, otherwise we would be colluding with the academic systems of oppression that silence and render invisible the emotional labor of women. Consequently, we often had to explain the importance of qualitative methods, as we felt marginalized by some colleagues unfamiliar with these methods. More difficult still was that, time and time again, we had to explain why we chose to study Latinas, even to members of the campus ADVANCE team, despite the fact that the grant proposal itself had foregrounded this focus. Being the researchers in the thick of actually conducting research, we often felt isolated, sensed that our methods were being questioned, and came to realize that the laborious nature of coding and data analysis was not well understood. We were asked often what we were "doing," which felt like an accusation that we were not "doing enough"—ironically, an experience shared by some of our interviewees. This is an aspect of "inclusion" not often discussed—the fact that qualitative, interpretive research of the sort we conduct may be devalued by scientists, not considered "real" research at all. This view marginalizes the humanities and qualitative social sciences in higher education, including ethnic and gender studies programs, ironically the very spaces on our campus with the most diverse faculty and student demographics.

Our interviewees' narratives, in combination with our own experiences, made visible that, for some of us, the academy can be a source of trauma, as reiterated in Fig. 3. Given the privilege that an academic position also brings, a final insight is that academics generally do not discuss the psychological costs of that privilege. Instead, they often internalize the criticisms, microaggressions, and erasures. Realizing this, we chose to ask our interview participants how they sought balance and maintained well-being in their life and work. Some said they seek therapy; others practice yoga and mindfulness, exercise, and share their experiences with a few trusted colleagues or friends. A few of the women disclosed that "things got much worse for them" whenever they complained or called attention to injustices.

To summarize, our in-depth interviews helped us understand the personal, familial, and institutional factors that have both helped and hindered Latina STEM scholars' professional and educational careers. The methodological approach we took has enabled us to comprehend the complex processes involved in forging these careers. We also identified important differences in the trajectories of domestic "URM" (underrepresented minority) scholars versus international STEM scholars. Drawing on our findings and experience in conducting the interviews, we conclude this chapter by offering some best practices for universities seeking to recruit Latinas in STEM.

Key Concept #3:
As we began to hear their stories, their narratives often resonated with our own painful academic journeys.

Fig. 3 The third key concept

5 Best Practices When Seeking Excellence Through Institutional Diversity

Our interviewees spoke freely of the importance of academic support programs they experienced throughout college and in their postdoctoral training. They commented that the role played by mentors, both official and unofficial, in learning to negotiate higher education or eventually an academic job, was critical, particularly for URMs and first-generation scholars. Furthermore, for URM scholars, peer mentors also were important. Several of the URM women described how peers who came from more privileged backgrounds encouraged their graduate school attendance, helped with applications, and provided emotional support. Likewise, many of the interviewees described family mentors who encouraged their interest in science. One Latina, for example, recounted that her grandfather (who worked as a gardener) bought her a microscope at a flea market when she was a child so she could see the inside of leaves, which fascinated her; she credited this experience with her ultimate choice of becoming a biologist. Another first-generation scholar credited a high school teacher who encouraged her by noting that she wrote well.

As discussed previously, in our interviews we strove to create a safe space where the women could talk freely about the barriers they had encountered. Many had difficult family situations, but prevailed because of their focus on and interest in school. They also found at least one family member, or perhaps a teacher, who encouraged and supported their interest in science. Unfortunately, most of the women got the message early on that being a scientist was incompatible with motherhood. Some of the Latinas in the sample who were parents bore their children as adolescents or while in graduate school. As summarized in Fig. 4, among the CAMPOS scholars, several said they had chosen the UC Davis campus over other options in part because of its policies regarding work-life balance and positive attitude toward mothering.

Key Concept #4:

Several CAMPOS scholars said they had chosen our campus over other options because of our policies regarding work-life balance and positive attitude toward childcare.

Fig. 4 The fourth key concept

The women's narratives regarding gender, racial, or ethnic discrimination referenced issues that manifested throughout their lives. The women who reported experiences of discrimination demonstrated great resilience in persevering despite microaggressions, feelings of inadequacy ("imposter syndome"), and general presumptions of incompetence. Some struggled with lab supervisors, mentors, and/or colleagues who were blatantly racist or sexist. Others, by contrast, described positive work experiences in their current positions, particularly if they were part of diverse work environments, or if they felt supported by their department chairs or more-senior faculty. Our CAMPOS scholars stated that they were eager for the opportunity to build community and network with other Latina STEM scholars on campus; they appreciated that such collaboration was a central goal of the ADVANCE initiative in general and the CAMPOS program in particular.

For the research team, it was essential for us to debrief after the interviews; as discussed, we often found interviewees' accounts triggering, as they mirrored some of our own experiences in the academy. Lisceth, as the team member responsible for mentoring our undergraduate assistants, was especially concerned that reading through the interviews might adversely affect the undergraduates, all young Latinas aspiring to STEM careers. She thus took time to discuss with them the myriad ways in which the women interviewed had resisted and persisted throughout their lives.

We found that collaborative coding enabled the team both to identify immediate areas of intervention and to provide feedback to other ADVANCE grant initiatives and the ADVANCE leadership. For example, one of the scholars on our campus shared that she was having to set up and maintain her own lab space, as she had received little help from her department. The interviewer on our team, with the interviewee's permission, informed a senior member of ADVANCE and the situation was quickly corrected. Another noted how, despite her understanding of her contract, she was having to teach during her first quarter on campus. This also was reported to senior management. We found it rewarding to be real-time advocates for some of our interviewees.

As the core team comprising the SSRI, we were encouraged to present at national as well as international conferences, experiences we found highly rewarding. Our engagement with STEM scholars and social scientists at conferences became a critical aspect of our work. Conference participants always expressed a great deal of interest in our findings, as they seem to have found scant information about Latina STEM scholars in other diversity, equity, and inclusion (DEI) initiatives. These academic exchanges also helped us debrief further and build community with other social scientists engaged in qualitative research.

6 Conclusion: Institutional Transformation—It Takes a Village

Overall, the Latina STEM scholars who shared their stories with our team demonstrated great resilience. They showed how it does indeed take a village for women who love science to pursue and succeed in STEM careers, as stated in Fig. 5. Family encouragement, interested and supportive teachers, academic support programs, and institutions willing to change their culture become generative factors for women, including Latinas—all are essential to the recruitment, advancement, and retention of women scientists. Institutional transformation efforts in the academy must respond to the gender, socioeconomic, racial/ethnic, sexual identity, and ability characteristics of all faculty. At the same time, Latinas already laboring in STEM fields also must recognize the diversity inherent in the label "Latina" and be mindful of the needs that different immigrant populations may have, as well as the difficulties endured by U. S.-born Latinas and Chicanas who have been uniquely marginalized in higher education.

Key Concept #5:

The Latina STEM scholars who shared their time and narratives demonstrated great resilience; they showed how it does indeed take a village for women who love science to succeed and pursue STEM careers.

Fig. 5 The fifth key concept

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Building a More Inclusive Academy

Seeing Self: The CAMPOS Model

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Abstract Building an inclusive community that diversifies the fields of science, technology, engineering, and mathematics (STEM) is a daunting task, all the more so given the low numbers of Latinas and other underrepresented minority groups (URM) who enter academic STEM disciplines. This chapter takes an in-depth look at one of the novel ADVANCE initiatives—the Center for the Advancement of Multicultural Perspectives on Science (CAMPOS). The center fosters sustainable institutional transformation by collaborating with traditional campus committees to recruit, retain, and promote excellent faculty committed to inclusion while also engaging the broader UC Davis STEM community. Its core mission is to support the discovery of knowledge though multicultural perspectives. CAMPOS creates an environment that is diversity-driven, mentorship-grounded, and career-success-focused. It recognizes the barriers that URM STEM scientists endure within academia and seeks to mitigate those barriers, highlighting the accomplishments of CAMPOS faculty scholars and making URM STEM scientists visible role models. The center is committed to transforming STEM by developing the leadership skills needed to sustain institutional transformation in laboratories, departments, and universities locally, nationally, and globally. The CAMPOS model can be replicated at other universities seeking to change the face of STEM.

Keywords CAMPOS · STEM · Multiculturalism · Transformative leadership

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1 Purpose of the CAMPOS Initiative

CAMPOS was created as a core component of the UCD ADVANCE Program's vision for sustainable institutional transformation in support of women in STEM. At UC Davis, given the demographics of the state, we focused initially on Latina scientists. The Center sought to establish an environment that would inspire excellence, develop leadership, foster success among the faculty scholars selected, and, over time, provide the URM role models missing in STEM. It was designed to showcase talented scientists of color, and benefit from their unique and diverse identities. CAMPOS was built on the premise that multicultural perspectives and interdisciplinary partnerships are essential components of innovative scientific discoveries. By creating an inclusive environment that is diversity-driven, mentorship-grounded, and career-success-focused, CAMPOS embodies and advances UC Davis' commitment to transforming STEM in the twenty-first century.

Given the mandate of the NSF ADVANCE-IT grant program as discussed in the Chapter, 'From Affirmative Action to Inclusion,' CAMPOS leaders felt it was important to create a mechanism that would attract and include a diverse core group of women in science. These women, predominantly Latina, could inspire racially- and ethnically-diverse students, professionals, and faculty alike to envision themselves working and progressing in STEM programs at UC Davis. As the research in the Chapter, 'Assessing Institutionalized Bias,' highlights, the inability to "see self" in a successful long-term career is a clear deterrent to retaining URM STEM undergraduates, graduate majors, professionals, and faculty.

"Seeing self" in this context means observing successful individuals who represent or reflect one's own social identity. It also means not needing to sacrifice our identity in order to "fit in" and be accepted. Our collective experiences, cultures, and perspectives must not only be accepted, we must also see ourselves as capable of excelling in, and of transforming, the historical traditions of STEM disciplines. "Seeing self" encompasses developing self-efficacy—a belief in one's own ability and in the right to claim a "scientist identity." To promote innovations in STEM, we urgently need institutional change that communicates a diverse and inclusive definition of who is, and can be, a scientist.

A CAMPOS faculty scholar is defined as an exceptional scientist in a STEM discipline. CAMPOS scholars are selected for their transformative thinking, unique perspectives, interdisciplinary approaches, and leadership potential to impact their discipline in profound and enduring ways. Their discoveries, innovations, and technological breakthroughs will contribute to the public good, locally, nationally, and globally. They are role models for future scientists and scholars who share their vision of diversity and inclusion as a key component of academic excellence.

1.1 CAMPOS Aims

CAMPOS was envisioned to create and sustain an accessible, inclusive community of research collaborators and mentors committed to diversifying the STEM. At its

inception, CAMPOS aimed to attract, retain, and help to promote Latina STEM scientists. Consequently, we focused on successfully cultivating the research programs of these scholars in order to increase their research productivity and leadership potential as principal investigators, laboratory managers, and future leaders in academia.

CAMPOS faculty scholar's selection criteria included:

1. Final selection among nominees who are candidates in a department's faculty search
2. Commitment and potential contribution to a diverse community of scholars dedicated to broadening participation in STEM and engaging underserved communities
3. Potential to advocate for diversity and inclusion in STEM
4. Knowledge of barriers that URM scholars experience in STEM.

Our CAMPOS program built upon well-established expectations and principles for academic success. First, we knew that the best predictor of academic success and advancement in STEM disciplines at major research universities are the number of publications that result from a well-funded and long-established program of research (Kraimer et al., 2019). Therefore, we linked clusters of new CAMPOS hires with more-senior mentors and leaders in their disciplines as soon as they began their appointment, irrespective of rank on entry. The linkages helped counter feelings of isolation, build and reinforce self-efficacy in their present and future research potential, and establish a vision for leading a successful program of research in a competitive, research-intensive university with largely homogeneous departments.

Furthermore, we knew that research success currently builds on environments that facilitate networking and mentoring opportunities, so we helped create opportunities for partnerships and innovations with the potential for increased research productivity through team science. The presence of CAMPOS on the UC Davis campus has not only brought together senior scientists to consider the importance of multicultural perspectives but also has helped them experience the potential contributions to scientific discovery and innovation that inclusive environments facilitate. By "multicultural" we don't simply mean racially and ethnically diverse, but also a range of different viewpoints generated by gender, nationality, immigration history, language use, and class status. Diverse, inclusive environments provide the infrastructure needed for sustainable transformation of academic cultures within STEM disciplines and departments. The fact that diversity and inclusion lead to successful team science outcomes has been amply demonstrated through the ability of faculty to garner external funding and to increase publication productivity and reach (Bennett & Gadlin, 2012; Dutcher & Rodet, 2018).

Research environments such as those provided by CAMPOS are particularly important to scientists who are women of color, as they experience a double bind of perceived difference and isolation of even greater magnitude than white women in science (Miriti, 2020). Compared to their male counterparts, female STEM faculty members consistently report feelings of greater isolation, reduced opportunity for collaboration, and limited recognition of their current and potential contributions (Bergsieker et al. 2020; Farrell & McHugh, 2020). This occurs despite

STEM research breakthroughs that increasingly require collaboration across teams of investigators in multiple disciplines, irrespective of their gender, race, or ethnicity.

Finally, given the paucity of advanced degree-holders among women of color, these scholars often feel more committed and motivated than their colleagues to engage and give back to their communities of origin through outreach, mentorship, and application of their acquired expertise. They are typically more motivated to discover knowledge that will improve the quality of life in their communities of origin (Wallerstein, Calhoun et al., 2019). Thus, we see CAMPOS as a potent model for broadening the transformative impacts of interdisciplinary research centers (Jordan, 2006) that endeavor to meet the needs of vulnerable populations. Community-based partnerships to promote STEM education as well as mentorship through research have proven to be effective strategies.

1.2 CAMPOS Mission

Truly innovative research requires creative and novel approaches as well as leaders who commit to sustainable transformation that reflect our current multicultural and global society. The more diverse a team is, the more innovative its methods, findings, and solutions can be (Dutcher & Rodet, 2018). The mission of CAMPOS is to support the discovery of knowledge by promoting diverse perspectives in science, through an inclusive environment that is diversity-driven, mentorship-grounded, and success-focused. This novel approach focuses on creating a community that values and acknowledges the benefits of diversity while promoting excellence in research. Through the support of diverse faculty, and the increased recruitment and retention of such a faculty, CAMPOS promotes a model for enriching scientific knowledge.

There are both short-term and long-term goals involved. A key short-term goal was to create a robust program of research on the premise that diversifying STEM also entails mentoring younger generations of STEM faculty as well as the next generation of students. Long-term goals include making visible and substantial impacts on STEM innovation through (1) national scientific and technological innovations, (2) contributions to complex global challenges facing human populations, and (3) measurable improvements in the gender, cultural, and ethnic diversity of the STEM workforce throughout the United States.

1.3 The CAMPOS Model

Institutional Transformation Enabled by University Leadership Support. The success of initiatives such as CAMPOS begins with a vision for institutional transformation that is committed to multicultural perspectives in STEM. Although this vision is rooted in the history of democratic ideals of equality as well as decades of social science and humanities scholarship on social inequality, it has to be "translated" to

the academic workplace and widely embraced. Transformation in academic STEM fields has occurred through funded initiatives like the NSF ADVANCE program, modeled largely after corporate diversity efforts. The resources provided by such programs are critical to building the infrastructure needed for diversity and inclusion. Those at the top of the organizational hierarchy must embrace both the vision and a peer-reviewed plan of action. It is through the inspiration, resources, and support of the campus executive leadership, working in partnership with faculty, especially underrepresented faculty, that sustainable change can happen in STEM. The perspectives and participation of underrepresented faculty must be central to all stages of transformation—vision, plan of action, implementation, and evaluation. The support of those in mid-level leadership—deans, department chairs, and senior faculty—is also critical because they are the "connective tissue" between faculty and executive leadership.

Together, these constituencies must commit to promoting racial and gender diversity in science, not just because it is the right thing to do but because multicultural perspectives can lead to better science, including novel scientific breakthroughs. As we have learned from developing CAMPOS, "commitment" must be simultaneously socio-cultural and financial: substantial resources provide incentive, time, and funding to support the kind of faculty engagement that will yield lasting change over time. The goal is a broad-based transformation predicated upon the assumption that diversity and inclusion benefit everyone, not only URM faculty.

Creation and Implementation of a Clear Vision. The initial CAMPOS vision was to attract, then successfully retain and promote, a diverse, collaborative community of tenure-track STEM research faculty at UC Davis. To implement its mission and vision, best practices were informed by the work of the campus's other ADVANCE initiatives. These included: (1) mentorship and networking, (2) policy and practices review, (3) inclusive campus climate, and, (4) Social Sciences Research Initiative, or SSRI. The mentorship and networking initiative established standards for mentoring newly hired women scholars in STEM fields from assistant to full professor at UC Davis, while the policy and practices review initiative worked to establish equitable guidelines for the appointment, retention, and promotion of STEM faculty in line with diversity and inclusion goals. The inclusive campus climate initiative created an institution-wide, faculty-led implicit bias training called Strength Through Equity and Diversity (STEAD) for search committee members involved in faculty recruitment. Finally, the SSRI sought to understand the personal and professional experiences of Latinas in STEM—the details of which are presented in the Chapters, 'Latinx Communities and Academic Trajectories,' and 'Making Visible the Invisible: Studying Latina STEM Scholars'.

Together, these four initiatives provided the strategic scaffolding needed to support the fifth ADVANCE initiative, the Center for the Advancement of Multicultural Perspectives in Science (CAMPOS). As noted earlier, CAMPOS was envisioned as a national prototype for achieving institutional transformation in STEM through collaborative, innovative, funded research projects linking CAMPOS scholars to both the UC Davis STEM community more broadly, as well as diverse communities outside of academia. However, establishing such a vision is but the first step. As

founding director of CAMPOS, I (Dr. Mary Lou de Leon Siantz), firmly believe, along with business leader Joel Barker (1992), that "vision without action is just a dream," that "action without vision does not just pass the time but is a waste of time," and that "vision and action together can change the world" (Barker, 1993, cited in Ritchie, 1999, p. 1).

Implementing a Vision Must Build on Strategic Planning. Research centers for STEM scholars are built on well-crafted plans that have been carefully vetted by faculty and administrative leaders alike (Kantabutra, 2020). Evaluation, supported by concrete results, is a key component of implementation. Centers build momentum via a mission, a vision, and concrete steps for implementation, tied to ongoing evaluation that measures targeted goals and budgets and verifies outcomes. Thus, my role as founding director was to establish a clear roadmap for CAMPOS, creating both a vision and a clear action plan. Devising a blueprint for action was the first step in the implementation phase of CAMPOS.

The initial challenge that CAMPOS faced was overcoming assumptions that supporting gender and ethnic or racial diversity would "lower the bar" or the standards expected of UC STEM faculty. This is a common myth shared by many academic search committees and STEM scientists in general (Flores et al., 2019). Consequently, the selection process for CAMPOS Faculty Scholars had to counter such beliefs about gender, ethnic, and racial diversity. This process included: (1) the review, selection, and identification of a candidate by a search committee as the department's top choice for a tenure track faculty appointment, (2) a dean's letter of offer to that candidate, (3) a copy of the candidate's CV, and (4) a nomination document by the search committee chair to the CAMPOS review committee describing the candidate's appointment in the target department and why he or she was a good fit for CAMPOS. The CAMPOS review committee then evaluated the candidate for potential appointment as a CAMPOS faculty scholar. It was important to the success of CAMPOS that nominees be the top candidate in their department as determined by the normal protocol of the departmental search committee, because the CAMPOS faculty scholar designation is considered an honor and an important component of the candidate's recruitment package. CAMPOS candidates were always invited to speak with me as founding director or a member of the CAMPOS selection committee when on campus.

The CAMPOS faculty scholar selection committee members were named by me and the Vice Provost for Academic Affairs. Tenured full professors in STEM departments, schools, and programs at UC Davis who also represented gender, ethnic, and racial diversity were invited to join the inaugural committee. The committee reviewed all CAMPOS nominations for their potential fit with the CAMPOS mission and participated in campus interviews when possible. I also met with potential candidates to discuss the prestige of the CAMPOS designation and its added benefits to a faculty appointment at UC Davis. These included summer research support, membership in faculty diversity organizations, the CAMPOS Leadership Institute, and paid membership in the National Association of Faculty Diversity, which provided additional faculty leadership development.

Once formally established, CAMPOS initiated a new cohort into the center's program each academic year. Despite the range of STEM disciplines that CAMPOS scholars represented, they were assigned to the cohort of the year that they began at UC Davis. Cohort establishment built community, helped orient the faculty scholars to UC Davis, and alerted newcomers to expectations for merit, promotion, and retention.

To enable other UC Davis faculty to participate in CAMPOS activities, the CAMPOS faculty affiliates program was established. This program helped affiliated scholars expand their research networks, and, via these networks, build diversity within STEM and enhance campus engagement with underserved communities. All UC Davis faculty (including Academic Senate and Academic Federation faculty from STEM and non-STEM disciplines) who wished to contribute to the CAMPOS mission were eligible to apply to the CAMPOS Faculty Affiliates Program. Affiliates enjoyed a variety of benefits: membership in a collaborative interdisciplinary community interested in developing new research, teaching, and mentoring methods to support diversity at UC Davis; access to networking and mentoring opportunities; and access to support for conference travel and other professional activities aligned with CAMPOS goals. Priority consideration was given to affiliates who enroll in ADVANCE and CAMPOS professional development opportunities as they arose. These included grant-writing workshops, joining the National Center for Faculty Development & Diversity (NCFDD) Faculty Success Program, and attending space-limited seminars, roundtables, and UC Davis networking events.

