

Material Goals Towards Equity Along the STEM and LGBTQIA+ Spectra

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In materials science and engineering (MSE) we champion materials, but advances come from the people “behind” the research and applications. This mandates us to assess whether equal access and support to participate exists. Here, we focus on exploring and addressing disparities for members of the LGBTQIA+ (lesbian, gay, bisexual, transgender, queer, intersex, asexual, and more) community, to create a sense of inclusion, belonging, and power-sharing amongst LGBTQIA+ and non-LGBTQIA+ identifying individuals.

With wider societal progress towards LGBTQIA+ equality, like the right of same-gender couples to marry, some question the need to discuss the role of sexuality and gender on participation in MSE.¹ Legal steps forward are just one fragment of needs for inclusion and belonging.

The co-correlation of LGBTQ identity, lack of inclusion and belonging, and poor experiences in STEM is highlighted by Cech and Waidzunus and is worth a read (n.b., this may trigger memories for those impacted).² The study explores 25,000 individuals employed in STEM in the United States, with 4% self-identifying as LGBTQ, revealing that LGBTQ people are:

- less likely to have adequate career resources/opportunities;
- less comfortable whistleblowing;
- experience devaluation of their professional expertise;
- experience social exclusion and harassment in their workplace;
- experience health and wellness difficulties; and
- more likely to leave their current jobs, or to leave STEM entirely.

Typical approaches frame this regarding equity (fairness), diversity (representation), and inclusion and belonging (e.g., in decision-making processes); often this centers on legally protected classes/characteristics (which, depending on location, may include sexuality and gender) and can be encouraged by individual interest groups or recent events. It is critically important to also consider intersectionality, where individuals who belong to multiple marginalized groups face extra barriers to participation and experience marginalization within groups (e.g., a Black lesbian can be marginalized within a queer-friendly space due to misogyny from gay or bisexual men and racism from white people).³

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The near monoculture of MSE, especially as reflected by those in positions of power, further accentuates imbalances. Materials science and engineering originates within a traditionally heteronormative^a and cis-masculine^b basis, being coalesced from engineering, chemistry, and physics. The lack of diverse representation is often only considered in terms of visible minority status, as indicated by perceived gender presentation, age, physical disability, and skin color. Membership of the LGBTQIA+ community may be invisible, as individuals can “pass” or “code-switch” to hide their minority status (e.g., for safety). This is not anecdote, as according to a recent survey of LGBT+ physical scientists from across the U.K., only 40% of lesbian and gay individuals are out to their coworkers, reducing to 15% for bi-/pansexual, and 21% for queer/questioning.⁴ These results hide local discrepancies, both in terms of geography, culture, and type of work, additionally within the LGBTQIA+ spectra there is evidence of discrepancies of experience, especially of transgender and post-secondary students in STEM.⁵

Moving Towards LGBTQIA+ Equality

We quote the U.K.-based charitable trust, Pride in STEM, on the annual International Day Against Biphobia, Homophobia, and Transphobia: “Every LGBTQIA person across the world deserves to live their life to the fullest with no fear of discrimination and persecution.”

Cultural change towards equity must be conducted within the context of “nothing about us without us,” so supporting LGBTQIA+ individuals means bringing them on board, fostering a sense of belonging for all, and deferring to members of the LGBTQIA+ community for advice. Everyone must recognize and challenge “deficit models,” as LGBTQIA+ individuals are not there “to be fixed.” Together we must navigate the “minority

tax” that many members of current and historically marginalized communities face, where they feel required to contribute service towards equity rather than be free to do what they need to do to succeed and thrive in their place of work on their own terms.

Here we introduce recommendations and work for institutions and allies, as they must do the “heavy lifting.” As we are not the first to make recommendations, and our list is not exhaustive, we encourage further reading.⁴

Institutions should:

- Create a safe, inclusive, and supportive environment that retains and respects individuals. Start with basic workplace protections that respect LGBTQIA+ status, including anti-bullying and anti-harassment policies that address the needs of the most marginalized. This should not be the responsibility of those who have already been marginalized by the status quo (also known as, minority tax) and often will require dedicated resources (staff time, specific budgets, etc.), to facilitate a change.
- Create/support queer-friendly spaces, such as establishing a monthly queer-friendly coffee, celebrating LGBTQ+ STEM Day, or starting a chapter of oSTEM (Out in STEM).
- Create and maintain codes of conduct and workplace policies. These are tools (with permanence) to sustain change but require cultural buy-in and enforcement. Refresh these regularly, with input from those who have been marginalized by the status quo, to reflect the changing needs of the communities.
- Upturn heteronormative and (cis-) gendered assumptions (and the static nature of sexuality and gender identity). This can start with a simple audit of policies, considering whether terms need to be gendered, and how the protection or policy should apply equally to all people (and how to

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^a Heteronormative is the assumption that it is normal to be, or to want to be, in a heterosexual relationship, e.g., in assuming that someone is dating or married to someone of the opposite gender.

^b Cis-masculine is the assumption that professionals (in STEM) identify with the same gender they were identified at birth (cis) and male-presenting (“are men”) or have male-like traits as inferred by societal norms.

actively frame it as anti-homophobic/transphobic).

- Include equity, diversity, and inclusion (EDI) as an active item within all decision-making processes, and support people asking about the LGBTQIA+-focused EDI implications of policy changes. There is risk that people asking for more inclusion are seen as “troublemakers,” but the status quo is demonstrably broken.

