



Building Community

The First-Year Success Research Institute aims to forge long-lasting bonds.

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Heading to college in a country more than 6,000 miles from home is a daunting journey, as second-year Caltech undergraduate Adelynn Tang can tell you. Tang enjoyed studying math and science during high school in Shanghai but knew that navigating a new language, culture, and environment while also adjusting to American methods of teaching meant she would need a collaborative learning culture, a feature she focused on when deciding on a university. “That’s one of the reasons why I thought Caltech was a good fit,” says Tang, who is studying physics. “I really like being able to collaborate with people on problem sets. That’s a little bit different from what my high school was like.”

When she learned about Caltech’s First-Year Success Research Institute (FSRI), which begins prior to the fall term, Tang felt encouraged and excited by the opportunity. “I thought FSRI would also be a good way to get started with things early, to have a little sense of what the Caltech community is like, and to get in touch with people,” she says.

FSRI is an orientation and academic-support program organized by the Caltech Center for Inclusion and Diversity (CCID). The program is designed to introduce incoming first-year students to Caltech’s research and math curriculum, culture and campus life, and academic and student support services in a collaborative environment that allows students to develop lasting relationships with peers and colleagues.

At no cost to attendees, FSRI provides participants with a summer research experience under the mentorship and guidance of a Caltech faculty member; computing, math, and writing courses during the summer; and leadership, research, and academic skill-building workshops. Additionally, cohort-building activities, which are central to the students’ continued success throughout their time at Caltech, include a service-learning project, group field trips and excursions, and opportunities to build relationships with all Caltech’s undergraduate students, as well as with graduate students, postdocs, faculty, and staff.

Thanks to the longstanding support of the 27 Foundation and a 2021 gift from the Gordon and Betty Moore Foundation (see page 34), FSRI has welcomed 52 students each of the past two years, up from 30 in 2021. The goal of

Incoming first-year undergraduates make moon lamps at an FSRI gathering on campus in July 2023.

program organizers is to reach a total of 60 students every year. And, since last academic year, FSRI’s educational, research, and social engagement opportunities have been expanded beyond the summer to include programs and faculty- and peer-mentoring engagements throughout the entire first year. In addition, FSRI is now led by its first full-time director, Lizette Alvarez, who joined Caltech in spring 2023.

FSRI, formerly known as the Freshman Summer Research Institute, evolved out of the Summer Scholars Program launched in the 1970s by Lee Franke Browne, a former Caltech lecturer and director of secondary-school relations at the Institute. It served incoming students who were from underfunded school districts or had gaps in their science and math enrichment and instruction.

“People ask ‘What’s in a name?’ In this case, I think a lot,” says Lindsey Malcom-Piqueux (MS ’03), Caltech’s chief diversity officer and assistant vice president for diversity, equity, inclusion, and assessment. “The F became ‘first-year,’ which is more gender inclusive. And then the S became ‘success,’ and that’s important because instead of focusing on a finite period like summer, we

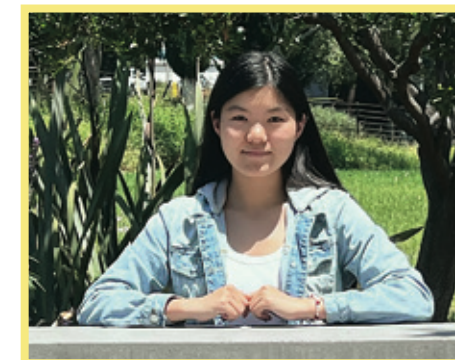
wanted to ensure these students know the program is committed to their success through support and community building throughout that crucial first year.”

Academics and research

A student’s FSRI experience begins online with a three-week computer-programming prep course. Then, when they arrive on campus in late July, the participants begin a six-week math course taught by lecturer Roberto Pelayo (PhD ’07). The math course prepares FSRI students for Caltech’s diagnostic exam in mathematics, a test that helps inform which core math courses students will be enrolled in their first year. “There are proof problems that we’ve never seen during high school,” Tang says. “So that was helpful, because [then] I already knew a little bit before we learned it in Math 1a.”

