

Strength

in Community



By the *Caltech* magazine staff
Illustrations by Aurélia Durand

Scientists and engineers share their experiences and perspectives on

how to create a more inclusive Caltech

There is a phenomenon that occurs throughout the natural world, known scientifically and philosophically as emergence, in which individual entities (such as individual brain cells) come together to create a whole (such as a conscious human being) that is greater than the sum of its parts.

That concept is one that Caltech scientists and engineers embrace in their work, recognizing that scientific advances demand collaboration among people with diverse points of view. But this idea is equally important beyond the lab, in the Caltech community at large. The idea, of course, is that the more diverse and inclusive the individuals are who come to the Institute, the more exceptional the Caltech community will become.

“It is only when all scholars share fully in the privileges of the academy that we will realize fully the potential of science and engineering to transform society for the better,” President Thomas F. Rosenbaum wrote in his letter marking the end of the 2019-2020 academic year. “Each and every person brings their own story that must be honored and valued as a contributing member of the Caltech community.”

Creating that community, however, requires intentionality and efforts to overcome the historical social, political, economic, and sometimes physical barriers in the way of many individuals whose racial, gender, socioeconomic, and other characteristics are not among those of the majority. The difficult truth is that the scientific community has never and still does not reflect the society in which it operates.

As just one example: of the 919 individuals who received Nobel Prizes between 1901 and 2019, only 53 (not quite 6 percent) have been women. And the Nobel Prizes in Physics, Chemistry, and Physiology or Medicine have never, at the time of this writing, been awarded to a Black American scientist.

The Institute, in recognition of these inequities, has accelerated efforts to foster a more welcoming community, one that offers access and support to individuals whose diverse experiences and perspectives enable Caltech to advance its stated mission to “investigate the most challenging, fundamental problems in science and technology in a singularly collegial, interdisciplinary atmosphere, while educating outstanding students to become creative members of society.”

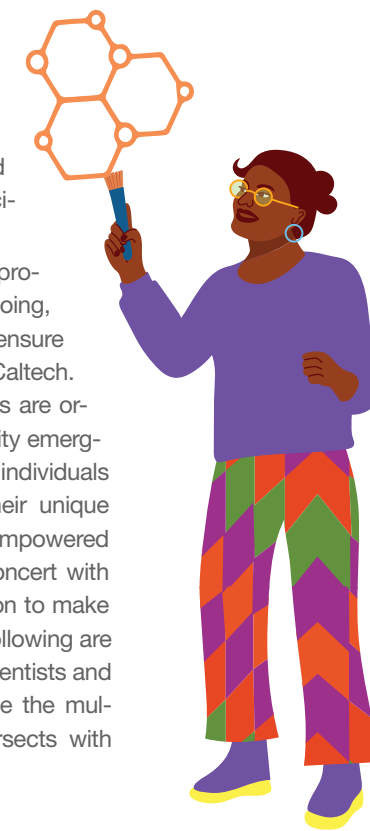
Fifty years ago, the modern-day Caltech first admitted women to its undergraduate program; today, women make up 45.3 percent of the undergraduate student body, and 31.5 percent of graduate students. The Institute has also taken seriously its charge to bring to campus the best and brightest individuals from all backgrounds, with a steady increase in the number of students who belong to one or more underrepresented communities: African American / Black, Hispanic / Latin(x), Native Hawaiian, Pacific Islander, Indigenous People / Native American /

First Nation. At the undergraduate level, in particular, the admissions office has implemented a holistic review process that considers in its decisions an individual’s experience, interests, and ability in its decisions, and that prioritizes outreach efforts that expand awareness to underrepresented communities. These efforts have ultimately expanded representation of students in the applicant pool and fundamentally changed the makeup of Caltech’s incoming classes; between 2010 and 2020, representation of undergraduate students who identified with one or more underrepresented groups increased from 9 percent to 22.7 percent.