Given the hostile nature of STEM, we suggest that at-risk individuals explore the safety of the work environment prior to agreeing to career changes. The Human Rights Campaign website provides resources that are helpful for seeking out safe employment opportunities in the United States.⁶

Allies should:

- Speak up when witnessing derogatory and/or dismissive behavior about members of the LGBTQIA+ community. It is exhausting for a member of an underrepresented minority to have to survive these daily micro- and macro-aggressions.
- Create a group code of conduct as a lab group leader/member that includes statements that support the need for an inclusive work environment (e.g., the code of conduct developed for Bahlai Lab at Kent State University).⁷
- Consider how the status quo favors cisgendered and heteronormative assumptions. “Stick to the science” statements are often made by those who have survived and are established in positions of power. Remind your peers that individuals in opposite-gender relationships often bring their sexuality and gender identity up at work, typically in most casual inferences like when introducing their wife (or husband) or children.^c Thus in the face of inequality, it is never possible to “stick to the science” because the

science is done by individuals.

- Avoid attending or engaging with events, activities, and organizations that are passively or actively hostile to LGBTQIA+ individuals. Ask about EDI policies when you start your discussions. This is important when accepting awards, conference invitations, and your participation in significant events or activities.

What TMS and TMS PRIDE Are Doing

TMS states on its website and within conference and event programs the expected code of conduct during meetings, committee participation, and after-hours events.

In 2015, the Women in Materials Science and Engineering Committee was renamed the Diversity Committee, and then the Diversity, Equity, and Inclusion (DEI) Committee in 2020, to reflect a broader mission statement. The TMS Pride working group was formed in 2018 to advise the DEI Committee, and leverages committee resources to advocate for and facilitate the inclusion, recognition, and networking of LGBTQIA+ individuals in the field.

Specific TMS Pride programming and current issues include:

- Broadening normalization of LGBTQIA+ identity within TMS by hosting EDI online webinars and in-person symposia at annual meetings through the Diversity in the Minerals, Metals, and Materials Summit series.
- Working with other MSE-related societies to increase LGBTQIA+ and intersectional identity visibility in all communities within our discipline.
- Hosting networking events at TMS annual meetings to enable LGBTQIA+ individuals (and their partners) to connect in safe, semi-closed, non-hetero-/cis-normative spaces.
- Combating existing and unique challenges for people of transgender,

^c We stress that many members of the LGBTQIA+ community have, and are actively considering having, children through a variety of means. Furthermore, while childcare and other matters correlated with heterosexual relationships may be supported and/or discussed professionally, we often see male-bias in representation and participation in STEM often due to the unequal support of men and women (and in many places legal provision with regards to identity with a non-binary gender is not considered at all).

agender, and genderqueer identity at annual meetings by:

- Working with TMS staff in identifying, labeling, and/or creating gender-neutral bathrooms and inclusion on site maps.
- Buying and distributing pronoun stickers for name tags at the annual meeting for LGBTQIA+ members and allies.
- Advocating for more inclusive honorifics for registration and nametags at meetings (i.e., gender-neutral alternatives for “Mr.” and “Miss/Mrs./Ms.”).
- Developing lists of LGBTQIA+ inclusive restaurants for annual meetings located in areas without legal protection for LGBTQIA+ identities or with bathroom bills in place.
- Advocating with TMS staff and leadership for local LGBTQIA+ protections to be considered when choosing future annual meeting locations.
- Fundraising for TMS-related programming for LGBTQIA+ individuals.
- Authoring articles for *JOM* focusing on LGBTQIA+ and intersectional identity.
- Addressing existing and ongoing exclusion of LGBTQIA+ individuals from positions of leadership within TMS.

The work with TMS Pride is ongoing and the team is always open to new members willing to help host, plan, and attend future events. If you have questions, please e-mail tmspride@tms.org.

Endnotes

1.L.R. Mendos, K. Botha, R.C. Lelis, E. Lopez de la Pena, I. Savelev, and D. Tan, “State-Sponsored Homophobia 2020: Global Legislation Overview Update,” (ILGA World Geneva, 2020), <https://ilga.org/state-sponsored->

homophobia-report. Accessed 9 June 2021.

2.E.A. Cech and T.J. Waidzunus, *Science Advances*, 7 (3), eabe0933 (2021). doi: 10.1126/sciadv.abe0933.

3.K. Crenshaw, *University of Chicago Legal Forum*, 1989 (1), 21 (1989).

4.“Exploring the Workplace for LGBT+ Physical Scientists,” (Institute of Physics, Royal Astronomical Society, and Royal Society of Chemistry, 2019), https://www.rsc.org/globalassets/04-campaigning-outreach/campaigning/lgbt-report/lgbt-report_web.pdf. Accessed 9 June 2021.

5.E. Kersey and M. Voigt, *Math Ed Res J*, 1 (2020). doi: 10.1007/s13394-020-0035605.

6.“Where Do Employers Stand in the Movement for LGBTQ Equality?” The Human Rights Campaign. 2 July 2021. <https://www.hrc.org/resources/employers>.

7.“Code of Conduct,” *Bahai Lab/Policies*, GitHub Inc., 2021, 2 July 2021. https://github.com/BahlaiLab/Policies/blob/master/Code_of_conduct.md.

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