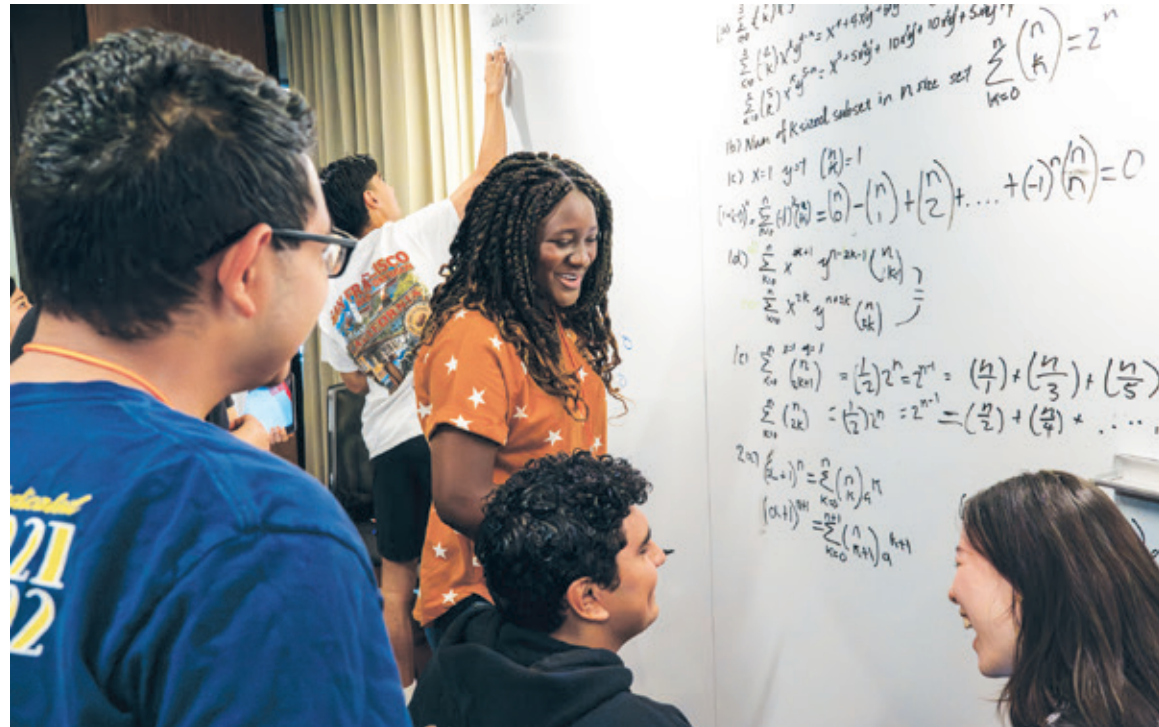
Adam Blank, teaching professor of computing and mathematical sciences and FSRI’s academic director, says the virtual component is designed to create a “stepladder” for students before they arrive at Caltech. “This staged process is very important,” Blank says. “It’s too much all at once for in person.”

Once on campus, the students also take a new three-week academic writing workshop through the Hixon Writing Center, and they are given a seven-week research



Second-year undergraduate Adelynn Tang

Left to right: Second-year undergraduate and FSRI math teaching assistant Mario Solis; first-year undergraduates and FSRI students Steven Romero-Ruiz, Angie Moussambote, Edvar Bautista Flores, and Gabo Zhang.



assignment with a Caltech faculty member, postdoctoral scholar, or graduate student. These research project leaders also serve as their students' FSRI academic mentors throughout the year, checking in with them weekly.

Beginning in 2023, FSRI students who perform well in the computer science class can request to skip Caltech's core CS 1 course. The goal of this is to provide students who have developed a strong foundation in programming the opportunity to progress in that field or explore other disciplines.

"My job is to get them excited about why programming might be useful to them, even if they don't want to be a computer scientist," Blank says. "In the course, they create code for things like a chemical equation balancer, an automatic differentiator, and a rocket simulation. We try to cover every field that computer science might be useful in."

After they complete the math and writing courses, students begin their research project under the guidance of their project leader. Some students choose to work alone, while others work in groups of two or three. The project is meant to align with their academic interests to the extent possible. After seven weeks, the students present their findings to the entire FSRI group. This early exposure to campus research is a defining characteristic of FSRI and an aspect that distinguishes it from other pre-college summer bridge programs. FSRI is designed to facilitate sustained engagement in research and to help incoming students better appreciate and feel equipped to access the extraordinary research opportunities that a Caltech education affords.



Second-year undergraduate Luke Alvidrez

Luke Alvidrez, a second-year mechanical engineering student who participated in FSRI in 2022–23, grew up in rural Jacksonville, Alabama, where there were just over 100 students in his high school graduating class.

