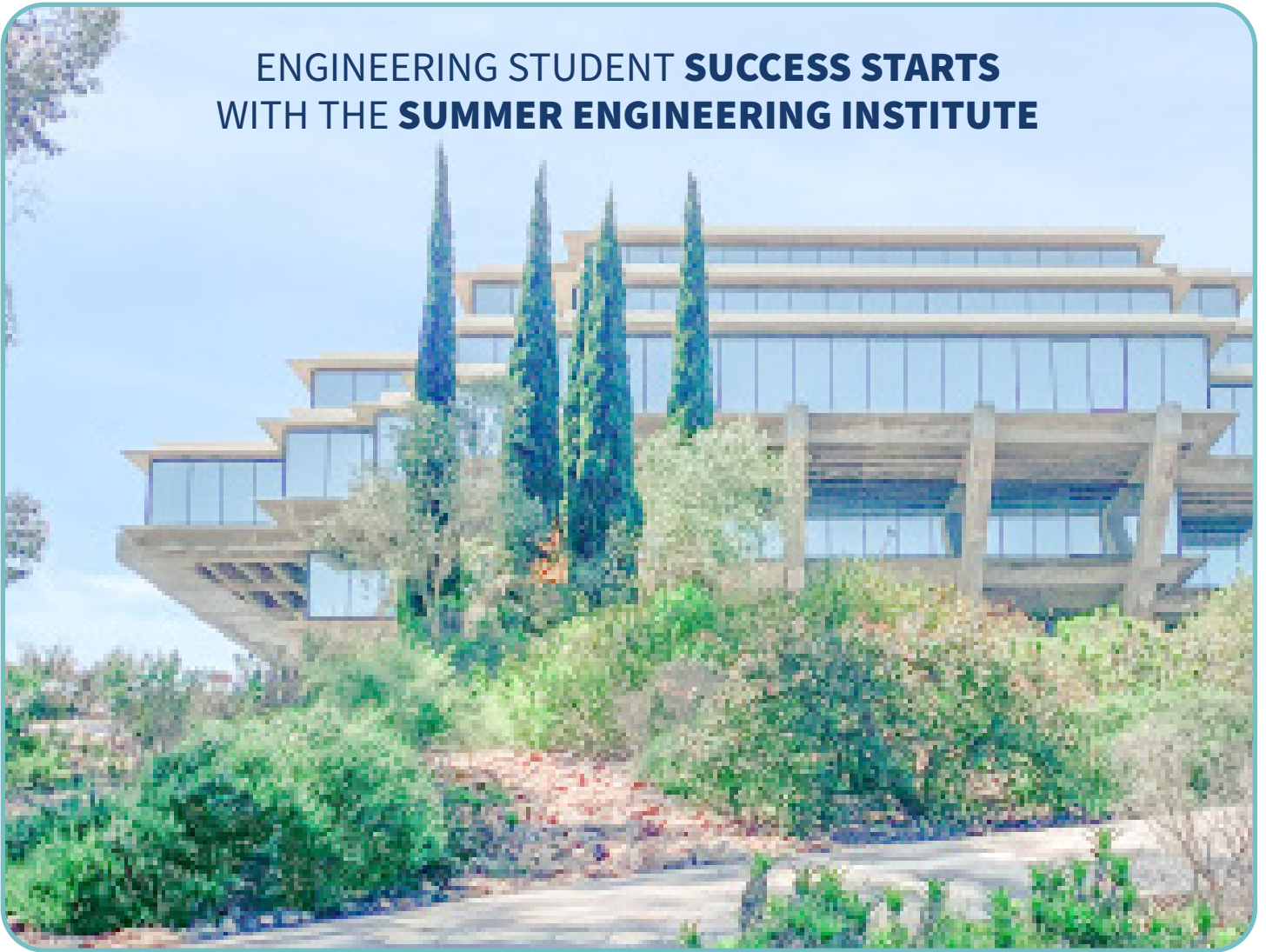


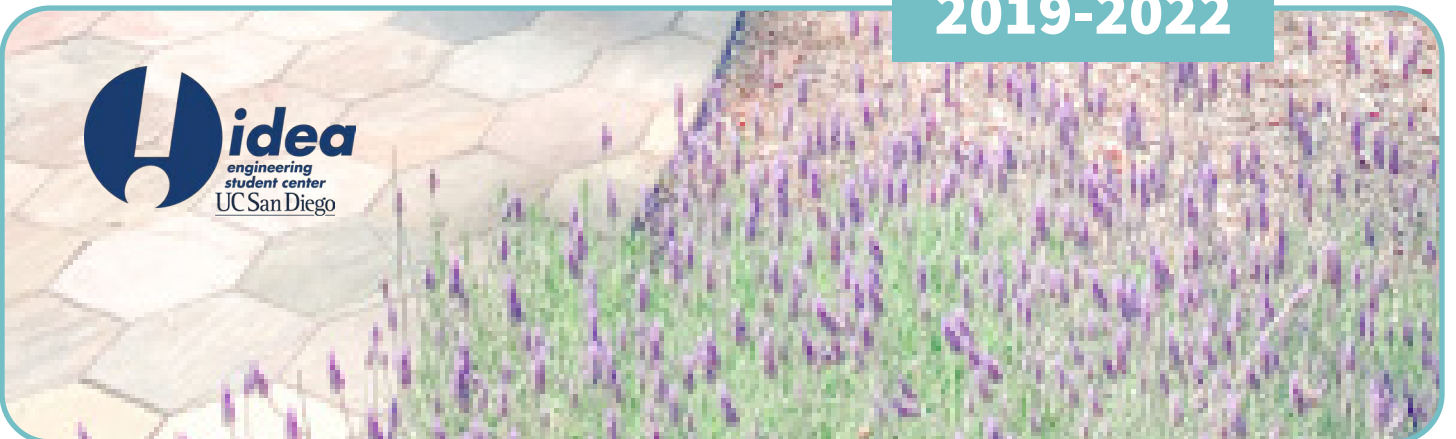
ENGINEERING STUDENT **SUCCESS STARTS**  
WITH THE **SUMMER ENGINEERING INSTITUTE**



— SUMMER ENGINEERING INSTITUTE —

# IMPACT REPORT

2019-2022





**INCOMING FIRST YEAR ENGINEERING STUDENTS HAVE THE OPPORTUNITY TO TAKE A 5-WEEK SUMMER SESSION BEFORE THEIR FIRST FALL QUARTER**

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**IN ADDITION TO ENROLLMENT IN A MAJOR COURSE AND IDEA CENTER COURSE, STUDENTS WILL PARTAKE IN COMMUNITY BUILDING ACTIVITIES AND ACADEMIC WORKSHOPS TO PREPARE THEM FOR THEIR FIRST YEAR OF COLLEGE AT UC SAN DIEGO**

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SUMMER ENGINEERING INSTITUTE

# PROGRAM OVERVIEW

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Since 2016, the [IDEA Engineering Student Center](#) (IDEA Center) has offered the [Summer Engineering Institute](#) (SEI) to almost 600 incoming engineering students. SEI is a 5-week, residential, credit-bearing summer transition program for incoming first year engineering students that aims to foster community and prepare students for the rigors of university study. SEI is an expansion of the IDEA Center's previous week-long Summer Prep orientation and community-building program (2011-2015). The goal of SEI is to help students prepare for their engineering coursework by taking a major course and developing study habits and attitudes (e.g., growth