Sustainability. With the commitment of UC Davis executive leadership, STEM faculty, and in collaboration with other ADVANCE initiatives on campus, CAMPOS has become a sustainable outcome of the NSF ADVANCE institutional transformation grant. CAMPOS successfully recruited 28 ethnically and racially diverse STEM scientists across 21 STEM disciplines. CAMPOS also piloted mentoring programs for its new hires that are now being extended to all faculty, and it created tools to develop leadership skills and visibility. CAMPOS is now sponsored by the Provost, while the selection of CAMPOS Faculty Scholars occurs under the leadership of the Vice Provost for Academic Affairs together with the CAMPOS director. Overall, CAMPOS programming is managed by the Associate Vice Chancellor for Academic Diversity and is housed in the Office of the Vice Chancellor for Academic Diversity, Equity, and Inclusion.

The center will continue recruiting a diverse array of scholars who meet the academic standards of university search committees and are appointed as faculty in STEM departments. These scholars will continue to have access to mentoring programs, leadership development opportunities, and outreach activities. Over time, they will educate and mentor undergraduate, graduate students, and new faculty about the benefits of interdisciplinary and multicultural perspectives in STEM. Moreover, by connecting and engaging with historically underserved communities, and by prioritizing research agendas that meet the needs of these communities, CAMPOS scholars will increase the relevance of STEM for everyone.

1.4 CAMPOS Programming Components

Mentorship. A key component of successful faculty and academic leaders is mentorship (Corneille et al., 2019). Mentors provide a range of wisdom and experience through their advice, role modeling, and constructive feedback, all of which facilitate research productivity, appointments to scientific review boards, and nominations for prestigious scientific awards. These elements are critical to successful academic careers in STEM. To ensure that incoming faculty will thrive in new work environments, CAMPOS scholars were offered participation in "LAUNCH" committees during their first year, with the option of renewing though their second year. Such committees are composed of the department chair, a successful senior department faculty member, and other faculty members (in or outside the department) who the scholar deems helpful to their success at UC Davis. The LAUNCH committee advises on committee assignments, consideration of committee appointments, student advising, teaching, and preparation for merit or promotion review. They also advise on broader issues such as how to recognize exceptional work in academia across a broad range of metrics and how to flag their own contributions and achievements to their best advantage.

Network Development. Networks are also keys to success in academia (Xu & Martin, 2011). The CAMPOS faculty scholars and UC Davis faculty are encouraged to network to learn more about CAMPOS and to identify ways to collaborate in research. "Cafecitos," or coffee breaks, were established to for scholars to meet and communicate with other members of the university. The Cafecitos enabled undergraduate, graduate, doctoral, and postdoctoral students to learn about CAMPOS and possible opportunities for involvement; they also facilitated conversations among faculty about grant prospects involving interdisciplinary and innovative team approaches. Cafecitos provided a space to recognize faculty awards for center participants. Finally, these coffee hours allowed CAMPOS faculty scholars to share their expertise through scientific presentations; these were so successfully we decided to develop the Cafecitos into research colloquia events**.**

Leadership Development. CAMPOS faculty scholars are chosen for their capacity to advance science in their respective STEM disciplines. However well-prepared these scholars might be, multiple factors persist that prevent underrepresented groups from achieving leadership positions. Faculty of color, whether they have earned doctoral degrees or not, are rarely considered for their leadership positions and leadership potential (Freeman et al., 2019). Therefore, one additional goal of CAMPOS was to build leadership skills and confidence for continued success; as a result, the CAMPOS Leadership Institute was established.

The Institute helped prepare CAMPOS scholars for the opportunities that might arise as their careers unfold—as tenured professors, principal investigators of grants and projects, laboratory directors, research team leaders, department chairs, deans, and even chancellors. The Leadership Institute focused on three core competencies: (1) personal skills needed to successfully lead laboratory teams, and to consider potential leadership opportunities over time; (2) the self-efficacy required to navigate

the merit review, promotion, and retention process at UC Davis; and (3) the expertise required to communicate matters of science to legislative leaders and external constituencies at both state and federal levels in accessible, jargon-free language. The underlying paradigm embraced multicultural perspectives: traditional approaches to leadership were integrated with Latino, Black, and American Indian approaches in order to strengthen the multicultural roots of the CAMPOS faculty scholars (Bordas, 2012). The institute helped participants recognize the competitive advantage that their multicultural perspectives brought to their own leadership potential (Szymanski et al., 2019).

Understanding Personal Leadership Characteristics. CAMPOS scholars are scientists who lead or will lead laboratory teams to innovation and discovery. The goal is to provide them with the skills needed to become successful laboratory leaders who can (1) distinguish themselves in extremely competitive environments, and (2) can help transform laboratories into innovative, nurturing, collaborative, and people-centered research environments that support successful programs of research for everyone involved (Maestre, 2019). The Leadership Institute also seeks to prepare scholars to assume leadership positions in academia as department chairs, deans, provosts, chancellors, presidents, as well as in their professional fields more broadly.

CAMPOS was fortunate in having a budget to support the leadership institute through the NSF ADVANCE institutional transformation grant. The budget covered costs for the leadership coach's travel, per diem, and time devoted to training participants. It also paid for the leadership assessments of each participant. These assessments, described in the next section, reflect the skills of each participant and are tailored to each of them as a result. The cost of university rooms needed during the institute and meals were included in the budget. The leadership institute began with a dinner the evening before to set the tone, prestige, and importance of the Institute. The Chancellor, Provost, and other academic leaders were all present at the dinner. The institute not only nurtured leadership skills, it also brought the cohort of participants together as a group through exercises aimed at team-building as well as leadership skills development. The experience was evaluated very positively by participants.

To assess personal leadership styles, each scholar was asked to complete the Myers Brigg Type Indicator (MBTI), a self-report questionnaire (Myers & Myers, 2010). The MBTI assesses four personal characteristics: (1) Introversion/Extraversion, (2) Sensing/Intuition, (3) Thinking/Feeling, (4) Judging/Perceiving. Each person is said to have one preferred quality from each category, producing 16 unique types (Sonnino, 2016). The assessment provides CAMPOS faculty scholars with insight into: (1) their own personal characteristics, (2) effective communication skills with persons who are very similar or very different from them, and, (3) leadership strengths that need ongoing development over time.

Each scholar was also asked to complete a "Leadership 360" assessment (Toegel & Conger, 2003). Outstanding leaders are expected to understand their personal styles not only from their own perception but also through the eyes of their peers, managers, supervisors, and members of their team. External assessments from a broader perspective help each scholar to identify and develop the competencies and self-knowledge needed to achieve personal, professional, and leadership excellence.

A Leadership 360 assessment focuses on: (1) communication skills, (2) decision-making abilities, (3) promoting change and innovation, (4) effective working relationships, (5) leadership skills, (6) coaching skills, (7) use of personal and others' strengths, and (8) team development.

In addition, CAMPOS Faculty Scholars had the opportunity to learn directly from leaders in academia. Faculty holding leadership positions led discussions about their own experiences in navigating their own careers as women in STEM science. These leaders included chancellors, vice chancellors, vice provosts, department chairs, ADVANCE program leaders, STEM business leaders, as well as community leaders (for example the Consul General for the Mexican Embassy in Sacramento, who happened to be a woman). These women had all overcome challenges and become leaders in their respective fields and organizations, having been recognized for their exceptional achievements.

The Leadership Institute also provided advice and discussion about the need for and ability to balance family and work, including but not limited to managing family–work conflicts and work overload. These discussions were important to all participants, particularly those who were or were soon to become young mothers and were new to their academic appointment.

Navigating the Promotion, Tenure, and Merit Review Process. CAMPOS was built on the assumption that diversity and inclusion does not end with appointment of women and faculty of color. This is merely the springboard to launch multicultural perspectives in STEM departments. Newly-appointed scholars of diverse backgrounds need to understand how to traverse obstacles of merit review, promotion, and tenure, whether they were appointed as assistant, associate, or full professors.

Training specific to UC Davis faculty merit reviews was provided by the vice provost for Academic Affairs and the chair of the Academic Senate, as well as faculty from the STEM disciplines who were tenured full professors. Women, especially women of color, continue to face barriers that include academic structures and a culture that have proven difficult to change, a deeply entrenched faculty value system, and ingrained sociocultural norms that define social roles and expectations (Burgess et al., 2012; Pearce et al., 2020). CAMPOS faculty scholars (CFS), learned about what to expect in a merit and promotion review. Dossier preparation was discussed using specific examples. The vice provost for Academic Affairs detailed the effective presentation of a dossier and its contents. She also shared available resources that UC Davis provides in grant and project development. The Faculty Senate chair discussed the Academic Senate review process. Tenured professors talked about the workings of personnel committees and their review processes. It was made clear from the start how candidates could take advantage of assistance and how they needed to fully understand each step in the merit review process, including expectations in each rank. The CFS expressed surprise at the level of detail provided as they entered UC Davis to begin their new appointments. They were not familiar with the sizable investment the university was making to ensure their potential success.

Over time, CAMPOS faculty scholars were given the opportunity to talk with members of the CFS selection committee in their departments, while also taking in advice that their own launch committees provided. CFS produced outstanding merit

reviews, earned promotions, and achieved tenure based on their research achievements, their teaching portfolios, their university service, and their engagement with programs of diversity and inclusion.

Scientific Communication with Legislators. Continued scientific innovation will require exceptional leaders in academe who reflect the ethnic, racial, and gender diversity of the United States. A need exists, then, to prepare the next generation of STEM scientists not only to advance knowledge but also to inform public policy makers at local, state, and federal levels about their research. Thus, the purpose of the Policy Development component of the Leadership Institute is to inspire racially and ethnically diverse STEM scientists to lead and shape such policy through communicating knowledge about STEM research in their districts. For most academics, the chance to discuss their research with legislators occurs at mid-career or later, if it even occurs at all. Scientists of color are rarely viewed as the experts in their fields (Jemison, 2019), so CAMPOS seeks to provide skills to change this view.

To build expertise in communicating science to policy-makers, the Leadership Institute planned for CAMPOS Faculty Scholars to meet with elected state and federal officials.. Many officials eagerly accepted the invitation to meet new URM STEM and learn about their research. The UC Davis Directors of Federal and State Government Relations prepared the CAMPOS Faculty Scholars for their visits to elected representatives and their staffs.

Scholars a-were first introduced to the legislative process at state and federal levels. Each CFS prepared a personal introduction lasting about 30 seconds, which includes their name, title, key area of expertise, as well as a one-page summary of their research, written in lay terminology, designed be left with the policy-maker or a staffer. The CAMPOS's Founding Director, along with administrative leaders (who may include the chancellor, the vice chancellor, and the provost, as well as the Directors of Federal and State Government Relations), then accompany the scholars to caucuses that support science, either at their State Capital offices in Sacramento or at their U.S. Capitol offices in Washington, D.C. The visits were solely an informational exchange as UC government policy and the National Science Foundation prohibits lobbying.

Community Engagement. A key component of the CAMPOS vision has been community engagement, with the goal of engaging CFS in answering questions that are important to local communities throughout California. An important quality that each scholar brings to UC Davis is their commitment to partner with local communities of color, whether through mentorship of students or pursuing research that answers questions of mutual concern. To this end, CAMPOS scientists and faculty are working to engage children and parents K–2 in STEM science, allied with organizations like 4H Clubs, Cesar Chavez Science Day, and summer STEM programs for underrepresented racial and ethnic minority high school students from communities around Northern California.

Building on their participation and success in the CAMPOS initiatives, Scholars are also teaching, mentoring, and inspiring college undergraduates to pursue graduate school in STEM fields. For example, six undergraduate research assistants in the Social Science research initiative applied to graduate school in STEM or Health

Science as a result of their participation in faculty research through CAMPOS. During their occasional visits to campus, community organizations seek faculty to share their academic journeys. CFS and affiliated faculty are working jointly to establish community-based research to promote environmental changes that affect community health with a team science approach.

Promoting Team Science. One of the key strategic goals CAMPOS has been to revolutionize STEM science as well as the pipeline to STEM fields through "team science." The term can be defined as a "collaborative effort to address scientific challenges leveraging the strengths and expertise of professionals trained in different fields" (Bennett & Gadlin, 2012). Key elements of a successful team science approach include: (1) a shared vision; (2) development of a shared vocabulary among team members; (3) explicit articulation of team member expectations, roles, and responsibilities; and (4) continuous communication across a complex landscape that encompasses scientific, regulatory, local communities, and commercial considerations (Sutton et al., 2019).

UC Davis has long recognized the importance of team science to timely discoveries that make a difference to the future of society and science itself. Interdisciplinary approaches have been a cornerstone of innovation. Interdisciplinary teams have been creating projects that, for example, positively affect the global environment, test the impact of climate change on the health of women agricultural workers, and measure the impact of technology on the future of agricultural farm work. STEM scientists in disciplines ranging from engineering, plant biology, and microbiology to the social sciences and health sciences together are creating programs that promote and facilitate team science. Multicultural perspectives are a natural fit with this endeavor and are influencing the next generation of STEM researchers in ways we are just beginning to appreciate.

Inter- and cross-disciplinary teams have integrated concepts, theories, methods, and multicultural perspectives into new research approaches that advance scientific innovation in ways that not only harness but also build upon increased specialization and knowledge fragmentation across diverse fields (Klein, 2010; Trochim et al., 2008). Growing evidence suggests that team science increases research productivity, helps to disseminate research findings across multiple disciplines (Vogel et al., 2014), and produces significant scientific outcomes as well as practical applications (Jordan, 2006). Team science also effectively engages and partners with local communities to generate knowledge critical for improving quality of life (Wallerstein et al., 2019).

2 Lessons Learned and Best Practices

The CAMPOS vision was to support discovery by establishing a research center that would change the face of STEM to reflect the multicultural diversity of California and beyond. The metrics of its successes included: (1) effecting institutional transformation with university leadership and National Science Foundation support, (2) adopting a mission and a vision, (3) designing a blueprint for action that can

ensure that the best and the brightest receive appointments, retention, advancement, and (4) creating a sustainability plan for its future. Since its founding, CAMPOS has gained both state and national recognition for achieving excellence through diversity. It has become recognized as a national NSF model for recruitment, retention, and promotion of a diverse and inclusive STEM faculty with multicultural perspectives; it has also been recognized nationally by *Forbes* magazine as a destination place for women in science in STEM (Forbes, 2016). Women in science now wish to come to UC Davis not only to join its unique research community but especially, to help transform STEM science in the twenty-first century.

Despite fears among some STEM department faculty that standards might be lowered to increase diversity and inclusion, CAMPOS scholars' achievements at UC Davis to date include the following:

- Attaining National Science Foundation and National Institutes of Health grants, including one with a perfect NIH score with no scientific peer reviewer concerns or questions (a rare occurrence)
- Numerous peer-reviewed scientific publications
- National and international recognition for scientific discoveries
- Academy of Science Fellow selection
- Recognition of excellence through campus awards and recognition
- Promotion to tenure at UC Davis.

3 Conclusion

Recognizing the importance of diverse viewpoints in STEM is not new, but building and sustaining diverse, inclusive academic STEM environments is no easy task. It takes sustained resources, both intellectual and financial. Despite CAMPOS's numerous successes and achievements, sustainable institutional transformation is an ongoing process of transcending traditional and historical barriers. Optimizing the benefits, challenges, and opportunities of modern science and technology requires understanding and confronting existing and persistent social inequalities within the academy. Including multicultural perspectives in the discovery and creation of knowledge is needed to achieve diversity and inclusion in STEM fields; in turn, diversity and inclusion are needed if the United States is to remain a global leader in science.

At the University of California, Davis, the mission and vision that launched CAMPOS are springboards to a new beginning—one that fully embraces both our common humanity and the complexity of our shared environments. In its next phase, through the ongoing support of the provost and other campus leaders, CAMPOS is partnering with the arts and humanities to pioneer a new vision for joint discoveries that began with a multicultural perspective in science and will, in time, have broader social impact.

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Mentorship, Sponsorship, and Professional Networking

Denneal Jamison-McClung

Abstract Creating an ecosystem of mentorship and sponsorship requires institutional commitment and the collaboration of faculty and administrators from diverse backgrounds. From 2012 to 2018, the UC Davis ADVANCE Mentorship and Networking Initiative (MNI) partnered with the campus leadership to implement several programs and activities to support mentorship, sponsorship, and professional networking for STEM women faculty across career levels. During this award period, pilot programs aimed to provide strong mentorship for newly recruited faculty, including scholars affiliated with the Center for Multicultural Perspectives on Science (CAMPOS) as well as mid-career faculty, with the intention of scaling efforts across campus units. MNI committee projects included piloting "Launch Mentoring Committees" for 43 new faculty, support for faculty-led "New Faculty Network" monthly networking mixers, implementation of the Associate Professor Network listserv, annual co-hosting of the Fall Welcome for Women Faculty, and development of the ADVANCE Scholar Award Distinguished Lecture and Networking Reception. Though all MNI programs and activities were well-received, both faculty mentors and mentees evaluated the Launch Mentoring Committees especially positively. This program emerged as a recommended best practice for engaging new faculty and building a sense of community that crosses disciplinary and intersectional boundaries.

Keywords Mentorship · Sponsorship · Faculty development · Academia · Retention and promotion · Career progression · Faculty networking

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1 Gathering Diverse Institutional Stakeholders and Collecting Baseline Institutional Data

At the time the interdisciplinary Mentorship and Networking Initiative (MNI) committee was formed, it was clear that disciplinary norms for recruiting, mentoring, and sponsoring new STEM faculty varied widely across campus. To effect institutional transformation in faculty mentoring with an eye toward improving inclusivity, we brought together mid-career and senior STEM faculty with expertise and interest in the topic as well as broad familiarity with existing campus practices and knowledge of "on the ground" challenges. Especially helpful was preliminary data on campus climate and faculty concerns gathered through the 2012–2013 UC Davis Collaborative on Academic Careers in Higher Education (COACHE) survey (Faculty Satisfaction Survey Reports, 2019). Initial MNI working sessions asked, "What are we currently doing? What is working? What seems to be ineffective?" In addressing these questions, we were primarily concerned with the mentoring of new STEM faculty and with the specific challenges faced by women and faculty from underrepresented groups.

Informed by existing literature on faculty mentoring, our discussions examined the potential benefits and drawbacks of common academic mechanisms for new faculty mentoring, such as assigning new faculty members a senior faculty advisor within their home department. A key point of contention that emerged early on was the degree to which we should emphasize structured or formal (e.g., assigned mentors and either peer-led or administration-led mentoring committees) versus less-structured or informal (e.g., peer-to-peer networking events, informational workshops) approaches for best supporting new STEM faculty in developing robust mentoring relationships and professional networks. Ultimately, MNI moved forward with a suite of options encompassing both approaches that were aligned with UC Davis ADVANCE's overarching goals and had measurable, attainable outcomes.

To link project goals with measurable outcomes, the MNI team collaborated with the internal project evaluators to create a framework based on Kotter's (1995) eight-step theory of organizational change (Fig. 1). In line with the premises of collaborative leadership, MNI activities were championed by specific co-directors and committee members, including both structured/formal pilot programs (Launch Mentoring Committees, ADVANCE Scholar Awards) and less-structured/informal professional networking programs (Welcome Reception for Women Faculty, New Faculty Network, Associate Professor Network). Leveraging internal and external expertise, the MNI team developed and scaled mentorship programs and activities that were modeled on similar efforts that had proven successful on campus and at other research-intensive universities (Bilimoria et al., 2008; Luz, 2011). The origin and development of specific MNI programs and activities are described in the next sections.

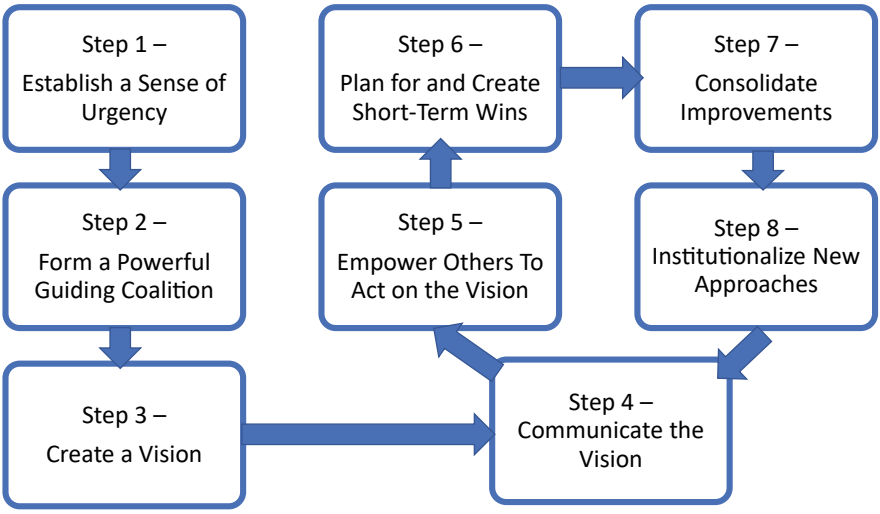

Fig. 1 Kotter's theory of cultural change (1995)

Lessons Learned—Stakeholder Engagement

To develop scalable, effective models for mentoring, sponsorship, and professional networking within an institution, we learned that it was vital to do the following:

- Engage stakeholders from across STEM disciplines and departments—colleagues' institutional experiences of mentoring and sponsorship may be more diverse than expected.
- Gather institutional data on faculty experiences of mentoring and networking to identify the main challenges and prioritize limited resources.
- Develop appropriate logic models, such as the theory of change flow chart in Fig. 1, showing the link between program goals and predicted outcomes at the beginning of pilot efforts, in order to set milestones and prevent "mission creep."
- Work with professional program evaluators to develop effective assessment strategies, including participant interviews, to better understand the impact of mentoring pilot programs on new faculty sense of belonging, self-efficacy, and familiarity with campus resources.
- Avoid "reinventing the wheel" when designing solutions to identified challenges:
  - Call on internal and external experts to share existing best practices.
  - Consider investing resources in scaling up or adapting successful, existing efforts, in addition to creating novel programs and activities.

