

Diversity at Synberc: Shaping the field of synthetic biology through inclusion

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Diversity of people and thought is a part of Synberc's fabric and a key to our research success. The ambitious aims of synthetic biology can only be realized by a research community that is as diverse as the communities it endeavors to benefit.

Diversity of Thought

Synthetic biology is an inherently interdisciplinary field that relies on the combined efforts of bioengineers, chemists, computer scientists and a host of other specialists. For the past 9 years, Synberc has provided a community that allows for collaboration and discussion between some of the top scientists and engineers in the country. Since many of our efforts are targeted towards affecting the global community, our community also includes bioethicists, political scientists, and others who explore how Synberc innovations impact the environment, health, and what policy changes are necessary for a safe and secure future. Due to these cross collaborative efforts in synthetic biology, the concept of inclusion naturally seeps into the entire framework of Synberc.

Diversity of People

Synthetic biology aims toward positive change in the lives of our global community and benefiting society through the design of genetic parts to allow for more control over systems and the creation of more affordable and more sustainable methods of synthesizing drugs. As highlighted in a recent [Scientific American](#) article, social diversity has been found to positively affect both creativity and innovation, two core foundational aspects of Synberc. To remain at the forefront of groundbreaking synthetic biology research, Synberc strives to reflect the diversity of our community. We must extend beyond just having a diverse array of STEM practitioners and include people of all identities. Presently our community is relatively diverse across gender and racial demographics: our faculty is 33.3% women and 18.2% underrepresented minorities (URM), our doctoral student population is 50.3% women and 8.1% URMs, and our postdocs are 42.2% women. We continually strive to increase the social diversity of our community and the STEM community at large and to ensure that we create a climate of inclusion across Synberc.

What do we mean when we say 'diversity'?

A major issue in STEM is that there is a severe lack of undergraduates that begin with a STEM major that successfully complete their degree in STEM. In fact, in the U.S only 40% of undergraduates who declare a STEM major at the beginning of their college career complete a STEM degree. Moreover, when considering the demographics of this small pool of STEM graduates, it is clear that there are large sections of the American population that have particularly high attrition, including historically underrepresented minorities such as American Indians, Alaska Natives, Blacks/African Americans, Hispanics/Latinos, Native Hawaiians/Pacific Islanders, and women. Increasing the participation of these groups in STEM is a focus of Synberc as well as the NSF and other STEM-focused government agencies. In addition to these groups, Synberc is also interested in increasing the participation of people from all socioeconomic groups, as low socioeconomic levels are often a greater indicator

that students are [less likely to attend college](#) and often correlates with students that are the first generation to attend college.

As we consider ways to increase diversity within Synberc and the synthetic biology community at large, it is important to consider the sociological issues that lead to exclusion or bias. One such issue is implicit bias. Implicit bias is an unconscious attitude, either positive or negative, that a person holds about a group, person, or thing. In STEM, implicit bias is often an unconscious negative attitude towards women or URMs. This was well exhibited in a [study](#) by Corinne Moss-Racusin where professors were given resumes for laboratory manager positions from a male and a female with equal qualifications. Regardless of gender of the professor, the male was selected for the position significantly more and also, more frequently offered a higher salary. This may be a reflection of the fact that STEM has been historically dominated by the male gender and that continues to influence the unconscious attitudes of all members in the STEM community.

Another hurdle is "stereotype threat", a term coined in 1995 by Claude Steele and Joshua Aronson. [Steele and Aronson](#) found that when culturally-shared negative stereotypes were made relevant to a task, they negatively affected the performance of those who belong to the stereotyped group. They studied the performance of African American and white college students and compared their performance on a standardized exam in and out of threat conditions. When race was taken out of the picture, the two groups performed similarly and in some instances, African Americans performed better than whites. In the STEM community, women and URMs are often singled out and feel like an "impostor." By feeding into that stereotype, these groups run the risk of underperforming due to stereotype threat.

Beyond Demographics

As mentioned above, Synberc is dedicated to increasing diversity within the center, the synthetic biology field, and throughout STEM fields. To achieve this goal, Synberc has adopted a continuously advancing diversity plan that consists of a variety of programs. The goal of these programs is to introduce URMs and students from low-income families to research and synthetic biology via education and outreach efforts. Since Synberc's founding, we have served hundreds of students from many different backgrounds. More information about these programs can be found [here](#). In addition to educational programming, Synberc has created a list of women in synthetic biology that serves as a resource for conference organizers and attendees who would like to see more gender sequitur at the podium.

Creating a climate of inclusion in Synberc ensures that the students that move through the pipeline enter into a welcoming environment, thereby promoting retention. Since the Synberc community includes current and future leaders in academia and industry, we use our bi-yearly retreats as a platform to introduce the Synberc community to some of the issues that tend to exclude certain groups, such as women or URMs, out of STEM. These diversity sessions have included an informational session about implicit bias led by Boalt Law Professor Victoria Plaut and a session about gender bias in academia led by Nancy Hopkins. Building upon these sessions Synberc's diversity team has organized a one-day workshop focused on the issues that women often face in

STEM titled "Expanding Potential: A workshop on navigating the hurdles faced by women in STEM." This workshop concentrates on two major goals: 1) addressing the issues that women face in the workplace and 2) promoting career development. By opening the dialogue, Synberc hopes to begin an ongoing conversation that will result in change for women in STEM.

As we look toward the future of Synberc and the synthetic biology field, it is our hope that we are able to continue to serve as a conduit to increase diversity and inclusion in STEM.