Biomedical Engineering Education, Vol. 2, No. 2, September 2022 *(© 2022)* pp. 99–100
https://doi.org/10.1007/s43683-022-00083-2

Editorial

BIEE JEDI Special Issue

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(Published online 24 August 2022)

All of us bring light to
exciting solutions never
tried before

for it is our hope that
implores us, at our
uncompromising core,

to keep rising for an earth
more than worth fighting for.

Excerpt from Earthrise by Amanda Gorman

In biomedical engineering education, we seek to bring to light exciting solutions that improve our world, our discipline, our departments, our classrooms, and our students' educational experiences and future careers. This Special Issue of the Journal of Biomedical Engineering Education is devoted to the ways in which we bring light to biomedical engineering education solutions building on a foundation of justice, equity, diversity, and inclusion (JEDI).

That diversity and inclusion are key drivers of innovation and complex problem solving is well known and well accepted in science, technology, engineering, and mathematics (STEM) disciplines, business, and social sciences. Such is the power of diversity that nearly 20 years ago Hong and Page demonstrated that heterogenous teams of problem-solvers outperform homogenous teams of problem solvers even when the homogenous team has on average greater ability.[1] Furthermore, individuals from historically marginalized groups, including women in engineering, have origins, experiences, and concerns that differ from the mainstream and as a consequence can identify connections between ideas and concepts that have been previously missed or ignored.[2] Thus, diverse teams can solve harder problems, are more innovative, and propel greater advances in STEM disciplines.

After the summer of 2020 in which the murder of George Floyd at the hands of police[3] was followed by uprisings for racial justice during a global pandemic, the acronym Justice, Equity, Diversity, and Inclusion (JEDI) appeared in a list of student demands from Black Stanford Medical students [https://www.diverseeducation.com/opinion/article/15109001/from-dei-to-jedi]. In selecting this acronym for this Special Issue, we unknowingly waded into a debate over how inclusive its referent *Star Wars* and parent company *Disney* are on the one side[4] and how to even define justice without invoking religious morals or the concept of merit,[5] on the other side. We are also sensitive to the complaint that "These terms and related abbreviations like DEI can come to be treated as institutional buzzwords that are more slogan than substance, signaling commitments that institutions fail to meaningfully honor".[6]

Therefore, here we expand on each of these elements in the context of biomedical engineering education and

[1]Hong, L., and S. E. Page. Groups of diverse problem solvers can outperform groups of high-ability problem solvers. Proc. Natl Acad. Sci. U.S.A. 101:16385–16389, 2004.

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[2]S. T. Bell, A. J. Villado, M. A. Lukasik, L. Belau, A. L. Briggs, Getting specific about demographic diversity variable and team performance relationships: A meta-analysis. J. Manage. 37, 709–743, 2011; M. W. Nielsen et al., Opinion: Gender diversity leads to better science. Proc. Natl. Acad. Sci. U.S.A. 114, 1740–1742, 2017; M. de Vaan, D. Stark, B. Vedres, Game changer: The topology of creativity. Am. J. Sociol. 120, 1144–1194, 2015.

[3]Kaul, Greta (June 1, 2020). "Seven days in Minneapolis: a timeline of what we know about the death of George Floyd and its aftermath". MinnPost. Archived from the original on June 9, 2020.

[4]See Hammond, Brownell, Kedharnath, Cheng, and Byrd. Scientific American. September 23, 2021 for an in-depth commentary.

[5]Merriam-Webster 2022.

[6]Hammond, Brownell, Kedharnath, Cheng, and Byrd. Scientific American. September 23, 2021.

our hopes for their potential positive impact on our students, classrooms, colleagues, programs, and discipline. By Justice, we mean practices that seek to right wrongs in engineering education from K to infinity, especially for those who have been historically disadvantaged or excluded. By Equity, we mean educational practices and programs that are free from bias and favoritism, especially in opportunities and treatment. By Diversity, we mean best practices in seeking and valuing a non-homogenous mix of identities and perspectives in undergraduate, graduate, faculty and staff populations as well as the biomedical engineering workforce. Finally, by Inclusion, we mean fostering belonging in the faculty, research laboratories, classrooms, and student bodies by centering, valuing, and amplifying the voices and perspectives of those who experience barriers based on their identities.

In this Special Issue, our articles do just that. Our contributing authors provide exciting and impactful teaching tips; innovations articles that highlight community-based, lab-based, and classroom-based programs; research articles; and perspectives. The focus of several articles in this Special Issue are activities and interventions at entry points and transition points for trainees, which may be especially challenging for first-generation students and members of historically marginalized and racialized groups. These entry and transition points include the first year of an undergraduate program, undergraduate student entry into mentored research, admission to graduate school, and the first year of a graduate program. Similarly, times of social crisis, like the murder of George Floyd, can become inflection points in students' journeys to understand how biomedical engineering can contribute to justice, equity, diversity and inclusion and how we can use our discipline to combat injustice, inequity, homogeneity, and exclusion. We hope our readers consider ways to implement the best practices shared here with students outside of the classroom, into faculty meetings, within professional societies, and with our communities outside of the university.

In our opinion, all authors in the Special Issue bring to light exciting solutions never tried before. We hope, perhaps uncompromisingly, that the teaching tips, innovations articles, research articles, and perspectives presented here keep our discipline rising for a field more than worth fighting for.