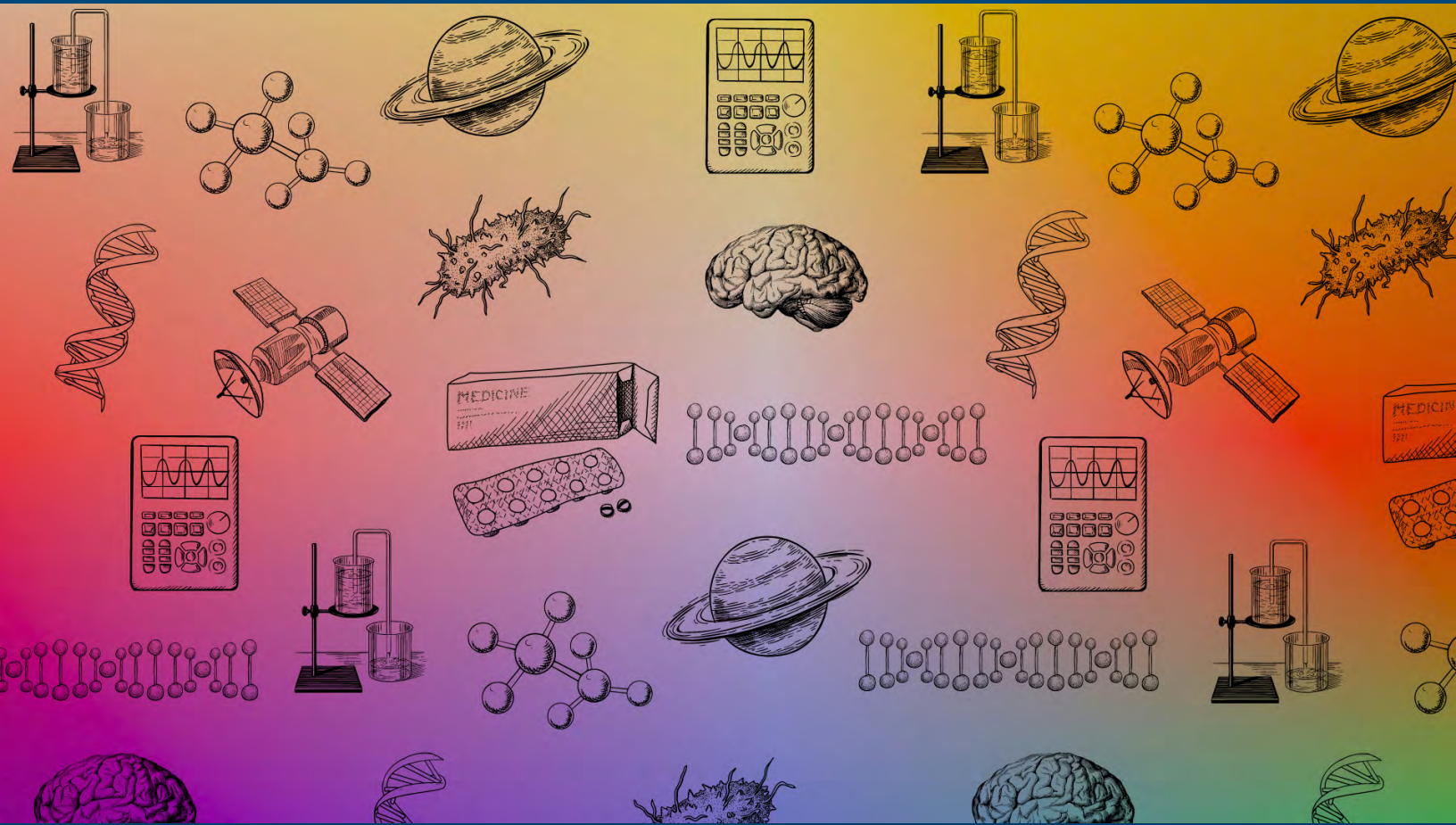


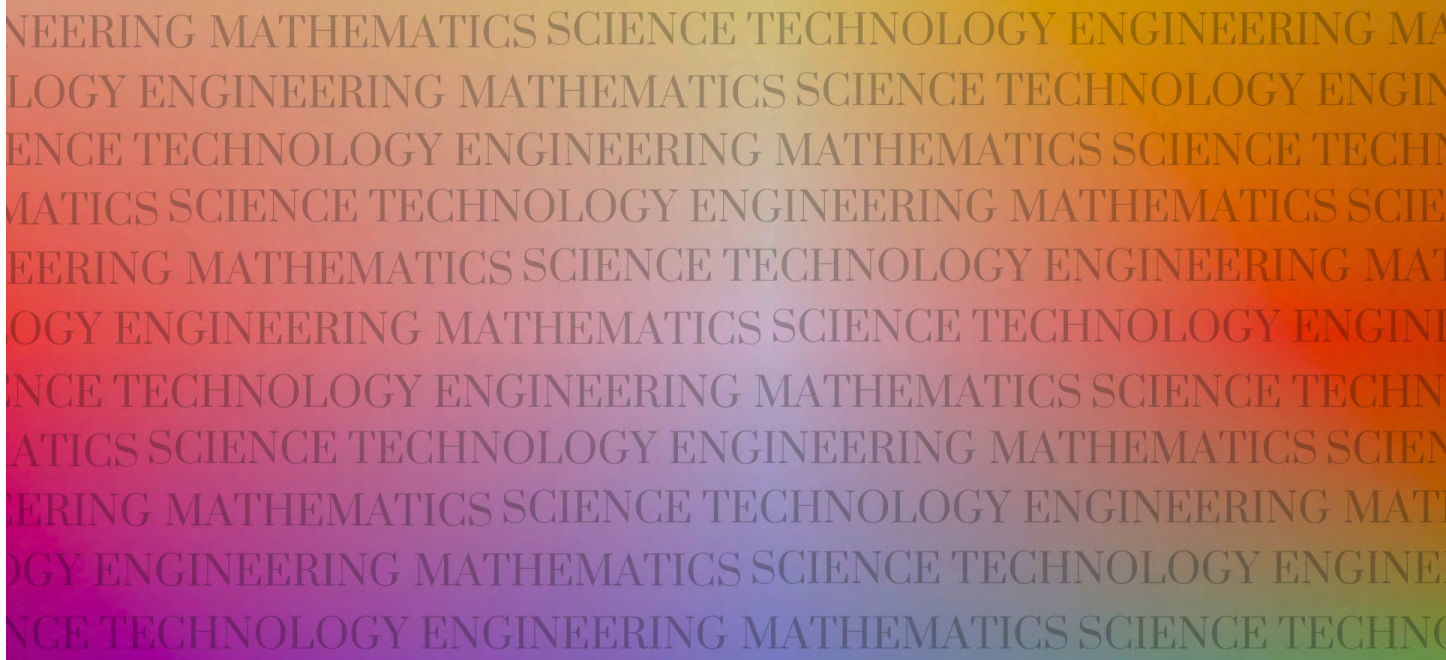
Advancing LGBTQ+ People in STEM Careers



A Report by the
Aspen Institute Science & Society Program and the
Royal Canadian Institute for Science