At the graduate level, admissions offers are made by individual options; although Institute leaders recognize that the pace of progress must accelerate, this distributed system creates unique challenges. In the last decade, the percentage of graduate students from underrepresented groups hovered around 6 percent (ranging from 6.2 percent to 6.5 percent), with dips in between. To explore Caltech’s opportunities for growth in recruitment and identify practices that better leverage the Institute’s strengths, President Rosenbaum in September constituted a new campus advisory committee to examine existing recruitment efforts and issue recommendations for moving forward.

The goal of these efforts, according to Chief Diversity Officer, English Professor, and Vice Provost Cindy Weinstein, is to create a community where everyone feels like they belong and can reach their full potential as scientists and as human beings.

Through multiple centers and programs, some new and some ongoing, the Institute is making efforts to ensure that diverse individuals thrive at Caltech. The manner in which these efforts are organized recognizes that community emerges when creative and curious individuals have an opportunity to bring their unique experiences together, and are empowered to share ideas and to work in concert with one another and the administration to make sure their voices are heard. The following are stories of some of the Institute scientists and engineers whose efforts celebrate the multifaceted ways that identity intersects with STEM and with Caltech.



Krystal Vasquez

Chemistry Graduate Student
Co-Founder, Caltech Disability Coalition

Chemistry for a cleaner planet

“As someone who has grown up in Southern California, it’s hard not to notice the poor air quality. I was always pretty curious why the mountains in the distance seemed to disappear some days. When I happened to take a class on the subject matter and learned that it was all a result of chemistry (my major in undergrad), I was fascinated and was told Caltech is a great place to go if I wanted to learn more. Now, my work focuses on how local and regional air quality is affected when urban pollution meets local biogenic (i.e., natural) emissions.”

Disability is diversity

“I became chronically ill in the middle of grad school. Because it was such a lonely and isolating experience, I founded the Caltech Disability Coalition with the help of [fellow graduate student] Newton Nguyen (MS ’19) so that disabled students, staff, and faculty at Caltech have a community to turn to. The Caltech Disability Coalition is also a space where allies can begin to learn about different disability issues and how to best advocate for their disabled colleagues. After all, disability is more than individual issues that certain students have to deal with; nondisabled people can play a huge role in breaking down the barriers that are keeping disability underrepresented in STEM. For example, though I don’t usually need captions, I make sure to have captions in my presentations and have asked seminar series around campus to consider including captions, too. Allies can also make note of places in their labs or around campus that are inaccessible to people with mobility and sensory disabilities, and inform Caltech Facilities so that they can resolve these issues. Even though over 25 percent of the U.S. population is disabled, only 10 percent of scientists are disabled. Fewer still obtain PhDs in science-related fields. We need a wide array of voices to proactively make spaces accessible so that disabled people feel welcome and supported at Caltech.”



Inclusion and Support

A variety of centers and programs at Caltech work to provide access and support to individuals with diverse experiences and perspectives as a way to foster community. While their focus varies, the overarching goal of these groups, many of which are student run, is to allow the broadest possible range of individuals to thrive at the Institute. The Caltech Center for Inclusion and Diversity (CCID; diversity.caltech.edu) serves as an umbrella organization for many of these affinity groups and provides education, advocacy, and allyship to create a “community

of equity and inclusive excellence,” says CCID senior director Hanna Song. The CCID offers access to information and resources as well as workshops and trainings, and provides inclusive spaces and skill-building opportunities for all members of the community to engage with issues related to their individual identities. To learn more about some of these individual initiatives, visit magazine.caltech.edu/post/access.



Isha Chakraborty

Sophomore Majoring in Computer Science
Event Coordinator, Society of Women Engineers; Title IX Advocate

Supporting women in computing

“I remember being in a Java programming class early in high school, struggling a little with some classwork, when another student commented, ‘This is why girls shouldn’t code.’ This kind of ignorant statement was really disappointing and frustrating to me. But, in a way, it kickstarted my passion for inclusion of women in computer science. I joined Technovation Girls Challenge, a global competition for app development, which is for anyone who identifies as a woman and is geared toward solving world problems. I ended up mentoring a team that built an app about interventional methods for autism, and the team ended up winning the national competition and coming in third overall in the world.