2 Early Career Mentorship and Networking

MNI pilot programs and activities focused on supporting assistant and associate level faculty colleagues, to help develop effective collegial networks and identify resources needed for career advancement. Newly recruited faculty, such as the CAMPOS Faculty Scholars, were encouraged to participate in early mentorship and networking activities, including the pilot Launch Mentoring Committee program and the New Faculty Network.

2.1 Launch Mentoring Committees

For newly recruited assistant professors, emphasis was placed on helping individuals to quickly develop a sense of belonging, become familiar with institutional and disciplinary metrics for success, and make authentic connections to those senior faculty and administrators who had a strong desire to serve as mentors and sponsors. To this end, MNI piloted the structured, committee-based mentoring program called Launch, which was modeled on successful new faculty mentoring programs piloted at Case Western University School of Engineering ("Mentoring + Mentor Fellows Program: Office of Faculty Development: Case Western Reserve University." *Office of Faculty Development—Case Western Reserve University*) and Michigan State University (Luz, 2011). Typically, Launch mentoring committees were arranged for new faculty in the pilot program during their first few months on campus. Over the course of the award period, 43 new faculty participated in the Launch program, including 19 STEM women faculty.

Launch Mentoring Committees typically included several faculty members:

- Launch Convener—a mid-to-late-career faculty member who invites committee mentors, organize and chair the Launch committee meetings, work closely with the Faculty Mentee to set effective meeting agendas prior to meeting, take and share meeting minutes, and ensure that action items are followed up
- Faculty Mentee—the new faculty member who works closely with the Launch committee Convener to identify potential committee members and prioritize issues to be addressed by the group
- Department Chair—the faculty administrator who is responsible for implementing campus and departmental policies, making teaching assignments, distributing local resources, and conveying a clear sense of departmental merit, promotion, and tenure expectations to the Faculty Mentee
- Internal Senior Faculty Mentor—a mid-to-late-career faculty member who is interested in mentoring a new departmental colleague
- External Senior Faculty Mentor—a mid-to-late-career faculty member who is interested in mentoring across disciplinary lines
- Other Senior Faculty Mentor(s)additional mid-to-late-career faculty members whose perspectives may be useful to new faculty mentees who are conducting

interdisciplinary research, have joint departmental appointments, or are working on a diverse set of scholarly pursuits.

Launch Mentoring Committees met quarterly for one year, with meetings commencing early in the first year of a new faculty member's arrival on campus. Through our internal evaluation process, we found that most Launch participants (mentors and mentees alike) felt the mentoring activity should start as soon as feasible after the hire; many even suggested that the first Launch meeting should occur before the new colleague arrived on campus. In practice, initial committee formation and meeting scheduling required a few weeks of administrative effort. This timing recommendation, along with the practical challenge of identifying Launch Conveners for each new faculty member, led the MNI committee to recommend that the faculty search committee chairs take on Launch Convener roles as a matter of programmatic practice.

Another recommendation that emerged during pilot evaluation was to extend the Launch program into the second year of the new hire's time on campus. Of the ~50% of participants suggesting extension, both mentors and mentees were equally in favor of the idea. When the Launch program pilot was initiated, there was some discussion about the appropriate time frame for mentoring activity. At the time, we decided that mentoring committees interested in extending their activity beyond one year could elect to do so without formal tracking. In retrospect, we think that institutions adopting the Launch mentoring committee model may want to ask participants to commit to a two-year, quarterly meeting cycle.

To facilitate meeting interactions, the Launch program employed a list of potential discussion questions (Table 1) covering common issues related to setting up and managing a STEM research laboratory, securing funding, and fulfilling teaching and service commitments. In the absence of specific mentoring requests by the new faculty member, the Launch Convener used these questions to guide committee discussions. For example, new faculty may not be aware that departmental teaching expectations change over their career progression. Having the Launch Convener ask questions about pre-tenure teaching loads with the Department Chair present to provide clarity would communicate short- and long-term merit and promotion expectations to the new faculty member while in a neutral, professionally-supportive setting. Faculty mentors from inside and outside of the department could then provide context on whether departmental practices and expectations are based on local, disciplinary tradition or derived from broader campus policies.

To recognize the service work carried out by Launch Conveners and Faculty Mentors, UC Davis ADVANCE worked with campus leadership to send formal letters of commendation that would be appropriate for inclusion in merit and promotion packets. Institutions adopting the Launch Mentoring Committee model should appropriately recognize and reward participating faculty and staff for their contributions to the effort, as well as encourage the participation of an inclusive group of both mid-career and senior faculty. Depending on the level of administrative effort required for an academic unit, a course release or modest stipend may also be appropriate for Launch Conveners. During our pilot program, one Launch Convener

Table 1 Example launch mentoring committee topics and questions

Funding	Are there grant-writing workshops or other campus resources for funded research? Who in my department helps with grant budgets? What is the campus indirect cost rate for this type of proposal? What is a limited submission proposal? How can I best use reviewers' comments to improve proposals? When should I contact a funding agency program officer with questions or concerns?
Research	Should I continue to collaborate with my postdoctoral advisor? If I collaborate, will that be seen as a negative during merit and promotion review? Are there people on campus in the ___ research area that I should speak to about collaboration?
Teaching	Who makes the teaching assignments? Is there a course repository for previously used course materials? How do I use the online course management system? What types of questions will be on the student evaluations? Will my course have a TA? Is there a teaching resource center or other training for new faculty?
Professional service	Which requests for service are most beneficial for new faculty? Least beneficial? When should I decline a service request? At this career stage, should I consider external service (e.g., professional societies)?
Laboratory and personnel management	I have limited funds—should I hire a postdoc or support a graduate student? What qualities do I look for in a new hire? How do professors post available laboratory technician jobs on campus? Are there required campus laboratory safety and personnel manager trainings?

was often responsible for shepherding three or more committees. Although that was deemed do-able (given administrative support for meeting scheduling and tracking), the team ultimately concluded that Launch Conveners should be responsible for no more than three Launch Mentoring Committees at any given time, to ensure a high-quality experience for new faculty mentees.

Internal evaluation of the project revealed that both mentees (n = 22) and mentors (n = 22) viewed Launch participation as a valuable experience, with the majority indicating that the most successful aspects of Launch were "getting information and specific resources" (83% mentees, 95% mentors) and "feeling welcomed and supported" (78% mentees, 86% mentors). The following quotes are representative of the qualitative feedback received from Launch mentees and mentors:

> The LAUNCH committee gave me a unique opportunity to connect at the time I needed it the most. I really appreciated the fact that the committee involved professors from my department as well as from other departments. I always received advice from different points of view, which I found particularly invaluable. I remain in touch with most members, and they have become my long-term mentors. – Launch mentee and Assistant Professor Cindy Rubio Gonzalez, Computer Science

> I've been on several Launch Committees. They're an incredible resource for the new faculty. But also, I've learned a lot, and it makes a connection with a new person. Launch Committees are fantastic. – Launch mentor (anonymous)

Lessons Learned—Launch Mentoring Committees

Based on the results of the pilot Launch Mentoring Committee program described above, we encourage institutions adopting this mentoring model to anticipate the following personnel requirements:

- *Identification and training of a sufficient number of Launch Conveners having the time and the expertise needed to establish and manage mentoring committees for all new faculty.* As mentioned, one possibility is to assign this role to the faculty search committee chairs responsible for recruitment, as they will already have a good grasp of the new person's research interests, professional strengths, and weaknesses, among other factors. Based on our experience of the administrative effort required per committee, we recommend that each Launch Convener be responsible for no more than three committees at a time. New Launch Conveners should receive guidance on the role from the Vice Provost of Academic Affairs or someone from another central administrative unit responsible for the overall administration of the Launch program.
- *Identification of sufficient senior faculty mentors to serve on Launch committees for all new faculty.* Small departments, as well as those expecting many new incoming faculty, have occasionally opted to hold "group Launch" meetings, which are shared among two or more new faculty colleagues. By structure, these are not individually tailored mentoring committees but ones that provide general discussion along with helpful resources, in addition to the opportunity for peer-to-peer mentoring and networking. Group Launch, we determined, is better than no Launch. However, evaluations of both mentors and mentees indicated a preference for individual Launch committees, when feasible.
- *Staff support for tracking and coordination of quarterly Launch committee meetings.* It is often challenging to align the schedules of busy faculty members. Doing so may require iterative emails and electronic calendar polls, as well as reserving numerous meeting rooms. Depending on a Launch Convener's professional obligations, they may or may not need assistance with meeting logistics. Central staff support would help to ensure that Launch meetings are not delayed or missed.

2.2 New Faculty Network (NFN)

In 2006, an MNI committee member, Magali Billen, started the New Faculty Network (NFN) to serve as an informal social and professional networking group, connecting new faculty members via an email listserv. The decision was made during the UC Davis ADVANCE award period to provide administrative support for the NFN listserv, a NFN annual fall reception, and advertisement of the network to all incoming

faculty in order to scale participation. The group continues as a faculty-led network of early-to-mid-career faculty who gather for monthly social mixers throughout the academic year. Each year, a few NFN members take the lead in organizing and announcing the monthly events, which are attended by about 15–45 faculty from across campus disciplines. Events are held at restaurants and public venues off campus.

All NFN members can send announcements to the network; it is straightforward to opt in or opt out of the list, using the institution's open-source mailing list manager, Sympa. Types of social events announced on the listserv have varied with participating faculty interests, including hiking and skiing trips, museum visits, attending performing arts or sporting events, book clubs, salsa dancing, picnics and potlucks, wine tasting, and "happy hour" gatherings. At NFN mixers, the main topics of professional conversation have included local resources to support work-life balance, best practices for teaching and mentoring, navigating the campus merit and promotion system, research funding collaborations, and early career award opportunities.

Lessons Learned—New Faculty Network

Effective strategies for helping new faculty build professional peer networks may include the following:

- Keep the structure of networking events informal, limiting announcements and maximizing time for peer-to-peer conversations.
- Encourage participation by a diverse group of faculty members, to create an inclusive network with many types of social and professional networking opportunities.
- To ensure continuity over cohorts of incoming faculty, provide Institutional support for informal peer networks, including electronic communication platforms (such as listservs and websites), distribution of related faculty orientation materials, staff support for event announcements and reminders, and resources for at least one annual event.

3 Professional Networking and Sponsorship

The MNI committee worked closely with the ADVANCE leadership and management teams, as well as UC Davis Academic Affairs, to develop and scale several activities to encourage peer-to-peer professional networking, promote familiarity with campus faculty professional development resources and efforts to embrace a culture of excellence in mentoring, and recognize the importance of sponsorship across all faculty career stages. Mid-career associate professors were key stakeholders for ADVANCE engagement, having also emerged as a faculty group in need of support on the 2012–2013 UC Davis Collaborative on Academic Careers in Higher Education (COACHE) survey. MNI program development aimed at mid-career faculty included the ADVANCE Scholar Award Distinguished Lecture and Networking Reception,

and the Associate Professor Network. We also partnered with the campus to cohost an annual reception to welcome women faculty to campus.

Mentorship and sponsorship necessarily have some overlapping characteristics. However, by definition, mentors offer junior colleagues useful advice on career-related issues, while sponsors nominate and promote colleagues for career-advancing opportunities and awards, both internally and externally. Having both mentors and sponsors is key for faculty career advancement across demographic groups. Good sponsor–protégé relationships are critical for development of academic leaders within institutions (Huston et al., 2019; Magrane et al., 2018). Recent studies in academic medicine—an area of STEM posing many of the same institutional diversity challenges as university research and teaching—have also highlighted the importance of sponsorship in the career advancement of women and other underrepresented groups along this professional career path (Ayyala et al., 2019; Shakil & Redberg, 2017).

3.1 ADVANCE Scholar Awards—An Avenue for Sponsorship

The ADVANCE Scholar Award was developed to recognize women faculty leaders who were not only excellent researchers but also outstanding mentors. Campus colleagues were asked to nominate mid-career and senior women faculty for the prestigious award, which included a stipend and an invitation to present a distinguished campus lecture in conjunction with a networking reception. This award served as a catalyst for sponsorship of women faculty protégés by senior colleagues. Over the course of the award period, 29 nominations were received and eight ADVANCE Scholar Awards were made. As programs have been institutionalized on campus, this award now falls under the purview of the Office of Diversity, Equity, and Inclusion, with expanded nomination criteria that encompass all "mid-career and senior, ladder-ranked faculty who will advance gender equity in STEM through their teaching, research or service."

3.2 Associate Professor Network (APN)

Given the success of the New Faculty Network and campus survey data indicating that associate professors were the least satisfied with their career trajectories and campus climate, an Associate Professor Network (APN) listserv was developed to facilitate awareness of and access to mentoring and professional development opportunities targeted to mid-career faculty. The Vice Provost for Academic Affairs solicited feedback from associate professors on topics of interest, and the following emerged as top concerns:

- Time management (related to research objectives)

- Developing and managing collaborative research projects across both internal and external stakeholders
- Preparing merit and promotion dossiers
- Using faculty leaves and accommodations—their impact on advancement
- Strategies for saying "no" to service and other professional requests
- Assessing teaching and course material effectiveness
- Classroom management and encouraging student accountability
- Navigating difficult collegial relationships
- Grant writing and seeking sources of research funding
- Managing laboratory personnel and mentoring graduate students.

The APN continues to be used to announce workshops, networking events, and professional development opportunities on these topics, as well as emerging areas of interest to associate professors. It is not limited to STEM but encompasses associate professors from all fields and disciplines across the campus.

3.3 Welcome Reception for Women Faculty

An annual reception for women faculty has been a tradition at UC Davis for many years, originally organized by a center called the Consortium for Women and Research. During the grant award period, the ADVANCE program continued the tradition, co-hosting the Welcome Reception for Women Faculty with the Vice Provost for Academic Affairs and offering a large, interdisciplinary networking opportunity for faculty at all career stages. Attendees at the inaugural event were encouraged to network with faculty from other academic units; faculty new to campus were identifiable via color-coded name tags. A midyear kickoff event was held in February 2014 and was followed by annual events hosted each fall thereafter. Event surveys provided our program with a rich source of local data on the most pressing challenges faced by faculty women, disaggregated by career stage, discipline (STEM and non-STEM) and academic unit.

For the February 2014 event, 117 women faculty attended, representing 14% of the campus's women full professors, 10% of women associate professors, and 27% of women assistant professors. Of these attendees, approximately 80% responded to the follow-up survey; we learned that 73% were interested in meeting other women faculty (their primary reason for attendance), while 69% were "satisfied" or "very satisfied" with the opportunity to expand their professional network. We also provided a list of professional development event topics to determine which would be of most interest to women faculty (more than one choice allowed). The four topics of most interest were Negotiating (64%), Mentorship (59%), Grant Funding (53%), and Work-Life Balance (50%). An area was provided for write-in topics of interest, and a variety of responses were given, including topics related to lived experiences of diversity and inclusion in the workplace and intersectionality. Examples included: "challenges to communication with colleagues and supervising faculty"; "how to

convince older white male colleagues that diversity in hiring matters"; "resolving work-related conflicts with male colleagues"; and "specific issues facing women of color."

By providing that large event forum in 2014 for professional networking and discussion of issues affecting women faculty, we were able to identify the topics of most relevance to the campus community. Attendees were drawn from all four academic colleges and four professional schools. By harnessing the collective wisdom of this faculty network, both at the inaugural event and years that followed, we gained a better sense of the mentoring and professional development needs of the community. This invaluable, nuanced data broadly informed the work of UC Davis ADVANCE and the MNI committee.

Lessons Learned—Professional Networking and Sponsorship

In striving to provide new and mid-career faculty with effective opportunities for professional networking and the development of connections to potential sponsors, consider the following:

- All faculty, but particularly mid-career faculty, are overscheduled and have many professional commitments. Before scheduling networking events or awards symposia, ask key participants (or a subset of the target demographic) which days and times would be most convenient for attendance. Lunchtime events work well for many faculty.
- Be thoughtful in choosing inclusive networking venues that have the event facilities and ground transportation needed for disability access, breastfeeding mothers, small children and caregivers, elderly attendees, service animals, and so on.
- Family care responsibilities disproportionally affect faculty women and can prevent attendance at late-afternoon and early-evening events. Assess whether provision of on-site childcare is possible within institutional policies and resource constraints (if not, this may be an important strategic issue to address). When possible, hold inclusive, family-friendly events that allow attendance of elder parents, partners, children, and others.

4 Concluding Remarks

Effective mentorship is necessary for success across the STEM career trajectory. This finding holds true for new faculty, who have ostensibly "made it" past many other obstacles. To navigate the complex cultural expectations and unwritten "rules" of academia, providing a mentor network such as a Launch committee is a must—especially for first-generation STEM professionals and groups historically underrepresented in STEM. Helping senior colleagues identify opportunities for sponsorship of new faculty is also essential for the promotion, retention, and leadership development of these junior colleagues. By providing structured mentorship, sponsorship, and a diverse array of professional development and networking opportunities, academic

units can set their new faculty hires on the path to tenure and, ultimately, to productive, meaningful engagement in their scholarly communities.

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Work-Life Integration in Academia: From Myth to Reality

Sophie J. Barbu, Karen McDonald, Binnie Singh, and Laura Grindstaff

Abstract Work-life integration is often considered the stuff of myth, especially for women in academia. The inherent conflict between an identity as a mother or parent and that as a working professional effectively limits diversity efforts in STEM. Addressing this conflict is therefore crucial to creating a more inclusive academic environment. Work-life integration has two fundamental components—structural and cultural. Workplace polices need to enable attainment of work and life goals; at the same time, the work culture is important in assuring individuals take advantage of existing policies. In this chapter, we review several work-life integration interventions at UC Davis, including the Partner Opportunity Program and Capital Resource Network. We discuss the challenges associated with these and other efforts during the implementation of our ADVANCE programs. We also make recommendations for improving work-life integration in academia and beyond—to turn myth into reality.

Keywords Work-life integration · STEM · Academia · Gender equality · Childcare · Dual careers · Partner opportunity program

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1 Introduction

In 2008, the Michelle R. Clayman Institute for Gender Research at Stanford University reported that 72% of academic faculty are in dual career relationships, with approximately half of that number in dual academic career partnerships (Schiebinger et al., 2008). The single career couple model of a primary breadwinner and a primary homemaker no longer characterizes academia, especially for faculty. The Clayman Institute report further linked achieving workforce diversity to the necessity of addressing dual career issues. An earlier analysis of the status of women at the Massachusetts Institute of Technology (MIT) concluded much the same thing: "the profession is set up in such a way that men academics routinely have families, while women, given current rules, find it much more difficult" (Bailyn, 2003, p. 139). Many professional women are childless, which has been referred to as a "creeping nonchoice" (Hewlett, 2002).

The assumption that "gender equality" means treating women faculty as if they are male is inequitable on its face, particularly with respect to childrearing. Failure to accommodate work-life integration discourages women from pursuing STEM careers in academia, and is thereby a barrier to inclusion. Given the prevalence of dual career couples and the distribution of work-life responsibilities across both members of the couple, this is no longer an issue for women alone—men who wish to be engaged fathers face many of the same barriers (Stovell et al., 2017). Thus, addressing work-life integration is vital for all faculty members, regardless of gender, although women are still likely to benefit more because responsibility for domestic life still falls disproportionately on them.

Relatedly, "devotion to work" is a culturally-valued attribute disproportionately associated with men; inseparable from measures of achievement, it too makes establishing a workplace culture supportive of work-life integration quite challenging (Williams et al., 2016). In part this is because, historically, "dedication" to work became implicitly entwined with "better" work (Williams et al., 2016). This culture of work devotion—what is referred to in the chapter, 'Barriers to Inclusion: Social Roots and Current Concerns,' as the "ideal worker norm," was enabled by the prevalence of single-career couples along with the clear separation of work and life/family responsibilities by gender (male breadwinner, female homemaker). The fact that single-career couples are now relatively rare has not led to a readjustment of workplace culture. There is, in essence, a tug-of-war between co-parenting and dual careers, which women feel especially keenly: they can choose between being viewed as a good worker or as a good parent, but never as both (Williams et al., 2016). Work-family conflict consumes cognitive energy, detracting from the positiveness of either experience. Thus, it's clearly beneficial to address this conflict and enable a cognitive focus on work, unhindered by guilt about neglecting family, along with a cognitive focus on family, unhindered by guilt about neglecting work (Williams et al., 2016). Although the current culture of devotion to work is anachronistic, effecting meaningful change is difficult. Not only are work-life integration programs important in effecting change, individuals must be able to take advantage of those programs without worrying whether colleagues and coworkers will feel disappointed in them. In the interim, it is important to fully understand the countervailing pressures on

performance versus parenthood, and to make work-life integration programs the new norm (Powell, 2019).