RCIScience
Royal Canadian Institute for Science



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Editors' Note

Scientists are human beings who can't and shouldn't be separated from society. As humans, they have diverse identities that extend beyond their chosen professions. Research thrives when it embraces a diversity of voices, perspectives, and experiences, but many LGBTQ+ scientists report feeling the need to hide their sexual and/or gender identity during their education or career, compounding the impression that the fields of science, technology, engineering, and mathematics (STEM) are “straight.” As a result, many non-LGBTQ+ scientists may not appropriately consider the LGBTQ+ community, if at all, even while trying to build more inclusive spaces in STEM.

While presenting [Science is a Drag](#)—an award-winning, community-driven, [science-themed drag show](#) that heralds inclusive science engagement—at the international [Falling Walls Science Summit](#) in Berlin, [RCIScience](#) challenged the notion that STEM needs to remain so traditionally rigid and [challenged the audience](#) to pay attention to, and start dismantling, the numerous barriers facing LGBTQ+ participation and retention in STEM. [The Aspen Institute Science & Society Program](#), whose [award-winning leadership had history](#) working on this topic by co-founding the organization People at Rockefeller University Identifying as Sexual/Gender Minorities (PRISM), now called [RockOut](#), and leading the first scientist contingent in New York City Pride, heard the call. Together, we embarked on the following report.

In convening a roundtable discussion with international, cross-sector, LGBTQ+ STEM colleagues, we set out to explore some of the barriers facing LGBTQ+ inclusion in STEM around the world. Many of the ideas explored here are not new, especially for members of the LGBTQ+ community, whose intersectional lived experiences extend far beyond what we could capture in one report. And while we celebrate examples of supportive educators and employers and their good practices, there is much still to do. We don't purport to have all the solutions to this ongoing challenge, but there is value in exploring the issues, particularly if you identify as straight or want to practice active allyship to this community. Some actions are small and can be undertaken by individuals. Others are much larger and require the support of employers, funders, and regulatory agencies.

We hope that this report inspires action within the STEM community, including corporate, research, academic, and nonprofit sectors, and pushes for intersectional policy change to build more inclusive spaces that ultimately benefit us all.

Aaron F. Mertz, Ph.D. – Director, *Aspen Institute Science & Society Program*

Carrie Boyce, M.A. – Executive Director, *RCIScience*

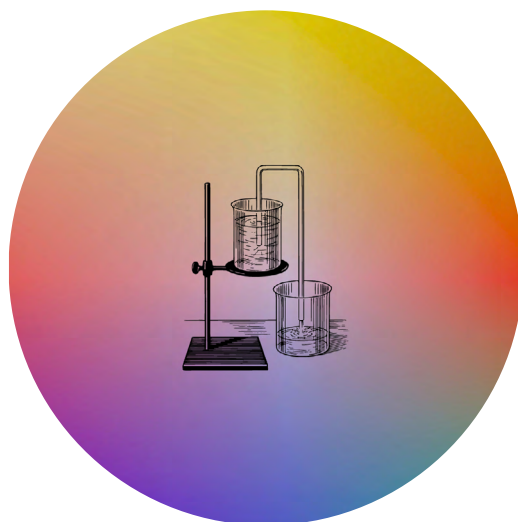
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Clinical Associate Professor, Social, Behavioral, and Population Sciences Department,
Tulane University School of Public Health and Tropical Medicine

Sarah Toland – Health journalist and co-author/writer of more than ten books in psychology, health, and wellness

The aim of this report is to synthesize and share perspectives from the roundtable discussion as a whole rather than to attribute any quotations or viewpoints to specific individuals. We are grateful to the following individuals (listed alphabetically by last name) for their participation in this timely and important discussion:

- **William Agnew, M.S.** – Vice President of External STEM Partnerships, *Out in Science, Technology, Engineering, and Mathematics (oSTEM)*; Doctoral candidate in computer science, *University of Washington*
- **Art Blake, Ph.D.** – Director of Dimensions initiative and member of the Graduate Faculty, *Toronto Metropolitan University*
- **Alexander Dow, P.Eng** – Co-Founder, *EngiQueers Canada*; Project Manager, *David Schaeffer Engineering Limited*
- **Lauren Esposito, Ph.D.** – Co-Founder, *500 Queer Scientists*; Schlinger Curator of Arachnology, *California Academy of Sciences*
- **Anicca Harriot, Ph.D.** – Chief of Community Development, *Vanguard STEM*; Postdoctoral Research Fellow, *Johns Hopkins Whiting School of Engineering*
- **Shaun O’Boyle, Ph.D.** – Research Fellow, *Dublin City University*; Organizer, *International Day of LGBTQ+ People in STEM*
- **Michelle Power, Ph.D.** – Co-Chair, New South Wales Chapter, *Queers in Science, Australia*; Professor, *School of Natural Sciences of Macquarie University*
- **Chanda Prescod-Weinstein, Ph.D.** – Assistant Professor of Physics and Core Faculty Member in Women’s and Gender Studies, *University of New Hampshire*
- **Blake Rowley, MPH** – Senior Community Liaison, *Gilead*
- **Marty Sterling, M.S.** – Next Generation Polar Engineering Director, *Northrop Grumman Space Systems*
- **Jeremy Yoder, Ph.D.** – Associate Professor, *Department of Biology at California State University Northridge*