“In the future, I’m hoping to use my computer science skills to help kids with special needs. This interest has been lifelong for me. When I was volunteering with special needs kids in elementary schools, I was surprised that there was no equivalent of Google Translate for American Sign Language. I’m hoping I can be the one to create that. Computer science is about more than just programming; it’s about what you can do for the community and for humanity.”

Namita Sarraf

Bioengineering Graduate Student
Co-Founder, Women in BBE

On healthy social relationships

“I really believe that the more fulfilled you are, the better work you do in every aspect of your life: you’re a better friend, a better scientist, you come up with better ideas. The best way to achieve fulfillment is to have solid supportive relationships. Fostering a healthy social environment can sometimes fall to the wayside at Caltech because people are so focused on lab work. I’m trying to promote people building social relationships and fostering a sense of community beyond one’s specific lab. A lot of my good research ideas and collaborations come out of hanging out and chatting about work with someone who is in a totally different field. So I’m really passionate about creating spaces for social hours for grad students.”

Telling women’s stories

“I started Women in BBE along with [fellow graduate students] Acacia Hori and Jess Griffiths because there are a lot of implicit barriers to women being successful, even in today’s day and age where we’ve made the most progress we’ve ever had. Having a community of women to discuss these issues and validate one another is really important. When women visit campus and see a strong community of women, it makes them want to come here. I’m also collaborating with other women across campus [Stacy Laroche (MS ’18) and Clare Singer (MS ’20), Women in GPS; and Jacqueline Tawney (MS ’20), Women in GALCIT] to host an event called Herstories: Lives and Lessons from Caltech Scientists, where female faculty talk about their professional and personal challenges and successes. Each of them has really incredible stories. We’re hoping to have it in person once COVID is over.”

Far left: Krystal Vasquez. Left: Isha Chakraborty. Above: Namita Sarraf with co-founders of the Women in BBE group, Acacia Hori and Jess Griffiths.

David Cagan

Chemistry Graduate Student
Co-President, Diversity in Chemistry Initiative

Discovering a love for chemistry

"I started at Pasadena City College as an art major. But after I took a required chemistry course, I remember thinking that chemistry was the most beautiful thing I'd ever seen. The deeper I dove into chemistry, the more I found it was a different kind of art itself, a new perspective for looking at the world. Science is such a creative thing, just like art. If you're going to answer the toughest questions in society today, you have to be open to different mindsets.

"I failed my first general chemistry exam. In moments like those, I questioned whether I was good enough, whether I was right for science, and whether science was right for me. But the people and mentors I've had in my life have pushed me to keep going; plus I love the field, so I push myself. I fully empathize with students who struggle, and I want people to believe in themselves and their capabilities. Even if they don't end up pursuing science, there is something to be learned. I ended up getting an award for organic chemistry. I'm very grateful to everyone who has supported and encouraged me."

Encouraging prospective scientists

"I fell in love with Caltech and the campus first through the WAVE program. Now, along with my fellow Diversity in Chemistry co-president Mary Arrastia, I'm thinking about ways to help underrepresented students build confidence in coming to Caltech and get them excited about science. Many programs like WAVE require you to have prior research experience, but how do you get that initial experience, especially if you're from an underprivileged background? My ultimate goal is to develop a one-month lab training workshop for local community college students, where they can build lab skills, learn techniques, and build their résumés as a kind of pipeline into WAVE."

Livia Hecke Morais

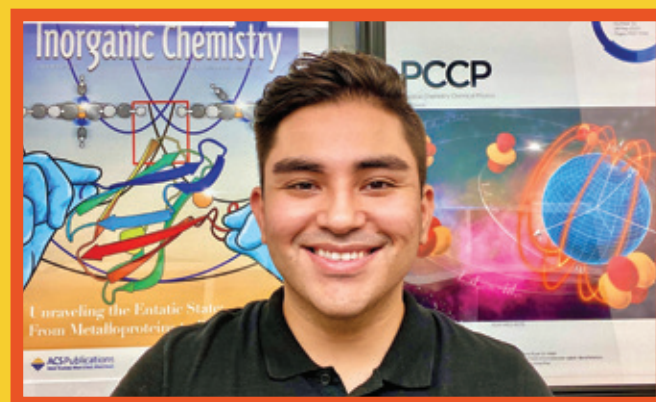
Postdoctoral Scholar
Founder, Diversity Committee of the Caltech Postdoc Association