2 The Status of Work-Life Integration Programs at UC Davis

UC Davis supports integration of work and life across the career spectrum, although its policies are more generous for faculty compared to staff, lecturers, and post-doctoral scholars. Our Work Life Program was launched in 2003 and was awarded the World at Work 2017 Seal of Distinction. In 2006, UC Davis received a Faculty Flexibility Award through the ACE/Sloan Foundation, which provided funding to the program for leaves and reduced teaching loads for new parents, with the central administration covering the costs of replacement teaching. The program also enables extending the tenure clock, deferring merit actions, adjusting to part-time status temporarily as needed, supporting adoptive or foster children, and more. Either parent or both parents can take advantage of these policies. Our Work Life Program is unique in that it designates select faculty members to serve as Faculty Work-Life Advisors in almost every college and school on the campus. These advisors are trained to help those undergoing major family changes, particularly the birth, adoption, or foster placement of a child.

Although information about the program is readily available on the Academic Affairs website, it has been challenging to make faculty aware of its many benefits. This is partly because of normal turn-over in department leadership and staff support, as chairs or staff members in a position to share information about the program move out of their roles. Consequently, we continually seek avenues to get the word out, such as attending annual workshops held for faculty, including the New Faculty Workshop and the New Chairs Workshop (for newly appointed department chairs). We put together traveling "road shows"—presentations made to groups of chairs and department managers in each school or college on campus. Brochures about our program are provided to faculty candidates during the search process in the materials they receive about the campus. Finally, our work-life advisors approach faculty who they know are having or recently had a child to ensure they are aware of our programs.

3 Overview of UC Davis Programs and Policies for Work-Life Integration for Faculty

UC Davis Academic Affairs manages the training of program advisors—as mentioned above, these are trained faculty peers. They meet quarterly with a staff member in Academic Affairs to discuss new campus programs, share experiences with colleagues, and provide support to faculty considering starting families or

needing support for them. This staff member also works directly with faculty, helping them understand and navigate the pertinent policies, answering questions, providing information on resources, and even advocating on their behalf with the leadership of a department or school or college.

3.1 Family Leave

In 2003, UC Davis began providing leave for faculty parents who had a child through either adoption or foster placement; the campus also provides central funding to cover replacement teaching costs. Since that time, women faculty members take advantage of family leave more often than male colleagues. Leave policies are based on the primary caregiver:

> Birthmother: One quarter/semester leave for a faculty woman with a single or multiple birth or a quarter/semester made of up a combination of six (6) weeks of leave and the remaining weeks as active service modified duties (ASMD). In the event of a summer birth/placement, the faculty mother may get three quarters/two semesters of ASMD, with complete relief of teaching for the fall quarter/semester, depending on the timing of the birth.
>
> Non-birth mother: One quarter/semester of leave for the primary parent for adoption or foster placement. Two quarters/one semester of teaching relief/modified duties for the parent with 50% or more childcare responsibility. Faculty couples may receive special provisions.

3.2 Extensions for Advancement Mandatory Timelines

Assistant Professors or Senate Lecturers automatically receive a tenure clock extension for one year per each birth or child placement event, for a maximum of two extensions, for a total of two years. These extensions on the clock are noted automatically when the relevant university staff are made aware of the new child. UC policy has increased the allowable reasons for extensions on the clock to include a disability, a bereavement, or another significant life circumstance or event. Associate or Full Professors may also apply to postpone merits actions and/or promotions to accommodate childbirth, adoption, or foster or elder care. The length of postponement may not exceed one year per event, for a total of two years.

3.3 Flexible Work

Policies to accommodate flexible schedules also exist. Faculty may request to reduce their appointment to part-time for a finite period or permanently to deal with family needs. Faculty may also take advantage of other flexible work arrangements. Faculty

schedules are conducive to flexibility. Besides teaching and fulfilling their other on-campus obligations, faculty may adapt their schedules appropriately and productively for scholarship; this can include working remotely.

3.4 Childcare

UC Davis has a wide variety of childcare options. Faculty can register for on-campus childcare, but receive no preferential treatment. All UC employees are eligible for Bright Horizons Care Advantage, with the following services for faculty (and staff):

- Sittercity, offering profiles, reviews, and background checks for prescreened caregivers, including babysitters, full- and part-time nannies, pet sitters, tutors, housekeepers, and individual senior caregivers
- Years Ahead, offering a nationwide network of certified senior care advisors, specialized facilities including memory and hospice care, independent and assisted living communities, and in-home healthcare and senior care companions
- Preferred enrollment at Bright Horizons childcare centers nationwide
- Tuition discounts at participating provider centers for ages two and older
- BrightStudy, tutoring and test preparation resources and referrals.

Employees have priority registration for children's summer camps through Campus Recreation and their respective unions. UC Davis also subsidizes on-campus childcare for student parents.

The UC Davis campus (logically, in Davis, California) currently has three child-development centers, which are accredited by the National Association for the Education of Young Children (NAEYC); although convenient, there is no discount for faculty or staff. Currently, the UC Davis Health System (UCDHS) Sacramento campus, which includes UC Davis Medical Center, the UC Davis School of Medicine, the UC Davis Medical Group, and the Betty Irene Moore School of Nursing, is the sole health system within the University of California that still lacks campus-based childcare; this is a priority for future developments on that campus.

3.5 Faculty Recruitment

Family-friendly policies start with recruitment. In 2012, UC Davis implemented a family-friendly recruitment practice to make it easier for candidates who are parents of very young children to participate in on-campus interviews for faculty positions. This practice allows reimbursement of travel and hotel expenses for a person to accompany the prospective faculty mother or a single parent of either gender in order to breast- or bottle-feed a child under age two. Reimbursable hotel expenses may also include the costs associated with providing a crib in the hotel room.

3.6 Faculty Travel

A newly revised travel policy, issued UC campus wide in July 2019, allows coverage for the travel costs of dependents of those employees who must travel for business-related reasons. This new policy increases the options for faculty to manage their family needs while simultaneously engaging in their scholarly activities. Each UC campus is currently devising implementation procedures for the policy.

3.7 Dual Career Programs

Partner Opportunity Program: One important aspect of faculty recruitment in today's academic world is candidates' frequent need to manage dual careers. The UC Davis Partner Opportunity Program (POP), one of the longest-running university dual career programs in the country, provides support to academic units in the recruitment and retention of outstanding faculty and in executive searches by assisting their partners and spouses in seeking employment at UC Davis. POP serves as a resource for candidates to explore their career goals, identify job opportunities and arrange contacts, access career counseling services through Human Resources, take advantage of training programs, and participate in informational interviews. It is important to note, however, that POP does not guarantee job placement.

It can be particularly challenging when *both* candidate spouses or partners are seeking faculty positions, because of the limited number available. POP can provide temporary bridging funds to support limited-term contract positions, so as to provide the partner of the main hire with more time to find longer-term employment. As a public institution, the university must adhere to mandatory open-search processes, which limits flexibility somewhat. Fortunately, the University of California as a whole and UC Davis in particular both include faculty hires as an acceptable reason for a search waiver, recognizing the challenges of creating a position specifically for an accompanying partner.

Capital Resource Network: Often, faculty being recruited have partners who are unable to find employment at UC Davis or who have a broader interest beyond the campus. The Capital Resource Network (CRN) was created in recent years to provide additional support to our newly hired faculty (or in fact any employee) or to help retain faculty. The CRN provides support early in the hiring process, when faculty candidates are considering accepting an offer. Candidates can meet with representatives of the CRN to discuss the services available for relocation and integration into the region (housing, schools, medical providers, special needs, and the like) and, if relevant, to get support for their partners' employment needs. The CRN team facilitates informed decision-making well in advance of an actual move if a candidate is hired. The CRN is a unique program within the UC system, and likely throughout the western region.

4 The Challenge of Childcare Provision

Institutions of higher education throughout the United States increasingly find that high-quality childcare services are essential for recruiting and retaining faculty and staff (Boressoff, 2012). Because childcare is important throughout one's academic career, student and postdoctoral parents also need assistance to ensure their enrollment, retention, and graduation. Lack of adequate childcare, meaning the kind that is both available and affordable, can drive prospective parents away from a career in academia.

One of the initiatives of the UC Davis ADVANCE program is the Social Science Research Initiative (SSRI), which studies the familial, socio-culture, and institutional factors that either facilitate or impede the inclusion and success of Latina scientists pursuing academic careers. SSRI's preliminary findings indicate that newly hired Latina faculty on our campus chose UC Davis over other options in part because of its suite of generous work-life integration policies. Faculty elsewhere interviewed by the SSRI team reported relying heavily on childcare during the work week, and benefited greatly from extended hours of daycare assistance during periods when their own workdays got extended because of grant or publication deadlines. Working in close proximity to day care centers also benefit faculty because it means driving shorter distances and spending less time commuting (Saldana et al., 2013).

4.1 Turning Talk into Action

UC Davis has two administrative advisory committees that partially overlap with the Work Life Program: The UC Davis Child and Family Care Administrative Advisory Committee (CFCAAC) and Status of Women at Davis Administrative Advisory Committee (SWADAAC), both composed of faculty, staff, and students. Their main purpose is to advise UC Davis leadership on gender and/or family issues affecting the larger campus community. CFCAAC, in particular, works to improve childcare and family care programs for employees and students. Despite all these efforts, provision of childcare remains a concern for many faculty at UC Davis. Faculty report greater dissatisfaction with work-life balance on our campus than at other nationally comparable institutions, with women being more dissatisfied than men (see COACHE Survey Advisory Committee Highlighted Results, 2016–2917, https://academicaffairs.ucdavis.edu/faculty-satisfaction-survey-reports-coache). Thus, although it is important to have committees tasked with advising leadership, such advice it is of little use unless put into action.

A key challenge here is the commitment of resources coupled with turnover in administrative leadership. Subsidizing childcare or eldercare for faculty, staff, and students is costly, and so, while the recommendations of advisory committees are often acknowledged, they are not always implemented. A strongly committed campus leadership that views work-life integration as a priority is essential for turning talk

into action; consequently, turnover in leadership can derail momentum because new leaders may need to be educated about the issues or have different priorities. Turnover disrupts institutional memory and makes it difficult to gain traction on childcare (and other) issues.

4.2 Risk and Liability as Decision-Drivers

In 2017, ADVANCE was approached by a planning committee for the national Latinas Research Network Conference to see if UC Davis would consider hosting its conference the following year involving approximately 500 participants. The committee had one specific request: could UC Davis provide onsite childcare for conference participants who brought children? So we rushed to conduct research on campus logistics and capacity.

We had never provided childcare at ADVANCE events, nor had we even heard of other large events held at UC Davis that did so. We contacted local childcare facilities both on and off campus to see if they could provide childcare at or near the anticipated conference building. We also reached out to CFCAAC to learn if they had any experience with providing on-site care. CFCAAC reported that although they periodically received such inquiries, they felt unable to help because they saw the barriers to provision as prohibitive.

We found that the ultimate barrier to identifying a viable on-campus childcare option for conference participants was the potential risk of liability to the campus for having children in care on campus. According to the Director of the Work-Life and Wellness unit in Human Resources, there are numerous considerations to bringing babysitters on campus, including appropriateness of facilities, numbers and ages of children, hours of care provided, qualifications of childcare providers, liability, need for insurance, and the "overall risk" that would have to be vetted by the Risk Management Department. Unfortunately, all these factors combined created bureaucratic hurdles that could not be surmounted in time for the conference. Creating childcare programming as part of conference programming, although it would have greatly helped some participants, was deemed too labor- and cost-intensive in view of the limited number of children who would likely be served.

Risk and liability are important considerations, of course, but they should not block action or prevent workable solutions. Complicated issues will never be resolved if we decide nothing can be done because they are too complicated. Clearly, and especially with regard to childcare, complete inaction minimizes liability to zero.

5 (Lack of) Childcare as a Barrier to Inclusion in STEM

Many academics (disproportionately women) rightly perceive that work-life integration is no easy feat because the culture of overwork and the desire to fulfil family responsibilities are in tension. The difficulty of balancing both can be visible to undergraduate as well as graduate students. One program on our campus that aims to reduce this tension is the Planned Educational Leave Program (PELP), which allows graduate students to take up to one year off (unpaid) for reasons related to illness, childbirth, childcare, eldercare, etc. and remain classified as students in good standing. However, this interruption can reduce access to support, including financial aid, academic employment, and the student health insurance program. Students who return from PELP status regain eligibility for these forms of support. Other options for student parents after childbirth or adoption include financial assistance, the Breastfeeding Support Program, the ability to enroll dependents in a voluntary healthcare plan, and eligibility for a Graduate Student Childcare Grant, which is not based on financial need. Graduate and professional students are also eligible to receive financial need-based childcare grants, which allow students to choose and schedule a childcare provider who works best for them.

Female students completing a PhD are more likely to enroll in PELP (19.3%, compared to 15.5% of male students); hence, median time-to-degree (TTD) for women is longer (5.7 years compared to 5.5 years for men). TTD excluding quarters in PELP is 5.5 years for both women and men. There is no difference by sex, race, or ethnicity in TTD among master's students who use PELP, nor is there a difference by race or ethnicity among doctoral students. Students typically learn about flexibility from their graduate advisors and graduate program staff.

6 Lessons Learned

6.1 Communicate in Multiple Formats

One issue that repeatedly stymied us was the prevailing, campus-wide lack of knowledge of our existing work-life integration policies and programs. Work-life advisors talked of having to identify new parents and then seek them out in order to provide appropriate advice. This suggested two things: (1) that in spite of advising new faculty and department chairs of the existence of these programs, the information was quickly forgotten, and (2) that faculty were likely finding advice elsewhere. In discussions with faculty, many referred to informal parenting networks that provided not merely moral support but also childcare backup as well as detailed information about childcare options. We concluded that institutions should embrace new-parent networks, provide cyberspace for their development, and work to ensure networks' awareness of campus policy and programs. In addition, electronic mailing listservs for faculty could be created to serve this same purpose.

6.2 Understand the Link Between Work-Life Integration and Diversity

The ideal worker norm—the idea that unencumbered dedication to work is an essential, if not *the* essential, component of a good worker (in the case of academics, one who achieves "superior intellectual attainment")—is a barrier to inclusion. The conflict between one's work identity and one's family identity often leads faculty to minimize or hide the family side of the equation. For example, women report more frequently than men that they avoid displaying photos of children on desks because it may communicate that they are insufficiently devoted to research, teaching, and service. The ideal worker norm creates a culture of exclusion for parents and may discourage the pursuit of academic careers for both women and men.

6.3 Do Not Take "It's Too Complicated…" for an Answer

In discussions of enhanced work-life integration programs, specifically in the provision of childcare as a work benefit, we often heard the excuse "it's too complicated" as a reason for not solving the central issue of affordable, available, and appropriate childcare. Our campus needs child-friendly spaces where faculty parents can collaborate with administrators to create solutions to childcare issues—by establishing a parents' cooperative on leased space, for example. But such ideas are shot down because of assumed liability issues.

UC Davis is not alone in struggling to address this problem in academia, and if liability is one obstacle, money is another. A recent article about childcare issues at Oregon State University cites a U. S. Department of Health and Human Services recommendation that childcare should not exceed 10% of total family income (Hogue, 2018). The average cost of childcare in California currently is approximately $1000 per month, or $12,000 per year, with variations by county and type of care (Kidsdsta, 2019).

Using the 10% rubric, a family would need a minimum income of $120,000 for one child, or $240,000 for two children. The UC systemwide salary scales (effective July 1, 2019) are well below these values for junior faculty. The salary range for assistant professors varies by unit and type of appointment. For academic year or nine-month appointments, the salary range is from $60,000 (step I) to $78,900 (step VI). Yearly childcare costs for a single child would range from 20 to 15% of salary. For 12-month or fiscal year appointees the salary range is $70,000 to $91,600, or from 17 to 13% of salary. Health science faculty are on a higher scale, with salary ranging from $72,800 to $95,300 at the ranks of assistant professor, or 16–12% of salary for childcare for a single child. Faculty in each of these groups raised concerns about the cost of childcare. Interestingly, faculty in the College of Engineering reported that the cost of childcare was not an issue. The Engineering faculty salary scale for assistant professors ranges from $93,200 to $117,100, or from 13 to 10% of the

average cost of childcare for a single child. This suggests that a viable alternative to providing childcare as a work benefit is the adjustment of salary scales along the recommendation that 10 percent of total income be devoted to childcare. Thus, rather than just accepting "no" with respect to childcare, we also need to consider viable, low-liability alternatives such as linking salary scales to the average cost of childcare for a single child. This would also address another issue we heard frequently—that childcare was not an "equitable benefit" because some faculty are not parents or are parents with older children and therefore ineligible for the benefit. Increasing salary scales for all rather than implementing a benefit would solve this problem.

6.4 Create a Sustained Commitment for Action

The final lesson we learned is that addressing work-life integration requires a sustained commitment for action on the part of administrators as well as faculty and that the commitment has to be visibly promoted. Through our work on ADVANCE, we contacted the two campus entities mentioned earlier: CFCAAC (Child and Family Care Administrative Advisory Committee) and SWADAAC (Status of Women at Davis Administrative Advisory Committee). From these committees we learned that faculty in the Health System (housed at the university's Sacramento campus) believed lack of childcare to be a major workplace problem, yet repeated efforts to address it had failed. When we took the issue to the executive leadership, we found there was overwhelming support to address childcare issues and to establish a childcare facility on the Sacramento campus. For various reasons, the Health System faculty on the Sacramento campus and the administrative leadership on the main UCD campus were not in conversation. With the support of the Chancellor, SWADAAC got direct access to the Planning Director of a new campus development in Sacramento called "Aggie Square." The committee successfully made the case for creating a new child care center near the UC Davis Health campus. To address a shortage of available licensed childcare for local working families, UC Davis Health, SMUD and Sacramento State University joined forces to create a new child care center in Sacramento, CA.

This incident reveals how important it is to involve in decision-making those standing committees or permanent advisory groups that advocate on behalf of diversity issues so they can keep such issues at the forefront of planning and development. A key challenge here is the sheer volume of campus groups and committees and the low-profile given to work-life integration. Work-life integration efforts are critical to faculty recruitment and retention; another recommendation, therefore, to ensure the *visibility* and *centrality* of those programs and committees that undertake such efforts.

Our final recommendation is to make work-life integration a priority for funding. As we have seen, childcare is expensive, especially in California, and whatever

strategies are proposed to help faculty parents balance commitments to work and home will require substantial investment. Whether by increasing salaries, providing childcare stipends or reimbursements, providing affordable childcare on sight, or coordinating childcare at a local facility, funding is critical because all options are costly. Only a broad-based, collective commitment that runs from the top to the bottom of the academic hierarchy will make it happen.

7 Conclusion

Work-life conflict leads to career and job dissatisfaction. Our acceptance of the importance of work devotion as a metric of intellectual attainment permeates all aspects of academic life. Individuals who place the quest for knowledge ahead of family are perceived as highly dedicated and committed to advancing society. This attitude, still widely held, raises barriers to inclusion for those faculty equally committed to being engaged parents. If we want to turn the myth of work-life integration into reality, we must not only change the policies and practices of academic institutions, we must also address the cultural norms and values that underwrite them.

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Lessons Learned and the Road Ahead

Leading While Female: A Personal Journey

Linda Katehi

Abstract Growth in the administrative function of universities along with the fragility of academic culture creates challenges for academic leaders invested in change. In my own case, these challenges were compounded by my gender: my status as an immigrant woman in a leadership role. In this chapter I outline the basic requirements of a democratic culture—allowing individuals to preserve their identity while positively contributing to the community in which they're embedded—and question the gender stereotypes that see men but not women as "naturally" suited to leadership. This prejudice can translate into implicit or even explicit bias and discrimination when women attempt to fill roles that historically have been reserved for men, and thereby violate gender expectations. As a consequence, women leaders may be marginalized and their authority resisted or unrecognized. This chapter is a personal journey detailing my own experiences of "leading while female."

Keywords Leadership · Cultural change · Institutional transformation · Academic culture

1 Culture in the Context of Institutional Transformation

According to the European Institute for Gender Equality (European, 2019), institutional transformation implies profound change; it encompasses changes in rules, policies, and practices whose outcomes may, in turn, trigger fundamental changes in the basic values and beliefs dominant in the institution's culture. As we try to understand institutional transformation and the role of an institution's leadership, it is important to consider the meanings and impacts of culture. From an evolutionary perspective, Plotkin (1994, 2003, 2007, 2011) argues that culture is essentially a kind of collective identity; as individuals create and share with others their stories, experiences, ideas, and beliefs, diverse ideologies eventually congregate, enabling a consciousness that represents a collective "intentionality" (Plotkin, 2003).

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The transition from individual intensions to collective ones, while slow and chaotic in nature and form, enables social evolutionary change. The Athenians called this process "democracy" (Thorley, 1996). For a democratic culture to thrive and provide the foundation for positive change, three elements are necessary: (1) freedom to express ideas and opinions, (2) freedom to safely and openly contest them, and (3) ability to respect the opinion of the majority without having to surrender one's personal beliefs. A democratic culture is the structure that seems most capable of moderating the impact of cultural conformity on personal freedoms; it encourages individuals to preserve their identity while acting as positive contributors to their community. By contrast, cultures that suppress speech and use force and intimidation to impose on the wider community values and beliefs that benefit only a small group result in oppressive or oligarchic regimes i.e., colonialism, fascism, totalitarianism, and some forms of communism. Because the majority is forced to follow expectations that largely benefit a minority, the cultures of such regimes may become socially unstable and require continuous application of force to survive.