Action Items

- **Establish policies that protect and support LGBTQ+ people:** Corporate- or university-wide policies that establish strict anti-harassment measures and swift action for discrimination issues can create a safer, more tolerant environment for LGBTQ+ people in STEM. Healthcare policies should be updated to reflect the unique needs of LGBTQ+ people and nontraditional families.
- **Call for official demographic data:** Most countries don't collect official data on the number of LGBTQ+ people in the STEM workforce. Without official data, many governments are unable to provide grant money, educational support, and other resources needed to help remedy issues of LGBTQ+ underrepresentation and inequality in STEM careers.
- **Increase mentorship programs:** Research shows that when LGBTQ+ people in STEM are paired with LGBTQ+ mentors, they feel more connected at school or work and demonstrate a higher skill level.
- **Encourage visibility:** When students and employees are able to be open about their sexual orientation and gender identity, it increases a sense of belonging and security for LGBTQ+ people in STEM.
- **Train leadership on LGBTQ+ issues:** Educating executives, supervisors, professors, and other STEM leaders on LGBTQ+ issues can foster a more inclusive, supportive environment and reduce discrimination and inequality for LGBTQ+ employees, faculty, and students.
- **Create a safe space for LGBTQ+ people to meet and socialize:** Dedicating a space for LGBTQ+ students or employees to meet one another, share ideas, and socialize can create community in STEM.
- **Celebrate LGBTQ+ people in STEM:** Recognizing LGBTQ+ STEM Day (<https://prideinstem.org/lgbtstemday/lgbtq-stem-day-events/>), held annually November 18, on company calendars, in email, and with meaning (not “pinkwashing”) events can help foster an environment of inclusion and tolerance. Employers and universities can also celebrate Pride Month, typically in June, and International Day against Homophobia, Biphobia, and Transphobia, held annually May 17.
- **Encourage accountability among LGBTQ+ people:** Scientists—LGBTQ+ and non-LGBTQ+—in the industry can choose companies, projects, and educational institutions that help advance sexual and gender minorities.
- **Emphasize gender-neutral language and spaces:** Using gender-neutral language and providing gender-neutral bathrooms encourage inclusivity.

Advancing LGBTQ+ People in STEM

Around the world, many companies and countries face a serious shortage of workers skilled in science, technology, engineering, and mathematics (STEM).¹ As the need to encourage and retain people deepens, a lack of diversity,² particularly in “cultivating talent and promoting the full inclusion of excellence across the social spectrum,”³ plagues STEM industries. This is a significant problem for many reasons, including the fact that STEM fields are increasingly tasked with addressing many of the world’s greatest challenges, including how to feed billions of people, combat climate change, manage artificial intelligence, and prevent and cure chronic health conditions and infectious diseases. STEM fields also need greater representation of diverse identities to ensure the development of various and innovative solutions that can benefit everyone.

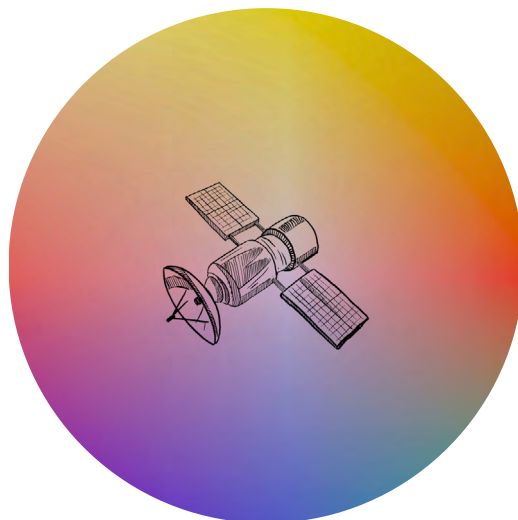
One segment of the world’s population, however, remains underrepresented and undersupported in STEM: those who identify as lesbian, gay, bisexual, trans, queer, intersex, asexual, two-spirit, and/or other gender identities and sexual orientations. While concrete data on the number of LGBTQ+ people in STEM is lacking in most (if not all) countries worldwide, reports and surveys suggest that these individuals are underrepresented in STEM degree fields and careers, and that those who do pursue the work often experience discrimination and an overwhelming number of systemic inequities and disparities.⁴

1. World Economic Forum, “Which countries’ students are getting most involved in STEM?” March 20, 2023, <https://www.weforum.org/agenda/2023/03/which-countries-students-are-getting-most-involved-in-stem/>

2. Richard Fry, Brian Kennedy, and Cary Funk, “STEM Jobs See Uneven Progress in Increasing Gender, Racial and Ethnic Diversity,” Pew Research Center, April 1, 2021, <https://www.pewresearch.org/science/2021/04/01/stem-jobs-see-uneven-progress-in-increasing-gender-racial-and-ethnic-diversity/>

3. Brian Gibbs, “Diversity in STEM: What It Is and Why It Matters.” *Scientific American*, September 10, 2014, <https://blogs.scientificamerican.com/voices/diversity-in-stem-what-it-is-and-why-it-matters/>

4. E. A. Cech and T. J. Waidzuna. “Systemic inequalities for LGBTQ professionals in STEM,” *Scientific Advances*, vol. 7, issue 3, January 15, 2021, <https://www.science.org/doi/10.1126/sciadv.abe0933>



Terms for gender identities and sexual orientations

Various acronyms are used to describe people of minority gender identities and sexual orientations. For the purposes of this report, we will use LGBTQ+, commonly used in the United States, with the plus symbol (+) indicating identities beyond delineated letters for Lesbian, Gay, Bisexual, Transgender, and Queer. This terminology is not exhaustive. For example, the umbrella term “2SLGBTQIA+” is often used in Canada to include additional gender and sexual minorities such as Two-Spirit, Intersex, and Asexual. Incorporating 2S into the LGBTQ+ acronym aims to bridge “Indigenous and Western understandings of gender and sexuality and breaks free from the violently homophobic/trans-misogynistic language and culture imposed by colonialism. Two-spirit-specific definitions change nation to nation and person to person. Not all Indigenous peoples who are sexual and/or gender minorities refer to themselves as Two-Spirit.”⁵

In this report, we will also use the terms *heteronormative*, which means a world view that promotes heterosexuality as the normative or preferred sexual orientation, and *cisgender*, which refers to a person whose gender identity corresponds to that which was assigned at birth.