"I wasn't able to do any research during my time in high school," Alvidrez says. "I was in an area that was very small, and I just couldn't find any of those opportunities. I knew Caltech was very research based, and I didn't want to fall behind. FSRI got me on track."

Blank led Alvidrez's and Tang's research projects, and mentored three other groups. Blank had students build a robot that could autonomously navigate a room to detect and retrieve certain objects while ignoring others. "Adelynn and I worked pretty closely," Alvidrez says, noting that he had been able to use some of the concepts taught in the FSRI coding class in this research. "We trained the object-recognition algorithm for all of Blank's

groups. I had fun trying to make code as short and safe as possible. I even tried doing the assignments in different programming languages."

Life outside the classroom

While summer academics and research are central to FSRI, the program also offers workshops and casual meetups each month throughout the summer and school year. The workshops, which broadly comprise the cohort-building component of FSRI, include Summer Undergraduate Research Fellowships (SURF) proposal training as well as seminars that explore social identity and

imposter phenomenon, database search strategies, and healthy sleep cycles, among many other topics. Casual events include board game nights, pottery painting, movie meetups, and trips to Disneyland and Knott's Berry Farm.

"We've been to OinkMoo, which is a bubble-tea place, and we went to get acai bowls. We're planning to go to Target and H Mart using our Metro pass," said Nicole Yang, a 2023 FSRI student who was painting moon lamps at an FSRI gathering on a hot afternoon in late July with three new friends: Hanna Park, Gabo Zhang, and Tuyako Khristoforova. Yang, who is from Hiram, Georgia, and her new friends met at the Discover Caltech event for admitted students in April. They stayed close over the summer and have grown closer since arriving on campus. "I'm so lucky," said Zhang, who is from Las Vegas. "I didn't have this kind of strong friendship bond in high school because there is so much competition."

The four women pointed out that FSRI faculty and staff have done a lot to help them feel at ease in their new surroundings, both academically and socially. "They're very generous," Khristoforova said. "Doing this stuff for us to have fun and de-stress, I think it's very nice. It's not just study, study, study."

"The classes are enjoyable, too," Zhang added. "They want you to work with other people rather than just listen to a long lecture, so even if you're struggling, you're struggling with other people. I find that comforting."

Tang and Alvidrez say the informal meetups and activities were their favorite aspects of FSRI, helping them

settle in at Caltech and feel they had found a welcoming community. In the process, they were able to connect not only with their classmates, but also with the faculty, post-docs, graduate students, and CCID staff. "It was really fun because they told us their perspective of Caltech, and it was really different from ours," Tang says. Interacting with faculty members in social environments also helped ease Alvidrez's fears that Caltech faculty members might not be approachable, particularly for a first-year undergrad. "It helped to humanize them," he says. "Yes, they're your professor, but they're just another person who you can talk to."

Brody Wyman, FSRI's program coordinator, says the social events and cohort-building activities are important steps in FSRI's effort to help students build a support structure and community that they can turn to in the classroom, lab, and beyond. In addition, the events help the staff to assess programming and, in so doing, to better serve students in the future. "Listening to them speak about their experience at Caltech, you really learn more about their personalities and where they're coming from, which helps us as we try to make their FSRI experience as personalized and impactful as possible," Wyman says. "I really value the chance to speak to students about their daily lives."

This type of healthy relationship building is what CCID director Tashiana Bryant-Myrick views as perhaps the most critical component of FSRI. "FSRI helps create a sense of belonging for students, which is a big part of CCID's goals of increasing cultural exchange and ensuring that you show up to Caltech as your authentic self,"

she says. Bryant-Myrick also highlighted FSRI's kin-group mentors—FSRI alums who make themselves available to current students for advice and guidance—as crucial to the program experience. "We want to create a family feel," she adds. "The kin-group mentors receive Red Door Marketplace gift cards to use during their meetings with their students, and they are invited to all the FSRI activities so that they can continue to build a rapport with the students. That has worked out well."

FSRI program director Alvarez joined Caltech in April 2023 and has been working with Wyman and the rest of FSRI's staff to ensure the programming is intentionally planned and structured to create an even more holistic experience going forward.

"We want to take care of the whole person and make sure we're not just adding to their plate," Alvarez says. "Sometimes that means they'll need academic support or professional development, but other times they might just need to relax. Sometimes they just need that space to be 18 or 19." 📍

First-year undergraduate and FSRI student Said M. Garcia performs research in Professor Changhuei Yang's biophotonics lab.