An extensive literature on culture has been published spanning a broad spectrum of approaches, from anthropological (Benedict, 1938; Boaz, 1915; Mead, 1970) and linguistic (Mandelbaum, 1985) to biological (Darwin, 1892) and socioeconomic (Marx, 1911). This early work laid the foundation for much contemporary scholarship (see Moon & Kern, 2002; Baldwin et al., 2006). For the purposes of this chapter, I will discuss what we call "academic culture," and then critique this culture for its view of gender within the professorial ranks.

The following definition of culture embraces most trends (Baldwin, 2017) and uniquely applies to academic institutions:

> Culture is the way of life of a group of academics including faculty, student, and staff who believe in the shared principles of academic freedom and freedom of speech, and aspire to excel in teaching, research and service. This culture continually evolves impacted by the clash between individual beliefs, perspectives and interests, power relationships and institutional expectations for academic excellence, merit, equal opportunity and social justice.

In a large institution such as a university, what the academic community intends may be at odds with what individual members want. This discrepancy, when systemic, leads to conflicts of consciousness or commitment and may eventually give rise to outright dissent. Instead of excluding or marginalizing individuals or subgroups with opposing views, progressive cultures typically allow personal beliefs and values to be freely expressed, debated, and even practiced, as long as these practices do not harm the community and oppress others. This process helps communities achieve concerted and sustained agreement. It represents a fragile balance of conflicting perspectives that, when sustained, can bring progressive change and cultural transformation.

2 Cultural Stereotyping, Prejudice, and Bias

Research on intergroup psychology suggests that many social attitudes, including stereotypes, are implicit. At the same time, there is little agreement on how implicit stereotypes and expressed prejudice are related. Whether the relation between the two is viewed as weak (Amodio, 2009, 2011; Correll, 2007; Forbes, 2010; Glaser, 1999; Judd, 2004; Valian, 1998, 2009) or strong (Gawronski, 2006; Gawronski & Bodenhausen, 2011; Greenwald, 2002), it is widely recognized that efforts to address implicit bias should attempt to achieve the following two objectives: (1) retrain the brain to form positive stereotypes (as, for example, "women can in fact excel in math and physics"), and (2) negate prejudice by educating the community on issues of implicit bias (Madva, 2016; Mazda & Brownstein, 2016).

Every culture enables forms of prejudice that may be more or less overt depending on how much they deviate from accepted social norms. For example, stereotyping homeless people as mentally-ill substance abusers results in prejudice that is largely tolerated in the United States the same way that stereotyping and prejudice against gypsies is largely tolerated in Europe. Prejudice against atheists is openly tolerated and even promoted in some parts of the world in the same way that anti-Semitism was tolerated in Europe until the end of World War II. When forms of prejudice are uncontested, it gives people permission to enact biases either explicitly or implicitly. In Western post-industrial societies today, prejudices stemming from racism, anti-Semitism, Islamophobia, homophobia, sexism, and gender discrimination are generally discouraged as they are considered incompatible with prevailing social norms and values.

Prejudice is not always motivated by hate; it may be motivated by a desire to preserve a status quo and/or affirm tradition. Consider that, until fairly recently in U.S. history, many women, with the notable exception of black women, were expected to be wives and homemakers rather than breadwinners. When women violate this expectation, they may be stereotyped. When I was a faculty member at the University of Michigan in the late 1980s, some politically-motivated groups on campus claimed that daycare centers slowed the emotional growth of preschoolers. These groups began characterizing working mothers as "competent professionals who occupied the role of a mother part of their time." Mothering "part-time" was a negative characterization that quickly found its way into grade-school classroom gossip and gave rise to prejudice against girls with working mothers. Girls subsequently formed their own in-groups whose mothers stayed at home and actively participated in school functions, and out-groups whose mothers held down jobs and were unable to participate in school activities that interfered with their work responsibilities.

With the massive entry of women into the workforce in recent decades, stereotyping working moms has generally given way to stereotyping women working in specific professions. For example, studies show that people associate men's names with high-income, high-status occupational roles (faculty member, manager, director, scientist, physician, mathematician, engineer) but women's names with lower-income, lower-status roles (assistant, teacher, nurse, caregiver). This can lead

to both implicit and explicit prejudice toward women who happen to fill "traditional" men's jobs (Rudman & Kilianski, 2000).

Researchers find that prejudice against female authority is often a result of stereotyping men (and white men especially) as "rightfully" exercising power and influence, while simultaneously highlighting women's professional inadequacies (Mazda & Brownstein, 2016). This holds true even in professional occupations where women have made significant inroads. Women may be viewed as legitimate careerists and able to teach math or engineering in a college or research university, fly an A380 airliner, or perform brain surgery. However, when women violate expectations that apply to white men only, i.e., *be powerful leaders*—chair of a department, dean of a college, chancellor or president of a research university, head pilot of a 747, CEO of a hospital, or president of a National Academy—their authority in the department, college, campus, plane, hospital, and Academy may not be welcome or even recognized.

The implicit stereotyping of subordinate groups—in this case, women leaders—and expressions of prejudice toward them, when shared by members of dominant groups within an organization or an academic institution, undermines inclusivity and creates social instability. Research on implicit bias demonstrates that when individuals feel supported in what they consider acceptable, they feel empowered to act in discriminatory ways even in the absence of an organizational prejudice. Stereotypes held about leadership abilities, for example, might cause a selection committee to discriminate against women when looking to fill a leadership position, even though the employer or larger organization openly is against gender discrimination. Experimental research by Flannigan et al. (2013) found that men and women in counter-stereotypical roles (such as male nurses or female pilots) were considered by research subjects to be "implicitly bad," leading some subjects—disproportionately men—to dislike or distrust them.

When implicit bias conflicts with the organizational goal of nondiscrimination, individuals, both men and women, may question (mostly privately but sometimes openly) the fit of women and underrepresented minorities in the "hard-working" roles traditionally and historically occupied by white men *without* disliking those they consider unfit for the role. This is consistent with the findings of Rudman and Ashmore (2007) as well as Ebert (2009) that men may like women, but do not associate them with leadership necessarily. Implicit bias is more likely to become explicit if the target is a member of marginalized out-group Jacobs and Campbell, D. T. (1961). For example, in my experience, international or immigrant women filling leadership roles are frequently viewed with suspicion and their rights, intentions, and abilities are openly questioned.

3 Academic Culture

There are three main constituencies that make up the university—students, faculty, and staff—each with its own priorities and areas of influence. Students want access to

high-quality education and good preparation for a successful professional life. Their choices about how to expand university resources would positively impact students exclusively, and faculty to a lesser degree. By contrast, faculty are mostly attached to their professional communities, believing that their success in that space leads to their professional and academic advancement. As a result, they want to demonstrate their worth to their national and international colleagues, so they often favor quality in academic programs and research. In contrast to the interests of students and faculty, staff usually see the university as an employer on whom they depend for a steady and satisfying job, appropriate benefits, and wages that match their qualifications. They expect a predictable working environment, prefer a decent salary program, and wish for continuous professional development. Of the three, the staff are the most stable population and as a result see themselves as the most loyal to the institution. The relative size and pace of growth among the three groups has changed over time. The vast post-Cold War expansion of academic degree programs, the proliferation of student services and sports, the increase in state and federal regulations, and the rise of academic medical hospitals throughout the United States have led to substantial growth in the numbers of students attending college and in relevant auxiliary services. As a result, the rate of increase of staff, both academic and administrative, and of students has substantially outpaced that of faculty.

Divergent interests and asymmetrical growth among the three constituencies contributes to the dynamic fragility of academic culture. The erosion of state support for higher education during the past 30 years and the imposed restructuring of university funding mechanisms involving new economic models has exacerbated this fragility, as do a host of other factors—including the transitional nature of the student community, the stratification of the academic professions, the uneven distribution of academic and administrative power, and a growing mistrust of administrative leadership. Efforts to sustain any type of progressive culture under such conditions has become increasingly difficult, making it almost impossible to define "progress" holistically and create a "normative platform" for change.

Fragility in culture is like a double-edged sword. It generates conflicts of principles or values which may lead to either positive transformation or distractive fragmentation of the community in question. Which side of the sword defines the community—in this case, the university—depends on whether it is driven by hope or hostility and whether it can sustain its institutional vigor while embracing dissent and withstanding conflict. Such fragility places a burden on leaders to provide an environment that both values inquiry and affords opportunities for constructive debate. It requires academic leadership at all levels to place the well-being and vibrancy of the university above individual benefit and influence. The lack of such leadership overwhelms progressive change, reinforces suspicions, and strengthens stereotypes.

Why is the nature of academic culture and leadership so important in identifying which actions have the potential to eradicate gender inequality and gender discrimination in academia? Based on 40 years of personal experience in four universities as a faculty member and administrator, I believe that sustained, positive change cannot easily be achieved in an environment as fragile in culture and weakened in leadership as that of the American public university today. American academic culture reminds

me of the John Lennon Wall in Prague. Once a regular wall, it was first decorated in the 1980s by an artist who painted an image of the famous singer and cultural icon, John Lennon, after Lennon's assassination in New York. Since then, the wall has been undergoing continuous change, sometimes carrying coordinated messages while other times highlighting the broad diversity of the local people's cultural sensitivities along with their conflicting interests. Now and then the wall is painted white again, in an attempt to give it a new start, only to be filled overnight with the same cacophony of messages.

4 Challenges of Academic Leadership

Institutions of higher education are complex, multi-faceted, and evolving. The transitional nature of the student body and the mobility of its faculty and staff along with the constant inflow of new community members with their own preexisting values and beliefs constitute additional challenges in sustaining a progressive academic culture. Whether this dynamism is harnessed as a force for positive change depends on the attitudes of the academic leadership. A conformist leadership will seek a point of a cultural equilibrium between stasis and change where open dialogue and critique are viewed with suspicion, are considered disruptive, and may be quietly discouraged or, at times, actively opposed. Although change can be effectively blocked by conservative forces (e.g., those vested in and loyal to the status quo), the aspirations and values of new groups (e.g., those seeking a more progressive institution) cannot be ignored. Loyalists' inability to engage these groups in meaningful dialogue fragments the culture and forces the institution away from the very cultural equilibrium they seek to achieve.

The open nature of universities, the protections of inquiry, debate, academic freedom, and freedom of speech all make fragility unavoidable. Yet, paradoxically, it is this cultural fragility that forces institutions of higher education to become places of experimentation and learning, of innovation and eventually progress. Sustaining intellectual rigor while embracing unorthodox inquiry and learning requires leaders willing to lead by example and capable of sustaining continuous dialogue and debate while also being strong enough to rebuff external politically-motivated interventions should they arise. It requires leadership that is willing to embrace ambiguity and uncertainty as issues get tested, debated or even rejected. It also requires open, continuous communication and transparent decision-making. Without such leadership capabilities, the institution becomes bureaucratic and stagnant, unable to innovate or transform.

As chancellor at UC Davis, I navigated such leadership challenges on multiple occasions with success and other with mixed results. Consider a couple of successful examples. First, I advocated increasing the number of international students from a mere 1.5% of the total student population to 15%, a number more consistent with the definition of a "global" university. Because of their higher tuition, enrolling international students would have come with a commitment to also increase the

number of Californian students. Opposition from the local academic community and state legislators reflected concerns over equity in admissions ("will they take opportunities away from Californians?") as well as institutional culture ("will they understand our lectures?"). Yet, after many months of discussion, many initially opposing groups of students, staff and faculty embraced the idea and accepted its challenges, with students becoming the most activate advocates. Within a few years, the campus completed the construction of a new International Student Center, introduced new student and faculty exchange programs, and proposed and approved new language programs—all of which helped "internationalize" the campus in ways that will increase its stature and global reach for years to come. Another challenge came when I declared that UC Davis was preparing to become a Hispanic Serving Institution (HSI). Because the effort would require significant resources, opposition came from every university unit that already supported a different form of diversity, with the view that supporting one group meant taking support away from others. In this case, allowing time for open dialogue and debate prompted rethinking on all sides and eventually enabled pursuit of the goal.

Unfortunately, for some members of the communities surrounding the university, bringing more students to campus who did not look or sound "like us" became an issue of serious disagreement as well as an expressed grievance that followed me until the end of my career as a chancellor at UC Davis. However, I believe that both efforts have made UC Davis stronger, more equitable, more open, and more visible—to the state, the nation, and the world.

An example where my efforts failed is illustrative, too. I sought to create a new affiliated campus in Sacramento that would focus on Health, Nutrition, and Public Policy. This idea had emerged from many years of trying to project the strengths of those academic fields with the capacity to address the problems and challenges of modern society with the greatest impact on people's well-being. I envisioned the new campus as a platform for making the university more visible and impactful, locally and globally. Unfortunately, despite the many years of planning, discussion with university stakeholders, and development of outside financial and political support, there was opposition. It came from academic leaders within the University of California system, community leaders from the surrounding regions, and elected officials who were uninterested in the project unless it directly enhanced their own political interests. The opposition succeeded in persuading the office of the President to withdraw support for the project at the end of 2015.

5 The Transformative Role of NSF ADVANCE

When I joined the University of Michigan as an assistant professor in 1984, I was one of three female faculty members in a department of 80 faculty, and one of a dozen or so in the College of Engineering. By the time I left the university in 2002 (to become the first female Dean of Engineering at Purdue), the number of women faculty had not changed substantially, while the college overall had suffered from serious attrition of

its women faculty. One department had even systematically refused to hire women, and dared to express pride at being all-male.

This situation was not unique to the University of Michigan but reflected the reality of science, technology, engineering, and math (STEM) at that time. By the 1990s, the American university had reached a conundrum: social science research showed that while the number of women college students was monotonically increasing in all areas of science and engineering, the number of female faculty in STEM had stagnated to single digits, in both absolute numbers and percentages. Consequently, in the late 1990s the National Science Foundation announced ADVANCE, a program to help academic institutions understand and address the underrepresentation of women in STEM. Michigan was one of the first three universities that received such a grant in 2002, under the leadership of then-Provost Nancy Cantor (https://advance.umich.edu/). The goal of the grant was to initiate institutional transformation, by using evidence-based interventions.

The programs developed at Michigan under this five-year grant provided a strong foundation on which to build the proposal that UC Davis submitted to NSF ADVANCE program in 2011 during my second year as a chancellor of that institution. The UC Davis proposal aimed to address, for the first time, underrepresentation in the STEM professoriate at the intersections of gender and race. For UC Davis as well as many other U. S. institutions, realizing that gender's intersection with race was critical to understanding the increasing gap between diversity in student demographics and faculty diversity. Throughout the University of California system, and more specifically at UC Davis, Latinx students had been the growing majority of the incoming class (close to 25%), while Latinx faculty had consistently remained below six percent across all STEM areas. We therefore chose to focus our ADVANCE program on increasing the number of Latina faculty in STEM fields, in parallel with our institution's efforts to become a Hispanic-Serving Institution (HSI). In less than five years, UC Davis succeeded in recruiting 16 Latina scientists and engineers as faculty members across many science and engineering disciplines.

The UC Davis ADVANCE program, together with the move toward HSI status, made visible the wheels of institutional cultural change. Diversifying the professoriate to reflect the demographics of the student and state population not only fulfilled a responsibility toward our students and the public, but also presented an opportunity to increase the impact of the institution in educating future community leaders. At the same time, the campus was consistently placed among the top 10 public institutions in the United States—an indication that the perceived quality of the institution overall had also increased, becoming a direct challenge to the assumption that diversity comes at the expense of quality. For the first time in 2015, the campus was recognized by *Forbes* as the No. 1 institution in the nation in the number of women teaching in the life sciences. In 2019, it received the Sea Change Bronze Award (one of three only institutions in the country) from the American Association for the Advancement of Science (https://seachange.aaas.org/).

6 The Cultural Basis of Intolerance and the Role of Leadership

A number of experiments have shown that members of groups often feel pressure to conform, or feel anxiety about countering what they perceive as normative or prevailing points of view. If the prevailing viewpoint is continuously reinforced, eventually these group members accept the point of view as their own and become strong supporters of the culture. These tactics work either in favor or against progressive change in a community, inflicting what Hannah Arendt called "the banality of evil."

Human history is full of powerful demonstrations of negative conformity practiced at a state level. Consider the trial of Socrates, the killing of "witches" in Salem, Jim Crow laws in the American South, the Holocaust in Europe, genocide in Rwanda, and apartheid in South Africa. By contrast, enforcing positive values has resulted in laws around the world prohibiting discrimination, including racism, gender- and sex-discrimination, homophobia, anti-Semitism, etc. Yet a lack of open debate can lead to the rise of opposing subcultures that feel victimized and go underground, only to emerge at a later time when triggered by social or political events (e.g., the increased visibility/activity of white supremacists in the United States after the election of Donald Trump). Lack of dialogue has been strengthened in recent years by the Internet and social media, which allow people to easily find affinity groups no matter their geographic location. This reminds us of the importance of strong leadership in supporting progressive cultural change and opposing the politics of intolerance. Although such observations pertain primarily to societal-level dynamics, the same can be argued about smaller organizations and institutions.

No academic institution can embrace tolerance and engrave it in their culture unless its leadership remains vigilant as well as vocal. A silent leadership places the institution at risk. By silence, I mean the inability to openly defend progressive institutional values at every opportunity available. When silence is the response, there is always the chance that elements opposing progress will feel empowered and act publicly.

The core elements of an institutional culture are often implicit; they are practiced in daily routines, they give a common direction to the members of the institution, and they are the result both of learning and of internal coordination. To revisit Plotkin (2003), they enable a "collective identity" not reducible to any one group. Furthermore, although collective identities cultivate a view of the world (Plotkin's notion of collective "intentionality"), this view is ever-evolving and open to change. Individuals do not consciously learn an institutional culture, but they do internalize it during a process of socialization and self-reflection. This implies that institutional transformation can take place only in the presence of an institutional culture—a collective identity—that values introspection and debate, and with a leadership that vigorously defends inclusiveness while condemning intolerance.

7 Silent Leadership and Conformity

Very few social, public, or business organizations, and few communities, actively encourage cultural or political nonconformity. In most organizations, nonconformists are dismissed, ostracized, or even forced out. They are considered to be disruptive and threatening. Yet, while nonconformism is a disruptive force, it can also become a powerful tool for progressive change.

A community or organizational culture that avoids challenge and considers questioning and new ideas as threats to its well-being is nonprogressive at best and autocratic at worst. Such cultures exist widely today, embracing various political orientations. Creating a progressive organization requires an enlightened leadership and a strong, open-to-change, and confident collective identity. Weak leadership is mostly defined by what it is ***not*** doing.

I offer three personal examples as evidence. When I was announced as the first female Dean of Engineering at Purdue in the fall of 2001, I received an email from Denice Denton, then Dean of Engineering at the University of Washington, in Seattle, who thanked me for increasing the number of female engineering deans in the United States by 20%. With me included, we became a total of just six female engineering deans in the country: Denton at the University of Washington, Christina Johnson at Duke, Ilene Bush-Vishniac at Johns Hopkins, Janie Fouke at Michigan State, and Eleanor Baum at Cooper Union. I was the sixth engineering dean, at Purdue. All of us went through higher levels of administration and probably faced every single form of prejudice and contempt that has been defined in the literature on gender stereotyping and discrimination. Too often, when our leadership was challenged, our institutions remained silent.

The most egregious case is that of Denice Denton, who went on from her dean role to become the first openly gay chancellor in the University of California system. Her appointment at UC Santa Cruz, announced in 2005, was received with suspicion and criticism by a community that nevertheless branded itself as liberal. Among all UC chancellors, Denice was targeted by students, the unions, and the Santa Cruz community for the following: her salary, not even the highest among the UC chancellors; renovations of the physically neglected Chancellor's Residence, which she was expected to occupy; and nepotism involving the recruitment of her partner, under a program that the University of California regularly uses to recruit faculty and their partners on all 10 of its campuses. The local newspaper published negative stories against Denice almost every day, directly encouraging students to push her out of the chancellor's position. Over a period of a year and a half, individuals claiming to be students or representing labor unions threatened her physically and abused her emotionally. During that period, the Office of the UC President refrained from providing any support to her and declined to give a public explanation for actions they approved. In June of 2006, Denice, fell into a deep depression and jumped to her death from her San Francisco apartment (Sonnenfeld, 2006).

A year later, M. R. C. Greenwood, a previous chancellor of UC Santa Cruz and a provost in the University of California system, was also publicly accused of nepotism,

an allegation that was proven false. Under tremendous public scrutiny and media attacks, she resigned from her position. She, too, was treated with bias and contempt and was publicly deemed unfit for the job. The UC Office of the President observed the attacks with apparent indifference and silence, making itself an accomplice to the hateful actions by the media and the broader public.

The last example involves a personal experience. After I was falsely accused by the President of the University of California of nepotism, among other things, my reputation as a person and a leader was ruined, and I was asked to step down from my chancellor's position. It was the support of my family and friends who helped me survive the crisis and avoid taking action similar to Denice's. They helped me decouple my true self from the straw person that had been created by a local newspaper, a community feeling deep contempt for a female chancellor, and a President with significant political insecurities. In this case, the UC Office of the President did not just remain silent; it played the role of executioner.