5. “Building Capacity to Work with 2SLGBTQIA+ Youth: Understanding Concepts and Terminology,” Western Centre for School Mental Health, accessed June 1, 2023, <https://www.csmh.uwo.ca/docs/HRP-for-2SLGBTQIA-Concepts-and-Terminology.pdf>

In April 2023, the [Aspen Institute Science & Society Program](#) and the [Royal Canadian Institute for Science \(RCIScience\)](#) convened eleven cross-sector members of the LGBTQ+ STEM community from four countries on three different continents to participate in a roundtable discussion to explore the challenges facing LGBTQ+ people in the STEM workplace. The organizers recognize that many regions remain unrepresented in the conversation, since many countries around the world have few or no organizations for LGBTQ+ people in STEM, few or no public discussions on the topic, and/or few or no people with enough visibility for us to invite them. This report summarizes key findings from the April roundtable and leverages recent research to present solutions that may help advance LGBTQ+ people in STEM degree fields and careers. While influenced by the roundtable discussion, the statements in this report reflect the views of the authors and not necessarily any specific roundtable participant or roundtable participant’s organization.

What are STEM degree fields and jobs?

STEM degree fields are those in the life sciences, agriculture, and environmental sciences; physical and earth sciences; engineering and architecture; computer and information sciences; math and statistics; and health-related fields. According to the Pew Research Center, STEM jobs include 74 different occupations across these fields.⁶ The Department of Homeland Security of the U.S. government recently added 22 additional fields of study eligible for its STEM training program.⁷

6. Richard Fry, Brian Kennedy, and Cary Funk, “STEM jobs see uneven progress in increasing gender, racial, and ethnic diversity,” Pew Research Center, April 1, 2021, <https://www.pewresearch.org/science/2021/04/01/stem-jobs-see-uneven-progress-in-increasing-gender-racial-and-ethnic-diversity/>

7. DHS Expands Opportunities in U.S. for STEM Professionals, January 21, 2022, <https://www.dhs.gov/news/2022/01/21/dhs-expands-opportunities-us-stem-professionals>

A lack of hard data on LGBTQ+ people in STEM

Many people believe “diversity” relates only to race, ethnicity, and binary gender (male/female). However, the Society of Behavioral Medicine defines diversity as “the collective ways in which people and organizations are different and similar with respect to demographic characteristics, values, beliefs, experiences, backgrounds, and behaviors,” including but not limited to “race, ethnicity, gender, gender identity, sexual orientation, language, culture, religion, mental and physical ability, class, education, immigration status, and professional discipline.”⁸

For years, organizations have researched and publicized the lack of racial, ethnic, and binary-gender diversity in STEM careers and education.⁹ At least three decades of research exists on the participation gap of women and historically marginalized racial and ethnic groups (e.g., Black, Hispanic/Latino/a/x, Indigenous peoples) in STEM, according to the National Science Foundation (NSF),^{10,11} which conducts and publishes the most comprehensive data on diversity trends in STEM.

8. Monica Baskin Diversity Institute for Emerging Leaders, Society of Behavioral Medicine, accessed June 1, 2023, <https://www.sbm.org/training/monica-baskin-diversity-institute>

9. Olivia Palid et. al, “Inclusion in practice: a systematic review of diversity-focused STEM programming in the United States,” *International Journal of STEM Education*, vol. 10, January 6, 2023, <https://stemeducationjournal.springeropen.com/articles/10.1186/s40594-022-00387-3>

10. Award Abstract #2104599, “Broadening Participation in STEM,” National Science Foundation, https://www.nsf.gov/awardsearch/showAward?AWD_ID=2104599

11. “Diversity and STEM: Women, Minorities, and Persons with Disabilities,” National Center for Science and Engineering Statistics, 2023, <https://nces.nsf.gov/pubs/nsf23315/>

Despite robust research on binary-gender, racial, and ethnic representation in STEM, no federal data exists on LGBTQ+ people in STEM in the U.S.,^{12,13} which is also true in most, if not all, countries worldwide. In Canada, for example, the Employment Equity Act provides annual employment data on federal and federally regulated workplaces in four “designated groups”: 1) women, 2) visible minorities, 3) Indigenous peoples, and 4) persons with disabilities. LGBTQ+ people are not one of the designated groups and cannot be included in the “visible” category, as gender expression and sexuality are not outwardly ostensible like skin color (which can imply race). These statistics have contributed to a lack of data on LGBTQ+ employment in STEM sectors.

With hard and widely accepted data still unavailable, researchers estimate that LGBTQ+ people may be up to 21 percent underrepresented in the STEM labor force compared to statistical expectations.¹⁴ Data about university-level education shows that LGBTQ+ people are less likely to major in STEM fields and earn STEM degrees,¹⁵ although official data on the exact number of LGBTQ+ students in STEM is also incomplete.¹⁶

Case in point: While the NSF collects data on women, racial and ethnic subgroups (Black, Hispanic/Latino/a/x, Asian, Indigenous peoples), and people with disabilities, the federal foundation has never conducted research on LGBTQ+ people, despite numerous requests from LGBTQ+ groups and the scientific community at large. The NSF’s failure to collect data is a departure from other federal agencies and organizations in other industries that do conduct research on LGBTQ+ participation and experience.¹⁷ Some companies and other workplaces do collect their own data, though, as one panelist noted, this extra onus can be perceived as LGBTQ+ people creating “extra work” for human resources departments.

The NSF has, however, piloted test questions on sexual orientation and gender orientation for possible inclusion on its biennial National Survey of College Graduates (NSCG), which assesses more than 160,000 people with at least a bachelor’s degree in the science and engineering workforce. But in January 2023, the NSF announced it will not include questions on sexual orientation on the NSCG, although it will add inquiries on gender identity (if approved by the federal government). The NSF’s rationale for not adding questions on sexual orientation was that these questions “didn’t perform well on the pilot test, taking longer to complete than the gender identity question and resulting in more changed answers and respondents exiting the survey.”¹⁸ While some scientists applaud the NSF for piloting sexual-orientation questions and trying to include gender-identity questions, others wish the NSF had enacted both lines of questioning since gender and sexuality can be closely interconnected.