mindset) that are conducive to effective learning. The program also aims to build students' awareness of campus resources and develop a community of peers. To meet these goals, this 5-week program offers multiple weekly community building events, introductions to campus resources, and two summer courses to support academic success in engineering. Currently there is a direct cost to attending the program, approximately \$5,200 that covers tuition, housing, and a program fee. Students pay for attendance in the program out-of-pocket or with the support of financial aid and/or scholarships.

# PROGRAM PARTICIPATION

## 2019-2022

# 317

**STUDENTS SERVED FROM  
2019-2022**

**600** STUDENTS  
SERVED  
SINCE 2016

**During the summers of 2019, 2021, and 2022 a total 317 students enrolled in SEI. The 2019 and 2022 programs were offered in-person, and the 2021 program was offered remotely. During summer 2020 a week-long remote program was offered in lieu of the full SEI program. Students across all six engineering departments participated in the SEI program.**

### SEI ENROLLMENT

2019	2021	2022	TOTAL
117	114	86	317

### PARTICIPANTS BY ENGINEERING DEPARTMENT

DEPARTMENT	2019	2022	TOTAL
Bioengineering	8%	4%	8%
Computer Science & Engineering	22%	12%	26%
Electrical & Computer Engineering	23%	16%	19%
Mechanical & Aerospace Engineering	35%	42%	17%
Nano & Chemical Engineering	6%	16%	19%
Structural Engineering	6%	10%	11%