A year and a half after my resignation as a chancellor, the UC Davis student newspaper published an article titled "Linda Katehi or Lizard Katehi" (Hanson, 2018), written by a male student who considered his article humorous. He writes about a fictional encounter with me in the university library, and his reference to "moonlighting" is a critique of my service on a corporate board of directors, despite the fact that 39 men in the UC leadership structure had similar appointments. In his effort to be witty, and oblivious to gender discrimination, the student wrote:

> …This was *[in the library],* where she *[Katehi]* made her move on me. I wasn't uncomfortable with the situation, but I said that it would be moonlighting since I do much of my sex work outside of school and rely entirely on "tips." She said that there was no potential for pregnancy since she was asexual and reproduced through parthenogenesis, and when questioned on STDs, she said that the only diseases she spread were occasionally plague in her human form, when afflicted by fleas, and sometimes anthrax when moonlighting for the United States' chemical weapons deployment team in South America. That last one she only did around Christmas, though—for extra gift money, mainly…

This particular paragraph of the article, written in the style of Generation Z, articulates the stereotypes and prejudice of our society toward all female science and engineering faculty of my generation. These are women who have fought hard against inequality just to do one thing: be given an equal opportunity to attain their dreams.

This student's article could have provided a unique opportunity for university leaders to engage both Generation Z and the general community in a dialogue that would have reemphasized the cultural values and principles that have characterized UC Davis for the past many years, and would also remind young people that stereotypes harm even when offered as humor. Yet again the university administration chose to remain silent and, in the process, became an accomplice to the sexism the article openly expressed. Silence defaced the very soul of the institution and stripped its culture from the only defense it has against stereotyping and prejudice—its ability to publicly lead an instructive dialogue.

8 Conclusion: Battling Gender Stereotyping and Prejudice

In view of what I have written, I would like to credit the efforts of scholars over the past 60 years to battle gender discrimination and am compelled to mention the changes I have personally observed. In 1972, I entered the electrical engineering program as a freshman, one of two young women among 198 young men, in the National Polytechnic of Athens, Greece. I was explicitly told by the class student president that I unfairly took a position from a young man who could put the engineering degree to good use. Since then, substantial positive change has happened in that specific engineering college, as well as others both in the U. S. and around the world; now women are expected and actively invited to join my profession. At present, we expect to see at least 20% of women in even the most conservative engineering departments.

In August of 1984, I was hired as an assistant professor of electrical engineering at the University of Michigan, at a substantially lower salary than a younger male colleague with similar experience to mine. When I asked why I was being underpaid, the administration said they expected me to spend less effort as a faculty member because I had a five-month-old son. Today, this explanation would be dismissed and disciplined. In 1987, when, as an assistant professor, I was expecting my daughter, I was told by my lab's administration that no maternity programs existed for women faculty, so I could choose to stay at home during the first six weeks, at no salary. Today, there is no academic institution that I know of throughout the United States that lacks a minimal maternity program for female faculty.

In my almost 50 years in higher education, I have had a wonderful and satisfying career that speaks to the amazing progress in lessening gender discrimination in academic. After all, I was the first immigrant woman to be the Dean of Engineering at Purdue University, the Provost at the University of Illinois, Urbana Champaign, and Chancellor at UC Davis. In 2015, I was the first woman in the history of the National Academy of Engineering to receive the prestigious Ramo Simon Founder's Award which was established in 1964. Yet the same successful career gifted me with numerous negative and harmful experiences that have left many emotional scars, suggesting that much more needs to be done to eradicate gender discrimination in academia. Stories from educators and administrators like me need to be told, to help the wider society realize that *we have not arrived yet,* and that the dream of our foremothers who fought for equal opportunity and equal treatment has yet to come true.

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Advice Not Taken

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Abstract Advice on how to build a more-inclusive academic community is emerging; however, this chapter suggests that such advice warrants "a grain of salt" depending on two circumstances: (1) the organizational culture needing to be "fixed," and (2) the existence of extra-organizational factors that may shape how transformation can proceed. First, the existing organizational culture affects the processes needed to achieve a more-inclusive community, and defines what "more inclusive" will look like. Programs shown to be effective at one institution might not be effective at another. External factors may also affect local culture. For example, a long-standing ban on affirmative action programs and quota systems at the University of California meant that, even though other institutions found them to be effective, replicating those programs was not an option. The second concern derives from the nature of change needed. Barriers to inclusion are deeply rooted in historical traditions, ideologies, and social practices outside of any single organization, and often these barriers are applied unconsciously. This means genuine cultural transformation will occur only if the organizational community as a whole is committed to that change.

Keywords Organizational culture · Inclusion · Diversity commitments · Cultural change · Accountability · Interventions · Transparency · Community learning

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1 Understanding the Nature of the Problem

Understanding the nature of systemic bias in today's society is a critical first step in designing an effective strategy to create a more-inclusive community. The link between diversity, equity, innovation, and success has been clearly established (Davidson & Goldberg, 2010). As a consequence, many organizations and institutions are committed to creating a more-inclusive community for themselves. Over 500 CEOs have signed a pledge for action on diversity and inclusion, having recognized the clear benefits to competitiveness (CEO Action for Diversity and Inclusion, n.d.). However, much of the work in organizational change focuses on modifying an internal culture—one that has long been established, vetted, and controlled by the organization (Quinn & Cameron, 1988). Creating a more inclusive and equitable environment also requires that we address the impact and influence on local culture of broader, socio-cultural sources of inequality.

1.1 Commitment of the Leadership is Necessary but Not Sufficient

Guidelines for institutional transformation advise forming a powerful coalition early on that can lead the effort with enough authority to effect change (Kotter, 1995; see also Kalev et al., 2006). From the beginning, our ADVANCE leadership team headed this advice. We confronted a very important question: *Who at our institution is powerful enough to change the very nature of society?* The top academic leadership of an organization obviously plays a critical role in establishing a universal commitment to change and providing resources for implementing and sustaining it. However, the effort cannot stop there but must extend beyond the leader to include the community itself. By "community," we mean primarily but not exclusively the faculty, students, and staff in the STEM disciplines on our campus. A second central feature of our program, therefore, was to engage the community in learning about the nature and manifestations of bias and discrimination, both broadly and locally, as a way to vet the vision for the ADVANCE initiative. Shared knowledge can engender consensual cultural change at different levels of the institution.

Institutional transformation needs to be collective and communal, not top-down and imposed. In essence, effective change must be "led from the middle," meaning that it requires the support and commitment of the community at large in partnership with those connected to resources. In our case, assembling a powerful coalition of thoughtful leaders and engagers was critical to having difficult discussions to bring the academic community together around questions of culture. Analyses of why ADVANCE programs succeed or fail reinforce this approach. People will chase financial incentives and may adopt behaviors accordingly, but when the financial incentives end, the commitment to the vision may also end. Thus, there may be little correlation between initial investment and sustainable institutional transformation;

missing is the ongoing communication needed to engage and maintain the partnerships that embrace diversity, equity, and inclusion (DEI) over time (Furst-Holloway et al., 2018).

1.2 Ignoring Naysayers

As we began our ADVANCE program at UC Davis, we were advised by those experienced with ADVANCE programming elsewhere to "ignore naysayers." After all, naysayers believed science should be independent of DEI concerns because such concerns could compromise excellence and innovation. We were warned about colleagues who simply "did not get it" and told we should exclude them from discussion. Dissenting voices were viewed as obstacles to achieving our goals. Yet if our goals encompassed "inclusivity," this advice was contradictory.

Although the voices of naysayers should not take up space disproportionate to their presence, we believe these voices should be embraced, for three important reasons. First, if the desired outcome is to be broadly inclusive, it can never be achieved by excluding dissenting views. Second, the perspectives gained from listening to both supporters and detractors provide the assessment data to help frame the action plan for changing the local culture. In other words, cultural transformation must be informed by assessing the nature of dissent. If engaged in the process, detractors help define obstacles to moving forward and, conversely, solutions for eliminating them. It is therefore important to foster a climate that welcomes constructive criticism, acknowledges that criticism exists, and is willing to address it appropriately. Finally, naysayers yield vital information on the spectrum of attitudes in the existing organizational culture and the extent to which historical barriers to inclusion are replicated within it. Assessing the nature and impact of barriers to inclusion first identifies the type of learning needed for institutional transformation and then helps guide optimal processes for such learning to occur.

1.3 Develop a Common Foundation of Empathy and Commitment to Change, Not a Cadre of Allies

Discussions of bias and discrimination in the academy and other institutions focus on the impact to women, men of color, and others from traditionally excluded or marginalized groups (identity categories). Often those in the majority are incorrectly seen as the sole cause of bias, as they disproportionately benefit from it. However, systemic biases emerge and get transmitted through individual attitudes, social interactions, cultural practices, and institutional structures that persist over time and affect everyone, albeit not in the same ways. Ideally, all community members should be viewed as stakeholders, regardless of identity. Consider the use of the term 'ally.' It

is typically intended to indicate someone belonging to a privileged identity category who serves as a supportive 'bridge' to those from marginalized identity categories. All community members should be viewed as stakeholders regardless of identity. Treating everyone as stakeholders despite being differently situated with regard to systemic bias creates a culture of "we" and facilitates the types of difficult discussions about race, gender, class and other axes of identity and difference that need to occur.

As we learned more about the nature of barriers to inclusion, it became clear that no social identity, including majority ones, was free from stereotyping, exclusion, or implicit bias. At one roundtable, for example, a participant used the term "jerks" to describe those who opposed DEI efforts. Another participant suggested that we would not make progress if we persisted in "white male bashing." The first individual did not think she was "identity bashing," yet her words were interpreted that way. We also learned that some participants objected to the seemingly positive term "ally," because to them it meant one group siding with another; it reinforced an us-versus-them and sent the message that there was only one right way to do things. Putting members of any social identity category on the defensive is, unfortunately, a sure way to shut down meaningful discussion of inclusion. The brain has been described (admittedly simplistically) as having two components—the cognitive brain and the emotional brain, which are interconnected (Gray, 1990). Discussions of emotionally-charged topics like bias can trigger a strong emotional response. It is important, therefore, to maintain discussions in the cognitive sphere and to avoid triggers of noncognitive reactions.

As a consequence, we decided to include well-known white male stereotypes, such as "jerk," in discussions of the ways in which stereotyping creates barriers to inclusion. We were aware of and concerned about the potential to minimize the significantly greater negative impact of bias and discrimination on women, men of color, and other marginalized. However, we experienced the opposite—including stereotypes of white men enabled a more dynamic and productive discussion of the impact of stereotyping for all participants. Participants also expressed more intense interest in learning about other factors, aside from stereotyping, that create barriers to inclusion, such as implicit bias and role of social location in generating privilege/disadvantage. By recognizing the universal existence of negative stereotypes, we were able to build a common foundation of community empathy in these discussions, a necessary prerequisite to building a more equitable community.

None of this is to suggest that all categories of people are equally responsible for, or similarly affected by, the differential access to power, status, and resources generated by deeply-engrained social inequalities. Black people in the U. S. did not create nor do they benefit from anti-black racism, for example, whereas white people (often along with other non-black groups) did create and do benefit from it, albeit not in the same ways or to the same degree across all historical periods or all social contexts. Rather, we stress that some of the processes underlying and contributing to racism (as well as sexism, homophobia, ableism, etc.)—such as stereotyping and implicit bias—have more general application and this fact can be leveraged to bring constituencies to the table who otherwise might resist participating in discussions of democratizing local culture.

1.4 Promoting Self-promotion: The Art No One Wants to Master

One of the goals of our CAMPOS initiative (recall that CAMPOS stands for "Center for the Advancement of Multicultural Perspectives on Science") was to mentor affiliated faculty in the skills essential to succeeding in the academy. One of these skills is self-promotion. Meritocracies reward accomplishment; consequently, faculty must be able to articulate their accomplishments, especially in the context of collaborative work. So we held workshops for CAMPOS scholars (and more broadly for junior faculty, postdoctoral fellows, and graduate students) on how to make the case for accomplishment. In the process, we learned that the constant need in for self-promotion—for securing competitive grants, for publishing in prestigious journals, and for invitations to present work at major conferences, all of which are necessary for career advancement—discouraged pursuing academic careers in STEM. Graduate students in particular cited this issue as a major factor for preferring industry over academia.

Workshop participants linked self-promotion to the negative trait of bragging, or boasting, regardless of who was doing it, and they expressed reluctance to carry on this tradition. Members of underrepresented groups relayed incidences where self-promotion backfired: boasting was seen as "covering up" for contributions claimed but not actually made. "Credit" generally accrued to those with more power on the research team, and many had witnessed STEM researchers successfully use the work of others for their own advancement. Consistent with this, some faculty believed that, in having to self-promote, they were forced to underplay the role of junior colleagues, postdoctoral fellows, and students. Participants, not without warrant, viewed reliance on self-promotion as a barrier to fairness in the review process.

We were acutely aware that reluctance to self-promote is not independent of stereotypical gendered and cultural expectations (Kandiko Howson et al., 2018; Van der Lee & Ellemers, 2018; Võ, 2012). For example, assertive behaviors, often rewarded in men, are less valued in women (Van der Lee & Ellemers, 2018). We were therefore prepared to "school" particpants in the art of self-promotion so that women and URM faculty could "boast with the best of them." We underestimated the extent to which training in self-promotion would be perceived as reinforcing an unattractive feature of STEM in academia. Participants simply didn't want to play that game. We therefore shifted discussion to center on "accuracy in reporting of accomplishment" rather than "the art of self-promotion." This led to a broader discussion of how to write and interpret candidate's statements submitted in support of advancement.

2 Understanding Local Culture

The second major issue negatively affecting cultural change is failing to understand the nuances or idiosyncrasies of the existing local culture. Bringing in external groups

to help facilitate change is likely to be unproductive if they do not understand this culture. It is imperative, therefore, that members of the organization to be changed lead that change. Because the immediate locus of change in our case was the STEM fields and not the university as a whole, leaders needed to be UC Davis STEM (and "STEM-adjacent") faculty. STEM scholars typically do not study the causes and consequences of social inequality either inside or outside the academy, so the first order of business was to learn about and understand the broad issues affecting inclusion. Our coalition of transformational "change leaders" spent the first two years of our program doing just this, enlisting the help of others along the way. Invited speakers sparked discussions of broad social issues. Group retreats enabled discussion and debate about how to best create a more-inclusive community within our own local culture. An external advisory board informed our actions, based on their collective experience and knowledge; its members also provided critical evaluative feedback on our ideas and progress. This type of learning for those spearheading transformational change is essential for generating a viable, tactical plan. Three main elements of the local culture are key to assess in this process: (1) its existing ("innate") commitment to diversity and inclusion, (2) the practical effectiveness of that commitment, and (3) processes currently in place to foster engagement in and accountability for that commitment across the community.

2.1 Community Commitment to Diversity

An organization's or institution's commitment to diversity is often reflected in the diversity of its membership and leadership. However, a group may appear diverse based on outward appearances, but in practice may not be inclusive if some members' contributions are not equally valued and respected. The expressed shared values of the community are also an important indicator of commitment to diversity and inclusion. For example, prior to the ADVANCE program, UC Davis had already developed a document on "Principles of Community," which was endorsed broadly by leaders across the institution. The principles were developed after extensive discussion and have been reaffirmed several times since their initial inception in 1990 (Office of Campus Community Relations, n.d.). These principles establish a "community identity" of shared values. They are repeated here:

> ***Principles of Community***
>
> The University of California, Davis, is first and foremost an institution of learning, teaching, research and public service. UC Davis reflects and is committed to serving the needs of a global society comprising all people and a multiplicity of identities. The university expects that every member of our community acknowledge, value, and practice the following guiding principles.
>
> We affirm the dignity inherent in all of us, and we strive to maintain a climate of equity and justice demonstrated by respect for one another. We acknowledge that our society carries within it historical and deep-rooted injustices and biases. Therefore, we endeavor to foster mutual understanding and respect among the many parts of our whole.

> We affirm the right of freedom of expression within our community. We affirm our commitment to non-violent exchange and the highest standards of conduct and decency toward all. Within this context we reject violence in all forms. We promote open expression of our individuality and our diversity within the bounds of courtesy, sensitivity and respect. We further recognize the right of every individual to think, speak, express and debate any idea limited only by university regulations governing time, place and manner.
>
> We confront and reject all manifestations of discrimination, including those based on race, ethnicity, gender and gender expression, age, visible and non-visible disability, nationality, sexual orientation, citizenship status, veteran status, religious/non-religious, spiritual, or political beliefs, socio-economic class, status within or outside the university, or any of the other differences among people which have been excuses for misunderstanding, dissension, or hatred. We recognize and cherish the richness contributed to our lives by our diversity. We take pride in all our achievements, and we celebrate our differences.
>
> We recognize that each of us has an obligation to the UC Davis community of which we have chosen to be a part. We will strive to build and maintain a culture and climate based on mutual respect and caring.

Although principles such as these lack the force of law, and although they can be interpreted as merely symbolic, they do establish assumptions, expected attitudes, and modes of behavior for the campus community. In short, they define the shared values of the collective culture. The Principles of Community were re-endorsed multiple times over the ensuing 30+ years. The ADVANCE program was rooted in that community identity.

2.2 Assessing Commitment to Diversity

It is not sufficient to simply state a commitment to diversity and expect everyone to act accordingly, especially given the fact that barriers to inclusion derive from society at large and manifest in local culture in different ways. It's important to assess whether and to what extent a commitment to diversity is widely embraced (as well as what "diversity" means to those queried). A common method is to compare the diversity of an organization to a control population. In our case, this would mean comparing the diversity of our faculty community to that of the undergraduate student population and then to compare that student population to the diversity of California itself. One can also examine the pool of Ph.D. awardees to determine if "pipeline" issues exist with respect to a loss of diversity over time as a career track progresses. Focusing solely on supposed pipeline issues, though, can detract from addressing bias and discrimination within the culture of the target community.

Surveys of job satisfaction among different groups within a community can help reveal potential problems. If respondents regardless of identity category find the work environment to be positive with regard to resources, opportunities, and standards for merit and promotion, this may indicate that the organization as a whole values diversity and inclusion. It is also important to assess retention issues, because the existence of bias can encourage targeted individuals to leave.

Complaint processes are important as well, as they may help develop suitable interventions when critical issues are identified. But because bias is a *learned* behavior that starts early (see Quintana et al., 2006), and because early experiences will vary across communities (especially in departments with international faculty), negative sanctions or penalties for individuals can be counterproductive. A proactive approach is better, in which community values are shared with new members through open and transparent conversations.

2.3 Accountability for Commitment to Diversity

An organization may agree to "commit" to diversity, equity, and inclusion for a variety of reasons. Legal requirements and even financial incentives may foster such a commitment but when the external pressure to appear committed lessens, the "commitment" also lessens ("talking the talk but not walking the walk"). Thus, the entire community must assume accountability for creating and sustaining an inclusive workplace, irrespective of external pressures.

Genuine institutional transformation requires embedding the responsibility for inclusion in all tiers of an organization. The following questions are critical to ask: *Is there a culture of "blaming the victim" in cases of harassment or microaggression? Are the targets of harassment or microaggression the only ones who speak out against it? Do they feel pressured to not complain? Is there training in how to deal with harassment and microaggression? Does the culture support open discussion of these and other discriminatory actions?*

In hierarchical or tiered organizations, it is important that "peers of the tier" speak out against bias and discrimination. The stratified nature of academic institutions can make it difficult for individuals to report problems without fear of retribution against those with more power. Silence from supervisors or colleagues validates microaggressions and harassment. Therefore, reporting and resolution processes must account for hierarchy in addressing such issues. For example, it is extremely difficult for a faculty member to challenge the behavior of a department chair or dean. Schools and colleges, as well as departments, must develop guidelines for "safe" communication without risk of reprisal, bypassing existing lines of authority if necessary. In some instances, another faculty member may be needed to corroborate the problem, or be present when it is brought to the attention of others outside the department, college, or institution. A process that ensures open and transparent communication about bias and discrimination must be developed, vetted by faculty, and fully supported by the academic leadership.

Many organizations practice what they call "restorative justice" as an attempt to mediate negative exchanges surrounding microaggressions. Restorative justice is an approach in which victim and perpetrator are brought together to discuss who was harmed, how, and what the perpetrator can do to repair or mitigate the harm (Zehr, 2002/2014). Critics of this process point out that offenders' apologies to victims, even genuinely expressed, can imply that the victim is hypersensitive and

the offender simply failed to recognize his or her hypersensitivity. Better processes involve acknowledgment of the offense against the shared values of the community. Microaggressions should be seen as harmful to the entire community, not simply an individual or single identity category; likewise, restitution should be made to the community as well as the individual. The best scenario is for all members of the community to be aware of the negative effects of stereotyping before any act of microaggression occurs in the first place, whether overtly or covertly.

As discussed in the Chapter, 'Barriers to Inclusion: Social Roots and Current Concerns', microaggressions occur, for example, when faculty of color are told they got their job based on their race or ethnicity, not because they met the standards of the search committee and their academic excellence was a match for the position and the department. Mexican Americans may be asked where they are "from," and when they state a geographic location in the United States, they are again asked, "but where are you *really* from?" Department faculty may naively, even proudly, assert that they are both "gender blind" and "color blind," which itself is a microaggression because it denies the ongoing existence of racial and gender oppression; choosing not to see it does not make the oppression disappear. Can we better sensitize faculty to microagressions so as to actively reduce or prevent them entirely (Forrest-Bank & Jenson, 2015)?