12. Jon Freeman, “To fix LGBTQ+ disparities in science, we need the data,” *Nature*, vol. 612, December 8, 2022, p. 191. <https://www.nature.com/articles/d41586-022-04331-x>

13. Max Kozlov, “Researchers blast US agency’s decision not to collect LGBT+ data,” *Nature*, January 13, 2023, <https://www.nature.com/articles/d41586-023-00082-5>

14. Jon Freeman, “STEM disparities we must measure,” *Science*, vol. 374, issue 6573, December 9, 2021, <https://www.science.org/doi/10.1126/science.abn1103>

15. Jon Freeman, “To fix LGBTQ+ disparities in science, we need the data.”

16. Katie Langin, “NSF still won’t track sexual orientation among scientific workforce, prompting frustration,” *Science*, vol. 379, issue 6629, January 13, 2023, <https://www.science.org/content/article/nsf-still-won-t-track-sexual-orientation-among-scientific-workforce-prompting>

17. Ibid.

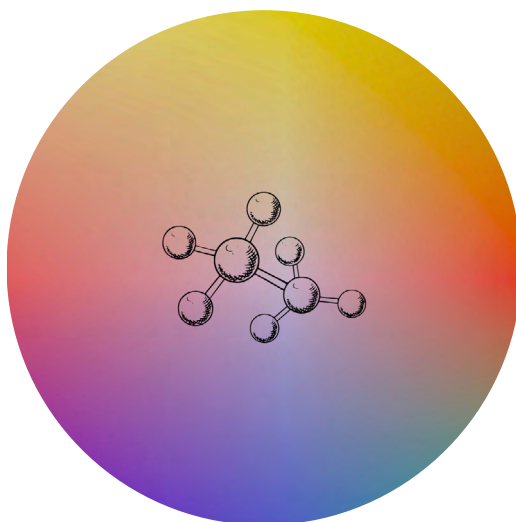
18. Ibid.

Without federal data on LGBTQ+ people in STEM, federal resources cannot be awarded to help remedy the numerous equity issues that research shows exist in STEM education and careers globally. In short, “the scientific community can’t improve a situation that it refuses to measure,” writes Columbia University professor and neuroscientist Jon Freeman in the journal *Nature*. Freeman further argues that “the U.S. government needs data on LGBTQ+ scientists that can drive policies and effect change.”¹⁹

Of the eleven international participants in the Aspen Institute and RCIScience roundtable, most agreed that official statistics on sexual orientation and gender identity are needed to help identify and address inequities and underrepresentation in STEM. One panelist challenged the use of the term “underrepresented” because there is no official data on the percent of LGBTQ+ people in STEM. However, researchers largely agree that LGBTQ+ people are vastly underrepresented in STEM, as previously noted. (For some roundtable participants, the question of “representation” is just a first step since individuals also need work environments and cultures in which they can thrive, discussed later in this report.)

At the same time, volunteering personal data on sexual orientation and gender identity may not feel safe for many LGBTQ+ people in STEM, as several panelists noted, which could lead to inaccurate results. According to one panelist, LGBTQ+ employees may be reluctant to share information on sexual orientation because responses can be identifying, especially in a small company, which is one reason why LGBTQ+ people are oftentimes protective of their personal data. Another panelist with professional experience surveying LGBTQ+ people shared that many are uncomfortable identifying as a sexual or gender minority, especially in STEM careers, which can often be overwhelmingly heteronormative and cisgender. Another participant said survey respondents often want to know exactly how their answers will be used, along with who will have access to the data and whether there is a minimum number of responses before they answer any questions on identity or other demographics. These challenges of ethical data collection apply to assessing other populations, too, especially those with “invisible” identities and disabilities.

19. Jon Freeman, “To fix LGBTQ+ disparities in science, we need the data.”



Inequalities facing LGBTQ+ people in STEM

Studies on LGBTQ+ people in STEM careers show that they “frequently encounter wage inequalities, social isolation from colleagues, workplace experience disadvantages, and pressures to downplay or cover their LGBT[Q+] status.”²⁰ The same is true of LGBTQ+ students and faculty in STEM degree fields, both of whom are more likely to feel uncomfortable and be more concerned about harassment and physical violence than LGBTQ+ people in other academic disciplines.²¹ One factor perpetuating these inequalities, according to researchers, is that STEM has long been dominated by heterosexual, white men.²² Deepening the problem is the sociocultural stereotype of the “white, male scientist,” which works to reinforce ideas of heteronormativity in STEM.²³ Studies also show that STEM employees in general are politically more conservative than those in other industries, which could make work environments and cultures less tolerant of LGBTQ+ people or perceived as such.²⁴

LGBTQ+ employees face inequalities in five primary areas, according to a key study on LGBTQ+ professionals in STEM published in 2021 in *Science Advances*:²⁵

1. Fewer opportunities for career advancement: LGBTQ+ employees report that they have fewer opportunities to develop their skills and less access to resources like administrative support needed to succeed.
2. Professional devaluation: LGBTQ+ employees say they are treated as less skilled by colleagues and managers and that their STEM expertise is often questioned, devalued, or discounted.

20. E. A. Gech and M. V. Pham, “Queer in STEM organizations: Workplace disadvantages for LGBT employees in STEM related federal agencies,” *Social Sciences*, vol. 6, issue 1, February 4, 2017, <https://www.mdpi.com/2076-0760/6/1/12>

21. Ibid.

22. Ibid.

23. Jeremy B. Yoder and Allison Mattheis, “Queer in STEM: Workplace experiences reported in a national survey of LGBTQ individuals in Science, Technology, Engineering, and Mathematics Careers,” *Journal of Homosexuality*, vol. 63, issue 1, October 26, 2015, <https://doi.org/10.1080/00918369.2015.1078632>

24. Zachary P. Davidson, “Political education of STEM workers in the U.S.,” University of Nevada, Reno dissertation, August 2016, <https://scholarworks.unr.edu/handle/11714/2246>

25. E. A. Gech and T. J. Waidzuna. “Systemic inequalities for LGBTQ professionals in STEM.”



3. Social exclusion: LGBTQ+ employees feel as though they don't "fit in" and/or are excluded from after-work social gatherings.
4. Increased health difficulties: LGBTQ+ employees statistically experience more frequent minor health problems, insomnia, stress, and depression symptoms than their non-LGBTQ+ colleagues.
5. Increased intention to leave STEM: LGBTQ+ employees are more inclined to consider leaving the field compared to their non-LGBTQ+ colleagues.