A role model at home

"Support for my pursuit of science really started in utero, as my mom was getting her PhD in engineering in Brazil when she was pregnant with me. I was really privileged to have a role model at home. I wouldn't have made it this far if not for my mom's encouragement; she gave me freedom to try different things and stimulated my creativity. Science is a way that I express and think creatively."

Creating space for LGBTQA+ postdocs

"Postdocs are at a challenging crossroads, which has become a kind of bottleneck for women and other underrepresented people to reach the faculty level. As a postdoc at Caltech, I created the diversity committee of the CPA (Caltech Postdoc Association). One of the



Above, top: David Cagan with journal artwork he designed and created. Above, bottom: Livia Hecke Morais with her mother at her PhD graduation. Right, top: Rebekah Loving (left, in blue top) with her family in Hawaii. Right, bottom: Bil Clemons.

things that I care a lot about is to bring awareness to the issues that LGBTQA+ community face with their identities in the workspace. I have invested time to foster a sense of belonging for LGBTQA+ postdocs and students to our workspace and community at Caltech by organizing social and professional events. It's our goal to understand the needs of the LGBTQA+ postdoc community and help postdocs become comfortable with diverse identities in the workspace."

Rebekah Loving

Biology Graduate Student
Member, Black Scientists and Engineers of Caltech

Finding a passion for human health

"There are certain things, health-wise, that are really underserved in the broader Oceania community. As a Native Hawaiian and Pacific Islander, seeing disease and physical impairments affect my family members and friends, I was really influenced to work at the intersection of health and biology.

"I initially applied to undergrad as a nursing major because I thought that would be the best way to give back to my community. But I realized that I really enjoyed the computational and mathematical sides of things, and I could use this to answer questions in systems biology, which would allow me to aid in decreasing health disparities facing



Pacific Islanders. When I first came to Caltech as part of the WAVE program, I worked with Lior Pachter [Bren Professor of Computational Biology and Computing and Mathematical Sciences] on a method for combining single cell and bulk RNA sequencing analyses that could be applied to cancer research. After that, I knew I wanted to come back to Caltech for graduate school."

Building home away from home

"My adviser and my fellow students both in and out of the WAVE program made me feel like I belonged. Even though I wasn't the same as anyone else, I felt like Caltech was a place where nobody needed to be the same. It's the first place I've felt at home outside of my family. Caltech provided an intellectual and personal home, and I searched and found part of my Christian family near Caltech as well. Through involvement with Caltech, my Christian family, and my community, I was able to build a home while at Caltech. In Oceania, family ties are really important, culturally. I chose Caltech because I knew that my adviser would be supportive of how important family is to me."

Bil Clemons

Professor of Biochemistry
Chair, President's Diversity Council

An early love for the scientific process

"I don't remember ever not being a scientist. I was always curious and wanting to know how things worked, to take things apart and understand. I didn't have any scientific role models growing up, but a teacher in elementary school encouraged me to participate in a marine biology program at the local aquarium in Waikiki. That was a very transformative experience that set me on a lifelong love of marine biology."

On being Black in academia

"I never had a Black lecturer or professor during my undergraduate and graduate education. It's crazy that I am probably one of the only Black faculty members my students will have. But we're in a very active moment right now. Caltech is asking itself: Where are we now? Where are we going? How do we enable, engage, and get resources to accomplish our diversity, equity, and inclusion goals?

"I would love for Caltech to be able to endow our DEI [Diversity, Equity, and Inclusion] efforts and provide administrative structure to accomplish concrete goals of building resources and programs. We've demonstrated our commitment to these goals with a plan, but our next priority is to get the financial resources to make the plan a reality. Caltech is already a beacon for academics and research, and we want to be a beacon for inclusivity as well."