Interventions to prevent microaggressions are clearly needed across a wide range of social institutions; in university settings, interventions must be adapted to meet the needs of faculty coming from various cultural and national backgrounds. Prevention programs should expose department faculty to (1) clear examples of microaggressions, (2) ways to recognize both common and unique forms of microaggressions in relation to gender, ethnicity, and race, and (3) sensitive communication strategies to use when microaggressions occur.

Relatedly, another important component of assessing existing culture is understanding the nature of complaint protocols, including where responsibility for resolution lies, who is ultimately accountable for remedying the harm, and the nature of community support for the victim. Equally important is correct assessment of the consequences for the offender. Often consequences focus on expecting the offender to override unconscious bias, despite evidence suggesting this is difficult if not impossible. Consequences that enable positive future social interaction with the targeted individual or group, rather than focusing on apologies alone, may be more effective in addressing the dehumanization associated with stereotyping and discrimination. The human brain has been described as a "hypothesis testing machine" (Hohwy, 2013) with respect to assumptions about identity. So, creating circumstances that enable the unconscious brain to "disprove" a social hypothesis are important. Providing the opportunity to discuss and learn that a given stereotype is incorrect may be more effective than attempts at behavioral suppression of the hypothesis that generated it.

Knowing the actual attitudes, values, and assumptions of faculty within a given local culture is a necessary prerequisite for meaningful institutional transformation. As discussed in the Chapter, 'Data-Driven Decision-Making', UC Davis was fortunate to have reliable tools such as the COACHE (Collaborative on Academic Careers in Higher Education) survey, which collected data on faculty perceptions of various

work issues as well as workplace culture. Data can be broken down by gender, race, and other identity categories to identify patterns or trends. Such tools are important both in validating impressions of the local academic culture and in determining needed areas of intervention. One advantage we had in planning our ADVANCE initiatives was the high value faculty placed on collaborative research, as indicated by the COACHE surveys in both 2012–13 and 2016–17. UC Davis is a collaborative institution in part because of the existence of interdisciplinary "graduate groups" that span the more traditional ("siloed") department structure, enabling multidisciplinary research. Although disciplinary diversity is not the kind of diversity that the ADVANCE program targets, it can establish a foundation for respecting and valuing differing perspectives, approaches, and research contributions.

3 Lessons Learned

In the following section, we provide a summation of our own experiences in adapting expert advice to the idiosyncrasies of our local culture. Academic institutions envision themselves as meritocracies—participants' status in the hierarchy is earned rather than granted or inherited. Many undergraduates receive degrees in STEM and if they do well enough can be accepted to graduate school and obtain an advanced degree. Successful graduate students become postdoctoral fellows, successful postdoctoral fellows secure positions as junior faculty members, and faculty members then advance through the ranks to full professor and potentially administrative leadership. Each stage is associated with meritorious achievement and assessment of achievement is presumed to be objective. However, meritocracies often subtly (or not so subtly) create and sustain barriers to inclusion. If advancement is deemed a reflection of success, lack of advancement can mean failure (Mijs, 2014). Barriers to inclusion may be ignored or denied, such that lack of achievement becomes associated with lack of effort and/or innate talent rather than the existence of the barriers.

3.1 Commitment to an Equitable Meritocracy

Meritocracies are problematic because they are presumed to be objective, but "objectivity" itself is subjectively defined by those who most benefit from it. One consequence is that members of under-represented groups are "included" on terms set by others. Once they rise in career status within the system as is, they may affirm the existing relationship between merit and success and minimize the impact of barriers to inclusion, effectively suggesting "if I can make it, so can you"—a sentiment we heard many times during focus-group meetings with URM STEM faculty on campus. This can then reinforce the perception of majority-group members that the local culture is fine and doesn't need changing because minority-group members can excel if they want to. Related to this is the potential for a meritocracy to consider its

own hierarchical structure as insulated from or unrelated to other social hierarchies: that white male faculty are overrepresented in the upper ranks of STEM in academia is presumed to reflect objective criteria for advancement (criteria that can absorb qualified others as they come up through the ranks), regardless of how racism and sexism might be operating in the "real" world.

Meritocracies—especially those that are seen as "objective"—pose significant barriers to creating an inclusive academy because the phenomena that form barriers to inclusion, such as unconscious bias, also shape assessments of merit (see also Stewart & Valian, 2018). A more desirable goal is an *equitable meritocracy*, by which we mean the criteria for achievement are ecumenical, prestige is not used as proxy for achievement, the potential for implicit bias in evaluation and promotion is openly discussed, and mentoring and community engagement are valued/rewarded alongside or as part of research productivity. Securing commitment to an equitable meritocracy is imperative for institutional transformation, particularly when the local culture is, by contrast, firmly rooted in the ideals of an objective meritocracy that assumes a level playing field for all, regardless of social identity or background. In fact, early naysayers criticized the UC Davis ADVANCE program as unnecessary, since we had "diverse" faculty, thereby proving we were already inclusive. A key task of the ADVANCE program, then, was teaching faculty how diversity can exist without inclusion and how unconscious bias and other barriers to inclusion manifest within "objective" academic meritocracies. The Strength Through Equity and Diversity (STEAD) training, outlined in the Chapter, 'Assessing Institutionalized Bias', was indispensable in this regard, enabling both peer-to-peer learning and concrete policy change. Now required of all search committees involved in faculty recruitment, the STEAD training consistently gets high marks in faculty evaluations across fields and disciplines.

3.2 Policy and Procedures for Advancement: Data-Driven and Transparent

STEM fields in general and our local culture in particular are data-driven. Scientists are often skeptical that academic meritocracies are tainted by subjective bias, especially implicit bias. Although a large body of research documents systemic bias in the academy (reviewed in Stewart & Valian, 2018), it is important to assess local institutional data because, as discussed in the Chapter, 'Data-Driven Decision-Making', the data must support the rationale for transformation. If the academic culture itself is data-driven, the strategic vision for inclusion must also be data-driven. Lack of diversity among faculty has many causes—lack of diversity in hiring pools, pipeline disparities, bias in hiring, bias in advancement, poor work climates leading to failures in retention, etc. Moreover, the specific issues that most affect faculty diversity can vary by discipline; there may not be one solution for all STEM fields. A deep dive into the data can help pinpoint the nature of a problem and focus efforts to fix

it. This is not necessarily simple or straightforward. For example, equity analyses of overt measures such as time to promotion and salary can suggest that all is well and there is no documentable bias. Such was the case at our own institution: after multiple rounds of salary equity analysis and adjustment, some concluded there was no mandate for transformation and that lack of diversity must stem from "forces beyond our control" (competition for excellent candidates, inability to hire a candidate's partner, a non-diverse selection pool). However, climate survey and retention data did reveal patterns of exclusion and dissatisfaction consistent with implicit bias and other barriers to inclusion. This example underscores the importance of knowing which data to look at and what different types of data can (and can't) tell you. It is also important to be completely transparent with data even when specific findings do not support change.

Determining data-driven policy for establishing an equitable meritocracy is a key challenge; another is ensuring complete transparency of decision-making and criteria for advancement within the institution. Analysis of the COACHE survey results revealed high satisfaction with the clarity of criteria for advancement and their fairness in application. The 2012–13 COACHE survey did, however, identify a need for a more comprehensive system of mentoring, particularly for junior faculty. As a consequence, the UC Davis LAUNCH program, discussed in the Chapter, 'Mentorship, Sponsorship, and Professional Networking', was implemented and institutionalized. The higher "scores" given to mentoring in the 2016–17 survey point to the success of that program. Thus, survey tools can assess and provide data to guide action, as well as provide data that document the impact of changes actually made.

3.3 Walking the Walk: Peer-Driven Learning and Community Engagement

Creating a more-inclusive climate is a noble goal, though not one easily achieved. Since it is well-known in academia that senior administrators must obtain resources, faculty may view new initiatives with suspicion as to their true purpose. Is the institution actually committed to change or instead committed to garnering resources associated with a stated commitment to change? Given the nature of barriers to inclusion and the necessity of full community support for dismantling them, peer-driven community learning that vets a strategic vision through collaborative conversations across academic units is more effective than top-down, "mandated edification."

In seeking to avoid mandated edification in favor of community engagement, we were fortunate that the University of California was established as a system of shared governance, meaning the responsibility for running the institution is shared between administrators and faculty, at least ideally. Mechanisms exist for review of proposed policy changes by the governing body of the faculty—the Academic Senate. The very existence of this structure ensured established channels of communication to engage

the broader faculty in developing a vision and plan for institutional transformation, and we took full advantage. The ensuing conversations enabled organizational learning—meaning, members of the organization learn how structures, practices, goals, and values (both explicit and implicit) shape the organization.

Research analyzing cultural change within organizations often cites the need to get "early wins" (Quinn & Cameron, 1988), yet the very nature of barriers to inclusion makes early wins unlikely in an academic setting. This is another reason why CAMPOS was such a critical component of our ADVANCE Program: from the beginning, it made visible our commitment to inclusion, and helped us realize that commitment through a structured network/community of highly-accomplished interdisciplinary scholars.

New STEM faculty with a track record of commitment to diversity, equity, and inclusion are eligible for nomination as CAMPOS scholars. Although the role is not limited to junior faculty or to members of underrepresented groups, early-career Latina (and other women of color) faculty are core participants and their commitment to a more inclusive culture is, logically, partly rooted in their own experiences. Changing the culture of a meritocracy cannot be driven only or even primarily by those in the upper tiers of that meritocracy, since they are products of the status quo and may have a vested interest in maintaining it. Thus, CAMPOS scholars both embody institutional change and help drive it from "the bottom up." CAMPOS is discussed in more detail in the Chapter, 'Seeing Self: The CAMPOS Model'.

4 Conclusion

Successful institutional transformation requires understanding existing institutional culture, the nature of the change needed, and the best data-proven mechanisms to enable that change. A more inclusive culture—one that is welcoming to historically underrepresented groups—must not only recognize and understand the social, cultural, and historical factors enabling bias and discrimination, it must also recognize and confront the negative assumptions that some faculty associate with diversity and inclusion—primarily, that diversity and inclusion are antithetical to excellence. In challenging this assumption, it is important that faculty and administrators alike not point fingers or alienate colleagues whose buy-in is critical for moving forward. The focus must instead be on inclusivity of process. The vision for institutional transformation must be embraced and modeled by leadership but incorporate all levels of the institution. The vision must drive a strategic action plan—a plan animated not by incentives and resources but by a commitment to the value and benefits of knowledge production.

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Disrupting Complacent Systems

Laura Grindstaff and Linda F. Bisson

Abstract In this chapter, we characterize the academy as a "complacent system" resistant but not impervious to change, and we discuss how to overcome that resistance in the pursuit of diversity, equity, and inclusion. We outline best practices for disruption drawing upon what we learned during the implementation of the NSF ADVANCE program on our campus. We then offer some thoughts on the steps ahead, including resources for sustainability.

Keywords Institutional transformation · Inclusive diversity · Peer-to-peer learning · Sustainability · Community consensus · Myth of meritocracy · Building resilience

1 Introduction

If existing social systems generally work well for most people in a group, organization, or community, these systems can become complacent and resistant to change. As we considered the long road ahead in sustaining the initiatives launched under the UC Davis ADVANCE-IT grant, we reflected collectively on what we had learned, what had proved most useful in moving toward a more-inclusive campus culture, and what advice we wished we had at the onset. We have documented our insights in this book as a way to catalyze deeper thinking about barriers to inclusion, optimal ways of addressing them, and how to tackle challenges that remain. We share our insights and experiences hoping they will benefit those in other institutions, both in and outside the academy, as they undertake their own diversity, equity, and inclusion efforts in pursuit of a new normal.

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2 Inclusive Diversity as a Social Good

As Stewart and Valian (2018) observe, for some people, the notion of fairness by itself is reason enough to support diversity, on the presumption that "excellence" more or less exists equally across all social groups and members of under-represented groups simply need access, a seat at the table. Provided all groups have more or less equitable access to the resources and opportunities needed to develop academic excellence, this is a reasonable assumption. But even if this proviso were true, we concur with Stewart and Valian (2018: 41) that "diversity is not only fair but smart, because diversity [can] *promote* excellence" (our emphasis). When diversity is inclusive—when everyone is a fully valued participant—diversity among faculty facilitates innovation, broadens areas of study, and improves outcomes for students because it communicates the message that there is room for everybody, even "people like me."

Without inclusion, diversity may be little more than what Marvasti and McKinney (2011) call "enlightened assimilation." Assimilation "allows" members of historically under-represented groups to join a common perspective already established. Being inclusive, by contrast, means welcoming ideas and perspectives that might differ from the status quo and/or differ from your own. Often what results from respectful discussion is a synthesis which is stronger than any individual perspective. In and outside of academia, inclusive environments that encourage people to share divergent perspectives can improve critical thinking and problem-solving skills as well as develop greater self-confidence (Chang et al., 2006). Diversity per se does not necessarily lead to improved outcomes if that diversity is not inclusive (Jayne & Dipboye, 2004; Stewart & Valian, 2018). Inclusion, rather than assimilation, leads to the benefits most often associated with diversity—including academic excellence.

That the faculty of research-intensive universities in the U.S. are less diverse than they should be is well-documented, as is the persistence of bias against women faculty and faculty of color (see Stewart & Valian, 2018). Barriers to inclusive diversity are complex. Higher education is guided by the principles of meritocracy, and although white women and under-represented minority (URM) scholars are not denied advancement under these principles, they may face greater scrutiny and work harder for recognition; as well, their contributions may be undervalued and colleagues may not readily see them as idea-generators, innovators, or discoverers (see Conway, 2018). All faculty like to think of themselves as fair-minded and objective, especially in their interactions with, and evaluations of, colleagues. But not all thought and action is fully conscious, and objectivity is an ideal that can only ever be approximated because there no way to push culture aside and exist outside of it—there is no way to eliminate one's own subjectivity. Nor is this always a desirable goal. Recognizing the role subjectivity can play in decision-making, and, depending on the nature of the decision, reducing its impact, strengthens the meritocracy for everyone. The fact that much thought is outside of conscious awareness further complicates things, of course. Implicit social cognition, a normal and inevitable aspect of brain functioning, can and does generate implicit bias; yet because it can't be seen and we

believe ourselves be in control of our thoughts and actions, we think implicit bias doesn't apply to, or affect, us. This is a real challenge in pursuing inclusive diversity as a social good.

3 Disrupting Complacent Systems: Lessons from UC Davis ADVANCE

Let's assume you're convinced that diversity, equity, and inclusion (DEI) are desirable and you know that your institution could do better. Assuming the resources are there, how do you make the case for change and how do you implement that change? Below we share "best practices" for disrupting complacent systems, drawing on our own insights and experiences institutionalizing the five interlocking ADVANCE initiatives on our own campus.

3.1 Make the Case for Change

In making the case for change, people have to understand what you're talking about. Explain concepts simply and unambiguously; clearly describe questions and issues. What does "inclusive" really mean? How can it be measured? Why is the current culture not inclusive? How will becoming more inclusive change the current culture? Why is this change important? Avoid disciplinary jargon as best you can, as it compromises effective communication.

Understand that some concepts are inherently difficult to grasp—implicit bias, for example—and be prepared to work at it, incrementally if necessary. Whereas explicit or conscious bias is well-known, implicit bias is often interpreted incorrectly as forgotten explicit bias, leading people to adamantly deny that they have it. Change is unlikely if people don't understand the nature of the problem and deny it exits (more on implicit bias in the next section). Other concepts—"social justice," for example—may be too vague to be helpful, as they have different and sometimes conflicting meanings depending on the context of use, even within academia. People can interpret this term as meaning anything from a socialist redistribution of wealth to acknowledging the legacy of a historical wrong to apologizing for offending someone perceived as easily offended. This "definition drift" can hinder consistent communication about, and comprehension of, the nature of the problem to be addressed.

Even when barriers to inclusion are generally recognized, majority-group members may still doubt the existence of a specific barrier or how "real" it is. Is there really a barrier or does the aggrieved individual simply choose not to persevere? If

she finds an environment to be hostile or toxic, is it hostile or is she just hypersensitive? Here, documenting where, when, and how systems generate or sustain bias is important to making the invisible visible. Data will help all community members to see the barriers that only some may face (more on this later).

3.2 Conversation, Not Confrontation

The most critical lesson we learned is the importance of community-wide understanding of the nature of bias as an essential first step. (Again, in our case, "community wide" refers primarily to the STEM fields on our campus). Conversation works better than confrontation in facilitating collective learning. Some conversations will be uncomfortable, even difficult. It is important that people are open to hearing each other because if things get confrontational, listening ends. For example, if someone expresses an unpopular opinion, rather than challenging them or telling them they are wrong, ask why they think that way. Keep the conversation going. Views change during conversation whereas they solidify under confrontation. Making abstract concepts accessible is also challenging if they provoke a defensive response. Referring to unconscious bias as "unconscious racism," without adequate explanation, feels threatening and can generate denial and confrontation. An alternative approach is to first explain the differences between conscious and unconscious learning, or explicit versus implicit cognition. This can work well for STEM audiences. Start with a discussion of "preference" rather than "bias." If asked what their favorite color is, most people will have a ready answer. Articulating *why* that is their favorite color is more difficult because the motivation may be implicit.

Cognitively, implicit preference is an orientation toward the routine, the established, or the expected. Preferences are generally associated with positive emotion, even a vague feeling that "all is right with the world." Our expectations that the people around us will act in ways we consider to be "normal" for their gender or racial category form a positive cognitive feedback loop. Thus, bias may be rooted in a preference for the familiar, as the familiar is tied to the generation of positive emotion (Duhigg, 2012). These expectations may limit opportunity or access for non-majority groups, although there is no malicious intent. In contrast, the term "bias" is generally associated with negative emotions, such as fear, anger, or hatred. When we began our work, people often told us they did not believe they had implicit bias, because they did not hate or wish ill for any group. We also often heard that if some individuals did possess implicit bias, it could not be easily changed, if at all. Logically, though, if an apparent bias is really an unconscious preference for the familiar, the familiar *can* be changed.

If terms like "bias" or "unconscious racism" generate defensiveness and derail meaningful exchange, consider using more neutral terms such as "preference" in initial conversations with colleagues, especially when they more accurately describe the situation. Unconscious or implicit preference is an easier concept to hear/receive and helps pave the way for understanding the nature of implicit bias. Meeting people

where they are requires patience (particularly if where they are is far from where you want them to be) but if sustainable institutional transformation is the end goal, it's a strategic step along the way.

3.3 Develop Trust and Build Consensus

Creating a more inclusive work climate cannot be imposed from the outside; it has to reflect the will of the whole community. Yet it's challenging to make the case for change when not everyone experiences the same kind or degree of bias. If the policies and practices of an organization or institution work well for the majority, how do you ensure the organization works for the collective, not just the majority? How do you get everyone on board?

As discussed in detail in the Chapter, 'Barriers to Inclusion: Social Roots and Current Concerns,' perspective is linked to social location in that social location yields a specific line of sight. A critical step in disrupting complacent systems is enabling majority-group members to value the perspectives, the sightlines, of others—and further, to trust and defer to those perspectives on issues of bias. Privilege is often invisible to those who possess it and highly visible to those who do not. In our fence analogy, people who easily see over the fence have a different perspective on the value of fences than the people whose sightlines are obscured, and the views of those who experience the fence as a barrier must be respected/trusted. Here again, learning about implicit bias along with other barriers to inclusion—identity exclusion, lack of belonging, stereotyping, microaggressions, work-life imbalance, etc.—was key. Individuals with the clearest view of the problem (not the clearest view of how well the status quo functions) must play a lead role in defining the change needed.

At the same time, building a strong consensus for change is *not* the exclusive work of a marginalized minority within a community. A marginalized group can define the change needed but alone cannot make it happen. Indeed, no one group, let alone a single individual or handful of individuals, has enough power or possesses the breadth of perspective required to make the case for change and develop a roadmap for getting there. Rather, the will to enact change must come from everyone; the bias experienced by the few needs to become the problem of the many. Consequently, any institutional transformation process must have at its core a focus on vetting. Initiative leaders need to listen to *all* voices and perspectives, including those of sceptics and naysayers.

Part of listening is making people feel that their views are important and are being heard. Naysayers—those who deny there is a problem to be fixed—have things to teach you, and they, too, are part of the community. Including all perspectives in discussions of barriers to inclusion does not diminish the greater barriers that some face compared to others. In our experience, such inclusion builds greater empathy. By listening, we learned, somewhat counter-intuitively, to avoid the term "ally." Although developing a cadre of white male allies was recommended by colleagues from other grant-receiving institutions, we found that conceptualizing

white men as "allies" stigmatized them as "others"—others who may "get it," but as "others" nonetheless. In a truly inclusive community, there *are* no others. We developed the practice of referring to majority-group members committed to inclusion as stakeholders—to reinforce their vested interest in a common goal.