During the Aspen Institute and RCIScience discussion, panelists expanded on these and other inequities that they have encountered firsthand or observed. Participants mentioned that applying the framework of "intersectionality"²⁶ can be helpful when considering LGBTQ+ people in STEM. Intersectionality occurs when an individual has more than one marginalized identity, such as a marginalized gender, race, sexual orientation, and/or disability, that can compound issues of a single identity and make it "nearly impossible to succeed," as one participant noted. Another panelist shared that, as a female LGBTQ+ manager, which is a role primarily held by men at her company, she "felt like the 1 percent rather the 10 percent" (note that "10 percent" is often used to refer to the percentage of LGBTQ+ people in society at large). "Preemptively designing policies and initiatives that take intersectionality into account is essential," another participant added.²⁷

Another panelist remarked that LGBTQ+ students are more likely to receive little to no financial support from their families due to homophobia—a statement supported by Student Loan Hero research²⁸—making it more difficult for them to pursue degrees in STEM or take entry-level or low-paying research jobs. Another panelist agreed, adding that "the lack of familial support also compounds the financial burden of pursuing STEM"—a burden that can include the cost of taking standardized tests for graduate school entry, relocating for study or work, and accepting generally lower wages in STEM careers.²⁹ This participant added that workplaces may be able to help ameliorate the financial burden by adopting more queer-inclusive policies like extending family benefits to a "chosen family" in order to help LGBTQ+ people who experience disproportionate rates of rejection from their nuclear or traditional family. This participant noted that the rejection rates are even higher for those with intersectional identities, like employees who are queer and racialized or queer and of lower socioeconomic status.

Some STEM employees may also originate from countries—or even parts of the U.S.—where LGBTQ+ rights aren't recognized at all, as one panelist noted, which may make them feel fearful or uncomfortable expressing their sexual orientation or gender identity at work. This oppression can be detrimental to career success and growth, as research suggests that authentic self-expression at work increas-

26. The term intersectionality was coined in Kimberle Crenshaw (1989). Demarginalizing the intersection of race and sex: A black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *University of Chicago Legal Forum*, vol. 1989, issue 1, <http://chicagounbound.uchicago.edu/uclf/vol1989/iss1/8>

27. As an example, see 500 Women Scientists, "Guide to Organizing Inclusive Scientific Meetings," <https://500womenscientists.org/inclusive-scientific-meetings>

28. Oliver McNeil, "The Burden of LGBTQ Student Loan Debt," Center for LGBTQ Economic Advancement & Research, November 19, 2020, <https://lgbtq-economics.org/2020/11/19/the-burden-of-lgbtq-student-loan-debt/>

29. "The scandal of researchers paid less than a living wage," *Nature*, November 2, 2022, <https://www.nature.com/articles/d41586-022-03472-3>

es professional satisfaction, performance, productivity, and success.³⁰ As noted before, many countries with important and emerging positions in the global STEM conversation were not represented at the roundtable because of a lack of national visibility of LGBTQ+ people in STEM and/or a lack of organizations to support them.

Panelists pointed out that LGBTQ+ people may not stay in STEM careers because their political or ethical values prevent them from taking a job within the industry. One panelist who teaches in STEM at the university level said that LGBTQ+ students leave the field at higher rates because the job opportunities available to them are often in fields like military or defense technology that don't align with their personal values. Interestingly enough, this observation played out in real time in advance of the roundtable when some panelists announced they would not participate in the event after learning it would be sponsored by specific companies. The organizers promptly pulled sponsorship of the roundtable, and all participants agreed to participate again. The incident highlights a challenge facing LGBTQ+ people in STEM: While nearly all roundtable panelists felt strongly that additional resources, including financial ones, are needed to advance sexual and gender minorities in STEM, some panelists expressed the belief that many companies with "deep pockets" in science are also "morally corrupt, even if they outwardly express interest in supporting LGBTQ+ people in STEM." One panelist attributed this turn of events surrounding the roundtable to the LGBTQ+ community's "commitment to solidarity-building," adding that "it's not about moral absolutism for the sake of moral absolutism, but rather building on a knowledge of the reality that logical inconsistency in advocacy can weaken a movement or cause."

30. Susan McPherson, "How much of your 'authentic self' should you really bring to work?" *Harvard Business Review*, February 12, 2021, <https://hbr.org/2021/02/how-much-of-your-authentic-self-should-you-really-bring-to-work>



Consequences of LGBTQ+ underrepresentation in STEM

The inequities facing LGBTQ+ people in STEM “impede our global scientific potential,” according to Columbia University’s Jon Freeman, who is an outspoken advocate of the need for official data on LGBTQ+ people in STEM and has pioneered research on the subject.³¹

Without diversity, a company or group’s stability, resiliency, creativity, and productivity all suffer—a broad premise proven extensively by research in fields like psychology, anthropology, and biology. Whether in STEM or other industries, people of different backgrounds bring different ideas, perspectives, and problem-solving techniques to their group, all of which can help drive and increase creativity and innovation. Diversity also helps people realize that alternative viewpoints do exist, fostering open-mindedness and stimulating everyone to work harder to explain their viewpoints and reconcile differences, according to research.³² In addition to playing an important role in supporting inclusion, diversity has also been shown to foster higher-quality scientific studies, which are imperative in STEM.³³

As long as LGBTQ+ people continue to face isolation, exclusion, discrimination, and marginalization in STEM careers and degree fields, they will continue to be less likely to pursue and participate in scientific fields. As John Pham, editor-in-chief of the journal *Cell*, summarizes it while speaking about LGBTQ+ scientists: “Imagine if we didn’t have some of the great scientists in the world because they weren’t encouraged to pursue science. We all care about diversity because it matters that the talent out there reaches its potential, and once that potential is reached, then we have the possibility to change the world.”³⁴

From a historical perspective, LGBTQ+ people in STEM have had both an immeasurable and indelible impact on the industry and greater good. The list is long and impressive, with notable examples including marine biologist Rachel Carson; agricultural scientist George Washington Carver; neurologist Ben Barres, who transformed the science of glial cells in the brain; computer scientist Lynn Conway, who sparked a new revolution in microchip design; astrophysicist Sally Ride, who was the first woman in space; and biologist Joseph Sonnabend, whose identity as a gay man informed both his research and his activism to advance HIV/AIDS scientific discoveries and medical treatments.³⁵

Today, STEM industries and fields continue to foster many incredible LGBTQ+ minds. For the greater good of both LGBTQ+ individuals and the world at large, STEM needs to continue to foster even more diversity and work to make everyone feel safe and supported. To that end, developing solutions is just as important, if not more so than discussing the challenges.