(i.e., submit an application but do not attend) tend to be first generation or from an underrepresented minority group. This hints at the multiple considerations that students face as they decide whether to attend the program, including personal obligations (e.g., work, family) and financial concerns that often



SEI is open to all incoming first year engineering students. The IDEA Center specializes in providing support to students from underserved and underrepresented backgrounds. SEI participants typically represent a slightly more diverse group than the overall Jacobs School of Engineering population. For example, a quarter to a third of participants are women or non-binary, a third are from underrepresented minority groups, a quarter to a third are the first person in their family to attend college, and a quarter to half are Pell Grant eligible students. We have found that the 30% of prospective participants who ultimately decide not to attend the program

disproportionately affect these communities. Due to impacts of the pandemic, we saw dips in attendance among first generation and Pell Grant eligible students during the remote 2021 program. We are working to continue equitable access to the program as we return to in-person programming.

## PARTICIPANT DEMOGRAPHICS

PARTICIPATION	2019		2021		2022	
	SEI	JSOE	SEI	JSOE	SEI	JSOE
Women/Non-binary Students	28%*	23%	43%*	31%	37%*	28%
Underrepresented Minorities (URM)	34%*	25%	30%*	27%	34%*	31%
First Generation College Students	38%*	33%	20%	31%	31%	37%
Pell Grant Eligible	46%*	33%	25%	31%	36%*	34%

**\*SEI representation is equal to or higher than the JSOE new undergraduate cohort**

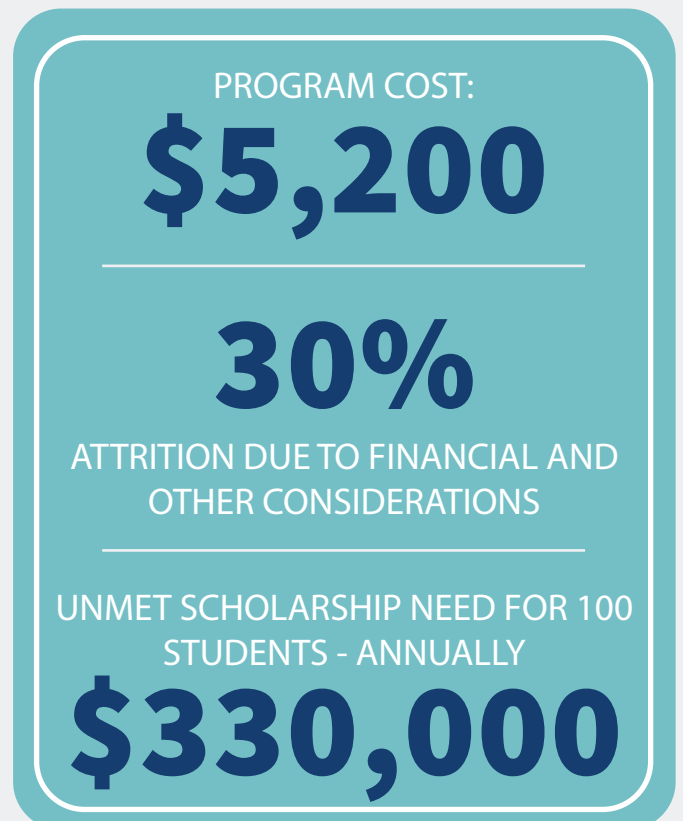
# SCHOLARSHIPS



A portion of SEI participants belong to the [IDEA Scholars](#) or ACES Scholars program. Participants in these programs are primarily from first generation, low-income, or underrepresented minority backgrounds. The IDEA Scholars program is ongoing while the final cohort of ACES Scholars began in 2020. More than 300 IDEA Scholars have benefited from SEI since the program began in 2016, including 39 in 2019, 35 in 2021, and 59 in 2022. An additional 67 ACES Scholars benefited from SEI from 2017-2019. Our scholars programs build on the foundation set by SEI and provide ongoing advising and academic enrichment to further support persistence and success in engineering. Both programs serve high numbers of first-generation and low-income students.

When applying for SEI, admitted engineering students can apply to the scholars program(s) and receive scholarships to attend SEI. The scholarships reduce the financial burden of attending the program. National Science Foundation grant funding provided scholarships for Pell Grant eligible students in the ACES Scholars program to attend the SEI program at no cost

(2016-2020). Beginning in 2022, seven Black Alumni Scholarship Fund (BASF) scholarship recipients attended the SEI program at no cost, and partnership with BASF will continue for future cohorts. Additionally, generous donations from corporate partners and endowments cover 20-30% of the tuition and housing cost for IDEA Scholars; In 2022, the IDEA Center awarded \$135,000+ through partial scholarships. There is an unmet need for additional scholarships that will allow more students to attend SEI at no cost. We hope to make the SEI program available to low-income students and IDEA Scholars at no cost. Doing so would require about \$330,000 in scholarships per year. To offer the program at no cost for 100 students would require a total of \$500,000 in scholarships per year.