Thus, any transformation process should get the entire community talking. An anonymous quote gathered during the final external evaluation of our grant put it best: "Having the ADVANCE grant got the campus talking about things that we hadn't really talked about before. It became an exponentially growing conversation, and now we're constantly talking about these issues and advancing faculty diversity. It has raised the cognition across the entire campus." Although all five ADVANCE initiatives contributed to these "exponentially growing conversations," no initiative did this better than the STEAD training in implicit bias, discussed in the chapter titled "Assessing Institutionalized Bias." A key reason we were able to raise awareness, is that we engaged a critical mass of faculty. Across the five initiatives and the internal and external advisory boards, nearly 50 faculty joined in our efforts on an ongoing basis. All initiatives met multiple times per year and produced tangible outcomes that reinforced our collective commitment to transformation. To seek inclusivity, the ADVANCE team itself had to model inclusivity.

3.4 Prioritize Peer-To-Peer Learning

Passive learning by being lectured at by experts might work well for certain purposes but we found that active learning through self-exploration and peer-to-peer dialogue was more effective. Peer-to-peer learning facilitates a faculty context rooted in mutual respect, shared values, and common experiences.

Of course, peer-learning can be developed using expert sources. Individuals committed to developing expertise about an issue can self-identify and form a learning group; this group can then dispense what they have learned to others. Our STEAD (Strength Through Equity and Diversity) training, which focused on faculty recruitment and hiring processes, employed this method. We benefited from the fact that many other institutions had already developed programs for identifying implicit bias in academic hiring—a key resources here was the STRIDE training used at the University of Michigan (STRIDE stands for Strategies and Tactics for Recruiting to Improve Diversity and Excellence). We adopted and adapted elements of these various programs to our own organizational needs, tailoring them to the institutional culture of our campus. Faculty volunteers read from the available literature and consulted with experts to learn about implicit bias and subsequently developed an interactive workshop on how to recognize and address implicit bias in the faculty recruitment process. We then required that all members of faculty search committees participate in the training, every three years. Other faculty and administrators took advantage of the training as well. Once a critical mass had been trained, their knowledge spread to other faculty members in their departments and programs via discussions of search outcomes. Productive discussions of strategies for creating a

more-inclusive academic community grew naturally from this collectively-produced knowledge.

Meanwhile, the ADVANCE leadership team and the members of the Policy and Practices Review Initiative engaged in extensive learning of their own. They reviewed the literature on implicit bias and invited to campus speakers with expert knowledge of implicit bias and other barriers to inclusion to lead general discussions with the team. They involved the appropriate faculty committees that regularly engage these issues: the Committee on Academic Personnel, the Committee on Affirmative Action and Diversity, and the Committee on Faculty Welfare, in addition to the oversight Executive Council of the Davis Division of the Academic Senate. They held annual retreats for the entire ADVANCE team during which we sought the wisdom of the external advisory committee as well as representatives from the other nine campuses of the University of California system. It was through these multiple and overlapping conversations that we were able to put flesh on the bones of the five core initiatives that comprised our ADVANCE program. These initiatives were the vehicles for establishing a "new normal" for diversity, equity, and inclusion on the campus—an ongoing effort.

3.5 Know that Leadership and Resources Matter

One factor that all individuals recognize about institutional transformation is the challenge of the process itself—and the need for committed leadership and a strong base of support working together with common purpose. The commitment of the top levels of administration needs to be visible and real, especially when prioritizing resources. If commitment to change is top-down only, however, the process will not work. It is all too easy in academia to chase resources by ensuring that requests for local resources match the stated goals of the central administrators holding the purse strings. As such, merely allocating resources may create a transient commitment in those academic units receiving them. As we've repeatedly emphasized, leadership for sustainable change must come from the community itself. For this reason, we engaged many faculty members in the vetting of ADVANCE initiatives. We held open seminars, panel discussions, and workshops; we reported out to the community on a regular basis; we created a website that would attract those interested in learning more; we sought the advice and engagement of the Academic Senate; we were fully transparent and welcomed advice and comments from all institutional stakeholders. Faculty talked and we listened, and listened again.

This is not to suggest that resources are trivial. Most certainly they are not. In fact, generous funding made possible our successes by underwriting all of our hard work; in turn, the successes born of our hard work helped to justify the generous funding. The resources supporting our efforts far beyond the dollar amount of the NSF ADVANCE-IT grant itself ($3.7 million). The UC Davis Chancellor at the time, Linda Katehi, was also the grant's Principle Investigator. Written into the grant proposal was a promise from the campus to hire *16 new STEM faculty* (representing roughly

$5 million annually) and provide ongoing support for a number of the proposed ADVANCE initiatives, including the Center for the Advancement of Multicultural Perspectives in Science (CAMPOS). The campus made good on its promises. The 16 new faculty were hired as "CAMPOS Scholars," with access to mentors, networking and professional development opportunities, and award programs. Most important, CAMPOS Scholars became part of an interdisciplinary, multicultural "think tank" enabling faculty to work together collaboratively on projects with the potential for significant community impact. CAMPOS is a jewel of the UC Davis ADVANCE program—and the price tag for its development was high.

3.6 Obtain Your Own Data, Know Your Own Data

Academics, across the many disciplines, are generally data-driven. They require a strong rationale for the *need* to change. This, in turn, requires not merely quoting the observations of others but also collecting, analyzing, and fully knowing one's own institutional data. When we were initially making the case for mandatory implicit bias training for faculty-search committees, the most common objection voiced by faculty was that no existing data actually showed the university had a problem with bias at the point of hire, as low numbers of women and/or people of color within any given field or discipline does not prove bias per se if the pool of available PhDs is also low. Of course, there were no data clearly showing the opposite, either, but we took the point.

The most recent data on our campus addressed salary equity and advancement for faculty *after* the point of hire, and found no significant differences among groups at the same academic rank within departments, although there were large differences in salary *structures* between disciplines, even within the same college—for example, Sociology has a lower salary scale than Economics. Yet equity in salary and advancement once faculty are already at the university are not the only or necessarily the best indicators of inclusive diversity. It became important, therefore, to document baseline or starting data in order to show progress or programmatic effectiveness. In our case, trend lines for greater diversity continued, although some argued, not unreasonably, that the increases we saw under the ADVANCE grant might have happened without the grant. Ultimately, our goal was to create an environment in which non-inclusion was acknowledged as a problem for all STEM faculty in the institution, so that our institutional transformation efforts would be widely supported. And we did accomplish that goal.

We also learned the shortcomings of our own data as we tried to compare centrally-held data to those of local units. We found that, although hiring data matched across the two levels fairly well, retention data did not: the numbers aligned, but the qualitative data revealed discrepancies between the actual reasons faculty gave for leaving the campus (or even academia entirely) at the local level and the reasons officially recorded in the central database. Locally, climate did appear to sometimes play a role in their decisions.

Thinking comprehensively about which data are needed to measure what, clarifying how data should be collected and managed, and identifying the key metrics for analyzing data—all these elements are important in evaluating the impact of inclusion programs. At very large and complex institutions, it is a daunting task. Yet as inclusive diversity becomes a higher priority in the academy, it will become increasingly important to gather data with inclusive diversity in mind from the outset, and not a task to be cobbled together after-the-fact.

3.7 Get at the "Why" and Not Just the "What" of Bias

Once the case for change is made, you need a strategic plan with concrete action steps to improve diversity, equity, and inclusion. This, too, is a difficult process, even with strong community consensus. A major challenge is that not everyone within the community will need the same support structures and programs to experience a more-inclusive cultural climate. We found that faculty from different areas within STEM had very different experiences with respect to bias in group work, assignment of credit, lab setup, the availability of course buy-outs and other resources, and access to mentoring networks, among other measures. This variability, caused by local disciplinary cultures, has to be accounted for in developing a roadmap for institutional transformation and seeking ways to enact it that will have the most positive impact.

One consistent barrier that cut across different constituencies was lack of work-life imbalance, especially for women faculty. The academic culture that currently prevails arose in the era of single-career couples, and much of what is "familiar" is still based on the gendered realities of two individuals (typically a man and woman) enabling the career of one (typically the man). In the Chapter, 'Barriers to Inclusion: Social Roots and Current Concerns,' we describe this as the "ideal worker norm." Factors such as overwork (the 60- hour faculty work week) and dedication to work (putting career ahead of family) still inform our ideas about how to achieve success in STEM. This creates barriers for dual-career couples, whose increasingly widespread presence in academia has not automatically unsettled this traditional view of the "ideal worker" (here, the "ideal scientist"). Although a shift is underway toward valuing the impact of "work across time" versus "time spent *on* work," it has been slow in coming. Relatedly, there is a shift away from a STEM culture of work-life *imbalance* to one of work-life *integration* in some pockets of academia and occasionally in the corporate world, but this societal change, too, is slow and its advancement uneven. UC Davis has relatively generous work-life integration policies for faculty (see the Chapter,'Work-Life Integration in Academia: From Myth to Reality'), but more can and should be done, particularly with regard to securing affordable childcare for faculty at the lowest salary scales.

Other common barriers reported by faculty pertained to the devaluation of teaching, service, advising, and community-engagement, all seen as largely incompatible with research excellence in STEM according to prevailing notions of meritocracy. To better reward what we collectively value in the academy, the ADVANCE team advocated for changes to the criteria for outstanding achievement by adding to, but not replacing, the existing criteria. Such efforts had already been underway on campus—including the institution of the "Step Plus" system of advancement for faculty, and the addition of a diversity statement to candidate portfolios for faculty undergoing review (see the Chapter, 'Assessing Institutionalized Bias').

3.8 Question the Myth of Meritocracy

When they appear, barriers to inclusion in the academy are often sustained by the myth of an objective, value-free meritocracy. Indeed, this is perhaps the toughest nut to crack. But it must be addressed if equity and excellence both are to be achieved. STEM fields often demonstrate a "monoculture of cultural perspective," meaning that the values and views of dominant groups become the values and views of the larger academic enterprise itself. When we created CAMPOS, we often heard from faculty that only one perspective prevailed in science—the scientific method, and dedication to this method—and culture had nothing to do with it.

Rather than point out that the scientific method is itself a product of culture, with objectivity as its core value, and rather than point out the many historical examples (and even some current ones) of sexist and racist scientific experimentation, consider instead asking faculty about the ways in which culture might impact the *contexts of research* that actually produce scientific findings. These questions might include:

- which issues/problems do scientists decide to study?
- what motivates them to study these issues?
- which questions do they pose, and why?
- what norms, values, or principles prevail in their labs, if any?
- who works in their labs?
- who do faculty collaborate with, and why?
- who—which communities—does their research serve?
- do research opportunities reflect the priorities of external funding agencies?
- If so, *what* are those priorities, and *why*?
- are scientific journals equally hospitable to all types of findings—for example, null findings as well as those that confirm a theory or hypothesis?

Talking about the contexts of research, the conditions both material and intellectual in which research is practiced, can serve to underscore the fact there is no way to "bracket off" culture and exist outside of it. This is, in our view, a good thing, because culture, while often incalcitrant, in not impervious to change.

3.9 Build the Capacity for Resilience

One of the key findings from our Social Sciences Research Initiative was the importance of building resilience in the face of barriers to inclusion. By resilience we don't mean an individualistic, "pull-up-your-bootstraps" capacity to bounce back from hardship and persist regardless of circumstance. In the academy, building resilience takes multiple forms, including: (1) providing adequate support, mentoring, and sponsorship opportunities; (2) learning about barriers to inclusion, because knowledge of those barriers and their social origins helps to mitigate their power; and (3) understanding the connection between resilience and self-worth. We think of self-worth as being shaped by internal and external currencies. Internally, it is the sense of having and meeting a personal value system that affirms a positive self-concept. Externally, self-worth can be enhanced if it is confirmed by others; alternatively, it can be undermined by others' negative views—especially if those others play an evaluative role and are generally perceived to be fair-minded and objective. For faculty who experience marginalization, implicit bias training can minimize the damaging effects of negative evaluations by highlighting the potential role of unconscious bias rather than or in addition to presumed impartial assessments of merit. Thus, such training is important not just for those who might want to check their own biases but also for those who might suffer from biases left unchecked.

In thinking about the first currency of self-worth—having an internal value system and the desire to live up to those values—we are reminded once again of the ideal worker norm and the conflict it creates, especially for women, between succeeding at work and succeeding at home. If a woman's core value system prioritizes the latter, she might reject a career option that jeopardizes it. In many Latinx cultures rooted in Catholicism, placing family first is a strongly-shared (and widely internalized) cultural value. The value is embraced by both men and women, but is typically realized in traditional, gender-specific ways (men provide for the family, women care for it). For some Latinas, then, rejecting a particular career path—e.g., a family-unfriendly one in STEM—may reflect the need to retain self-worth as well as adhere to community norms.

As we proceeded with the ADVANCE-IT project, we developed several programs aimed at reinforcing resilience—including the LAUNCH committees that served to link new faculty to a network of valuable resources and wise mentors on the campus, and various CAMPOS events and programs that supported the center's community of scholars committed to diversity, equity, and inclusion.

4 Sustain Change

We are under no illusions that sustainable institutional transformation on our campus will be smooth from this point forward. In addition to the matter of necessary resources, there is the matter of "culture," which is more powerful than people tend to

give it credit for. In the academy, the views and values of majority-group members, consciously and unconsciously held, tend to represent the academic culture that prevails for all, especially with regard to meritocracy; this works fine for some, even most, but creates barriers to full inclusivity. Creating a genuine culture of "we" *can*, in fact, be done (Dovidio, et al., 2009; Gaertner et al., 1993). Shared principles, including those that define merit, can be upheld in an inclusive way—not to dilute excellence, but in fact to reinforce it.

We offer the following suggestions for sustaining a culture of inclusion. First, it is important to continue the discussion of barriers to inclusion. Learning must be sustained over time. A one-time workshop is unlikely to have lasting impact unless its lessons and insights are put to regular use. Devising ways to engage in continuous conversation is important. This can be accomplished through regular and periodic events, interactive blogs or other on-line forums, and informal but enabled gatherings such as book clubs, film clubs, and speakers' series—provided there is no pandemic preventing congregation. It is also important for women and URM faculty to have access to separate as well as integrated spaces for peer learning, as separate spaces typically feel safer for sharing and validating personal experiences. The more positive the environments for learning, such as over a meal or at a pleasant location, the deeper the commitment to learning may be.

Second, alongside and in tandem with sustained learning through conversation, institutionalized programs that help keep an inclusive climate alive are critical to fund and maintain—on our campus these would include CAMPOS, the Work-Life Integration Program, the Committee on Affirmative Action and Diversity, the Committee on Faculty Welfare, the Feminist Research Institute, the Office of Diversity, Equity, and Inclusion (which oversees the LAUNCH mentoring committees), and Academic Affairs (which oversees sexual harassment training, the STEAD training, and the Capitol Resource Network). The UC Davis ADVANCE program developed a number of these lasting programs through the five initiatives that organized our DEI efforts.

Third, frequent community self-assessment is essential. We suggest that a team representing the diversity of the community—and, ideally, including representatives from the sorts of programs listed above—be created and meet regularly to address any issues that arise. This would help ensure that different campus units are not duplicating efforts, talking past each other, or dropping the ball on a problem. The values of diversity and inclusion have to be continually and visibly reinforced until they become the new normal.

5 National and International Resources

Of course, the NSF ADVANCE-IT program is not the only source of support of diversity, equity, and inclusion in higher education, nor is the U.S. alone if providing resources. The National Science Foundation offers a variety of grant opportunities

under the ADVANCE umbrella which target STEM.[1] In the spirit of peer-to-peer learning, there now exists the ADVANCE Resource and Coordinating Network—a program that connects ADVANCE-funded programs with each other, enabling participants to interact.[2] The group holds annual meetings to exchange information and best practices across a host of institutions committed to addressing systemic bias.

Other organizations offer more formalized engagement. The Athena SWAN (Scientific Women's Academic Network) originated in Great Britain, with the goal of fostering gender equality in STEM fields. Although initially focused on STEM, the program is now under the auspices of "ADVANCE HE" and covers non-STEM fields as well[3] (the "H-E" stand for higher education). Member institutions engage in self-assessment and commit to uphold a charter of common principles,[4] with periodic review to ensure continued commitment. The Athena SWAN program has spread internationally. In Australia, it is housed under the SAGE program (Science in Australia Gender Equity).[5]

The American Association for the Advancement of Science has developed a similar program, SEA Change, with SEA standing for STEMM Equity Achievement (the extra "M" broadens the acronym to include medicine).[6] The SEA Change program focuses on addressing systemic, structural inequalities, of which gender is a component. Like the Athena SWAN program, SEA Change institutions commit to a core group of principles of inclusion and formally apply for membership.[7] Membership is based upon review of a detailed self-assessment; each institution is granted a status based on the self-assessment. SEA Change uses a rating system with status increasing from Bronze to Silver or Gold depending upon the nature and degree of progress towards inclusion.[8] Initially, members receive bronze status and periodic reassessment is mandatory for continued membership as well as advancement to a higher level. These types of organizations serve to formalize the commitment to change and require continued progress and evaluation. They also provide member institutions with resources and opportunities for peer learning.

DEI efforts also extend beyond the academy. The CEO pledge for Action aims to advance diversity, equity, and inclusion across the workforce.[9] Whether this is more than window dressing remains to be seen. As noted in the Chapter, 'From Affirmative Action to Inclusion,' diversity programs owe their origins and initial growth primarily to the business world—they developed not out of a desire for fairness necessarily,

[1] Description of the National Science Foundation ADVANCE program https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5383.

[2] ADVANCE Resource and Coordinating Network https://www.equityinstem.org/.

[3] ADVANCE HE program https://www.ecu.ac.uk/equality-charters/athena-swan/.

[4] Charter of Athena SWAN core principles https://www.ecu.ac.uk/equality-charters/athena-swan/about-athena-swan/.

[5] SAGE program https://www.sciencegenderequity.org.au/category/athena-swan/.

[6] STEMM Equity Achievement Change program https://seachange.aaas.org/.

[7] SEA Change core principles https://seachange.aaas.org/about/principles.

[8] SEA Change Levels https://seachange.aaas.org/about/pillars.

[9] CEO pledge https://www.ceoaction.com/pledge/ceo-pledge/.

but to avoid litigation. Corporations in the 1970s and 80s created diversity trainings in order to avoid civil rights lawsuits charging gender and/or racial discrimination. As with faculty and administrators in academia, today's CEOs agree to a core set of principles and commit their organizations to change. The network provides guidelines for change and enables interaction among members on best practices.

What many institutions of higher education have that corporations may not is deep belief in a set of academic ideals, what Stewart and Valian (2018) call "academic virtues," that can be harnessed to facilitate sustained change: the search for truth, the freedom to pursue all ideas, respect for knowledge, and a belief in merit. These are fundamental virtues that can produce research excellence, provided we define and operationalize them with diversity and inclusion in mind.

6 Conclusion

In and outside of the academy, DEI programs make visible a commitment to institutional transformation, yet their effectiveness is by no means guaranteed. Since complacent systems are most comfortable remaining complacent, ongoing "disruption" is necessary. Otherwise, complacent systems drift back to complacency and the commitment to change gives way to the ease of staying the same. To avoid this, the necessity of change must be continuously documented; the consensus to act secured through dialogue and debate; a plan of action devised and accepted by all stakeholders; and considerable resources—financial and intellectual—devoted to implementing and sustaining the plan. The role of resources cannot be overstated. Ideally, institutions of higher education should think of external grant support such as that provided by the NSF ADVANCE programs as "seed" funding to shift the needle on the dial; cultivating broad and sustained institutional change will take much more.

Regarding this last point, it seems to us that faculty colleagues with deep expertise in racial and gender inequality are an under-valued and untapped resource. Yes, STEM faculty have to lead the charge if STEM fields are the ones targeted for change. But these fields don't exist in isolation from the rest of the university, just as science doesn't exist in isolation from the broader society. Consider the COVID-19 pandemic, which, at the time of the writing, is seemingly winding down. The pandemic has disproportionately affected black and brown Americans along with those shouldering child- and elder-care responsibilities, predominantly women. Clearly both biological and cultural expertise are relevant to understanding and addressing the causes and impacts of such a crisis.

Moreover, cultural expertise must extend beyond the psychology of individuals. Stereotyping, implicit bias, microaggressions—all are important to understand and challenge. But they aren't the whole of the story, because even people who are consciously anti-racist in attitude can enable structural racism—by deciding where to live, choosing where to school their kids, or, closer to home, by allocating the fewest resources to the most diverse pockets of an organization or institution. This last point references a sobering reality: in the University of California system, diversity

is inversely related to funding (Newfield, 2016, 2020). This pattern holds across universities, across campuses within the system, and across disciplines on a campus, including our own. Indeed, we note the considerable irony of devoting so much time and money to diversify STEM at UC Davis while already-diverse social science and humanities departments struggle with insufficient resources to meet student demand. That DEI initiatives here and elsewhere have blossomed in this context underscores both their limitations and their unrealized potential to mobilize more collaborative and wide-ranging transformation.

It would be naïve to conclude that any single program or initiative will solve the problem of systemic bias in the academy, let alone end structural racism, sexism, heterosexism, or any other "ism." Even with concerted effort and tremendous resources, our own campus is far from perfect on this score. Another lesson we learned, then, is that you have to keep trying. Keep talking, keep listening, and keep searching for new ways to understand and address the problems. Nothing happens without collective, sustained commitment. Given the interconnectedness of different disciplines within a university, of different universities within higher education, and of higher education within the society at large, disrupting one complacent system makes trouble, however small, for them all.

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