31. Jon Freeman, “To fix LGBTQ+ disparities in science, we need the data.”

32. Katharine W. Phillips, “How diversity makes us smarter,” *Greater Good Magazine*, September 18, 2017, https://greatergood.berkeley.edu/article/item/how_diversity_makes_us_smarter

33. Ibid.

34. Alison Bert, “On being LGBTQ+ in science—yes, it matters, and here’s why,” *Elsevier Connect*, July 25, 2019, <https://www.elsevier.com/connect/on-being-lgbtq-in-science-yes-it-matters-and-heres-why>

35. Institute for Stem Cell & Regenerative Medicine, “The enduring contributions of LGBTQ+ scientists,” University of Washington, <https://iscrm.uw.edu/celebrating-lgbtq-scientists/>

Recommended strategies to help advance LGBTQ+ people in STEM

According to research and to the panelists who participated in the Aspen Institute and RCIScience roundtable, possible strategies to advance LGBTQ+ people in STEM careers and degree fields include:

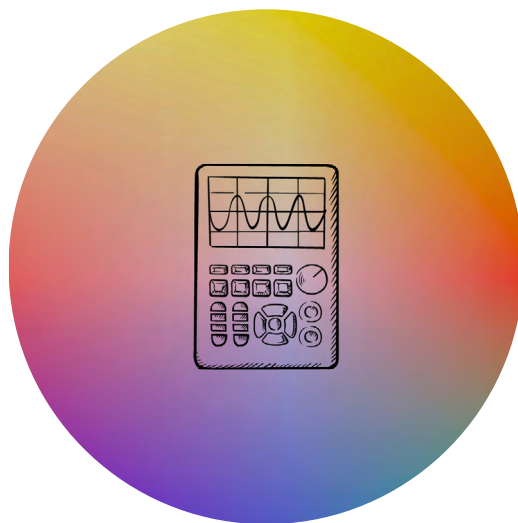
Establish policies that protect and support LGBTQ+ people: LGBTQ+ people need to feel safe at work and school in order to remain and thrive in STEM careers and degree fields. Corporate- and university-wide policies that establish and enforce strict intersectional anti-harassment and anti-bullying measures can help create a safer environment for LGBTQ+ employees, faculty, and students. LGBTQ+ people should also be represented on corporate or university boards and in other decision-making roles.

Healthcare policies should also be updated to reflect the unique needs of LGBTQ+ people who often have different medical concerns from heterosexual, cisgender people. Gender-affirming care, such as hormone-replacement therapies, surgeries, electrolysis, and affirming mental health support, should be explicitly named by companies when outlining health benefits, especially to prospective and new employees. Other benefits should extend to family outside the traditional definition in order to better support LGBTQ+ relationships.

Call for official demographic data: Most countries do not currently collect official data on the number of LGBTQ+ people in the STEM workforce, which many advocates believe is the biggest hurdle facing sexual and gender minorities in STEM careers and degree fields.³⁶ Without official data, national governments cannot provide grant money, educational support, and other resources sorely needed to help remedy issues of LGBTQ+ underrepresentation and inequality in STEM.

In many countries, STEM agencies are often overseen by the federal government—in the U.S., for example, such agencies include the NSF, NASA, EPA, NOAA, and other associations and foundations that collectively employ thousands of STEM workers from around the world. Securing official federal demographic data may help these agencies take additional steps to promote and retain LGBTQ+ people and address existing issues of inequity and discrimination.

36. Jon Freeman, “Measuring and resolving LGBTQ disparities in STEM,” *Policy Insights from the Behavioral and Brain Sciences*, vol. 7, issue 2, October 1, 2020, <https://journals.sagepub.com/doi/abs/10.1177/2372732220943232>



Increase LGBTQ+ mentorship programs: Research shows that when LGBTQ+ people are paired with LGBTQ+ mentors in STEM, they feel more connected at school or work and demonstrate a higher skill level.³⁷ While any kind of mentorship is better than no mentorship, programs created and spearheaded by companies and universities may be the most effective, according to experts.³⁸ Many nonprofit associations and groups also provide mentorship programs tailored to the needs of LGBTQ+ STEM employees and students, including Out in Science, Technology, Engineering and Mathematics (oSTEM), MentorNet, Out in Tech, LGBT Tech's PATHS program, and the National Organization of Gay and Lesbian Scientists and Technical Professionals, Inc. (NOGLSTP).

Boost the visibility of LGBTQ+ people in STEM careers: Where it is safe and possible to do so, being able to be open about one's sexual orientation and gender identity increases a sense of belonging and security for LGBTQ+ people in STEM, according to research.³⁹ Grassroots organizations like 500 Queer Scientists, a visibility campaign for LGBTQ+ people in STEM, and Pride in STEM, a charity that organizes international events to help celebrate LGBTQ+ people in STEM, have helped increase visibility on a macroscale. Researchers say social media platforms like Twitter can also be useful in encouraging LGBTQ+ employees in STEM to connect with and support one another.⁴⁰

Panelists who participated in the Aspen Institute and RCIScience roundtable discussed more specific ways companies can increase LGBTQ+ visibility in the workplace, like encouraging pronouns on work badges and email signatures. Doing so, several panelists noted, boosts awareness of gender identity and can encourage LGBTQ+ employees to come out without having to "say" anything.

37. Allison Mattheis, Rochelle Diamond, and Mary Fernandez, "Mentoring the whole STEM person: Advancing LGBTQ+ students and professionals," *Computer Research News*, vol. 28, issue 1, January 2016, <https://cra.org/crn/2016/01/mentoring-the-whole-stem-person-advancing-lgbtq-students-and-professionals/>

38. "Exploring the mutual benefits of mentoring in the workplace," University of Massachusetts Global, <https://www.umassglobal.edu/news-and-events/blog/benefits-of-mentoring-in-the-workplace>

39. Matthew C. Sinton et al, "Increasing the visibility of LGBTQ+ researchers in STEM," *The Lancet*, vol. 397, issue 10269, December 16, 2020, [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)32626-X](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)32626-X)

40. Joseph D. Unsay, "LGBTQ+ in STEM: Visibility and Beyond," *Chemistry Europe*, June 26, 2020, <https://chemistry-europe.onlinelibrary.wiley.com/doi/full/10.1002/chem.202002474>

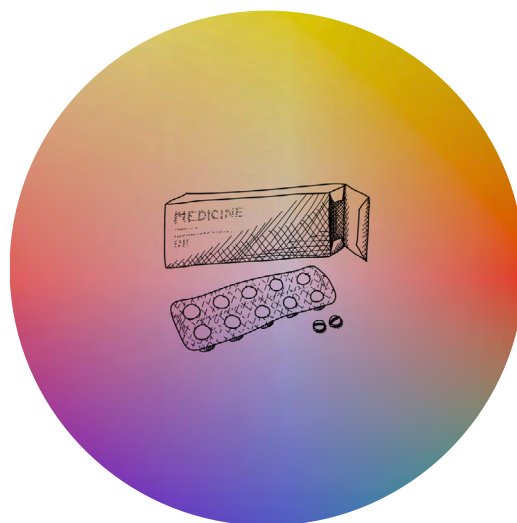


Train leadership on LGBTQ+ inclusion: Several panelists noted the need to educate executives, supervisors, professors, and other STEM leaders on LGBTQ+ issues in order to foster a more tolerant, supportive environment and reduce the possibility of discrimination and inequality for LGBTQ+ employees, faculty, and students. The adage “the fish stinks from the head” is often used to describe how an environment’s culture is created by its leadership. Training executives and educators can be instrumental to shifting a culture to be more safe, inclusive, and supportive for LGBTQ+ employees, faculty, and students. When relevant to a particular sector, leaders of organizations should be educated on the challenges trans or genderqueer scientists face in obtaining security clearances.

Create a safe space for LGBTQ+ employees to meet and socialize: Dedicating a safe space for LGBTQ+ people to meet one another, share ideas, and socialize can increase feelings of support, inclusivity, and community among employees and students. One panelist said that having a shared space for LGBTQ+ employees to meet and at least get to know one another can reduce feelings of isolation and better build a community within a community. Employee Resource Groups (ERGs), or groups of employees who band together over shared interests, can be beneficial, too, not only to facilitate community-building but also to help establish a formal channel of communication between marginalized groups of employees and the institution. ERGs can also help show representation of certain groups, which in turn can create more power, especially in institutions with a lack of concrete demographic data on LGBTQ+ people. Combining an ERG’s visibility with a union’s influence can go a long way toward keeping an institution in check.

Recognize and celebrate LGBTQ+ employees: November 18 is international LGBTQ+ STEM Day which was established by the U.K.-based charity Pride in STEM to boost visibility and support for LGBTQ+ people in STEM careers and education.⁴¹ Organizations can help increase inclusion by recognizing LGBTQ+ STEM Day on company calendars, in email, and with meaning (not “pinkwashing”) events aimed at all employees. Employers and universities can celebrate Pride Month, typically in June, and International Day against Homophobia, Biphobia, and Transphobia, held annually on May 17.

41. “LGBTQ+ STEM Day Events,” Pride in STEM, accessed June 1, 2023, <https://prideinstem.org/lgbtstemday/lgbtq-stem-day-events/>



Encourage accountability among LGBTQ+ people in STEM: One panelist said that advancing LGBTQ+ people in STEM requires accountability and that scientists already in the field should choose companies, projects, and educational institutions that promote rather than alienate sexual and gender minorities. According to the panelist, scientists hold a certain amount of power in society and can help steer the kinds of technology, medical advances, and other scientific breakthroughs that come to bear. In short, making sure that science is LGBTQ+-friendly is in part responsibility of all scientists with power to effect change for marginalized communities. Those who identify as LGBTQ+—and have power and capacity—need to “hold the door open” when they can.

Emphasize gender-affirming language and spaces: A simple way to increase safety, tolerance, and inclusivity for LGBTQ+ people in STEM is to ensure executives, employees, and educators use gender-neutral language like “humankind” instead of “mankind” and the pronoun “they” instead of “she” or “he” where a gender is unconfirmed. Companies and universities can also encourage inclusivity by providing gender-neutral bathroom options. Staff should respect and not assume anyone’s preferred pronouns or gender.

To summarize and conclude:

- 1) **We need robust data.** Data drives funding, policy change, and action from the top.
- 2) Collecting this data is complicated and nuanced. While we won’t have it anytime soon, there are plenty of **actionable steps to be taken** in the meantime that can support the LGBTQ+ STEM community.
- 3) We can intentionally **build inclusive, intersectional spaces and policies that support LGBTQ+ participation and retention in STEM.**

While these conclusions may not be revelatory to the LGBTQ+ community, we and the roundtable participants hope that those in power—both inside and outside of this community—will take action because, ultimately, inclusive spaces and policies will benefit us all.



Recommended Readings

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Jon Freeman, “**To fix LGBTQ+ disparities in science, we need the data**,” *Nature*, vol. 612, December 8, 2022, p. 191, <https://www.nature.com/articles/d41586-022-04331-x>

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Alice Motion, “**Pride in science**,” *Chemistry World*, November 11, 2021, <https://www.chemistryworld.com/opinion/pride-in-science/4014647.article>

Katherine Bourzac et al, “**LGBTQ+ chemists you should know about**,” *Chemical & Engineering News*, June 7, 2021, <https://cen.acs.org/people/lgbtq-scientist-chemist-history/99/web/2021/06>

Committee on National Statistics, “**Measuring Sex, Gender Identity, and Sexual Orientation**,” National Academies Press, 2022, <https://nap.nationalacademies.org/catalog/26424/measuring-sex-gender-identity-and-sexual-orientation>

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LGBTQ+ IN STEM



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