# ASSESSMENT & IMPACT

Beginning in 2019, a pre-post survey was conducted each summer to investigate the impacts of SEI on students' short-term growth and to make program improvements. The survey asked about students' satisfaction on the workshop topics, academic experience, and social connection. Additionally, focus groups were conducted to gain detailed feedback. A follow-up survey was sent to the 2021 cohort at the end of their first year and to the 2022 cohort at the end of their first quarter (with an end-of-year survey planned). Additionally, the IDEA Center conducted a survey of the 2016-2019 SEI cohorts in 2021 to gain further insights on the short-term and lasting impacts of SEI.

## **IN A BROAD SURVEY OF EARLIER SEI COHORTS (2016-2019), THE TOP WAYS SEI PARTICIPANTS SAY THE PROGRAM HELPED THEM ARE THAT:**

- 1) SEI supported their successful transition to UC San Diego
- 2) SEI helped them navigate resources during their first year

We see further evidence and explanation of these impacts from our recent pre-post surveys.

## Build Community & Sense of Belonging

From the participants' perspective, community building is the most impactful part of SEI and has a lasting effect on their support and professional networks. Each summer, participants engage in 10 or more weekly large-group community building events and small-group activities with their residential hall suites to allow students to build connections with each other.



Even when offered remotely in 2021, 88% of participants developed relationships/friendships with students in their major and 75% had a strong network of people to support them at UC San Diego. In person, the community and networks built are even more extensive. For example in 2022, the development of friendships and networks has returned, and even surpassed, pre-pandemic rates. **In 2022, 96% of participants developed relationships/friendships with students in**

their major and 86% had a strong network of people to support them at UC San Diego. In a survey at the end of their first fall quarter, most of the 2022 cohort reached out to friends for support several times during the quarter, with all respondents saying that they reached out to friends at least a few times for support, information, or guidance.

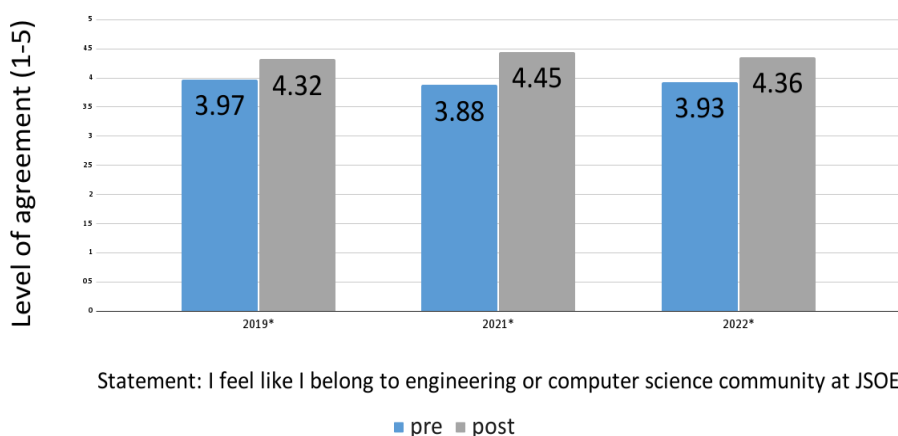
SEI alumni attest to the long-term impacts of SEI on their social and professional networks, which extend far beyond their first year through friendships, mentorship, and connections that open opportunities. In particular for IDEA Scholars and ACES Scholars, SEI plays an essential role in establishing a cohort of peer scholars that provides ongoing social support through academic challenges and navigating professional development opportunities such as undergraduate research and deciding whether to apply to graduate school. Among earlier cohorts (2016-2019), 95% of scholars said that SEI was the most impactful aspect of their scholar experience

because of the friendships and community they formed early on. Their SEI friendships helped them navigate and feel connected while they transitioned to UC San Diego, provided comfort and emotional support through stresses and challenges, and enabled them to form study groups (i.e., academic support).



**For each year of the pre-post survey, SEI significantly improved students' sense of belonging within the UC San Diego campus community, engineering or computer science community at the Jacobs School of Engineering, and a general community of peers**

Figure 1: Sense of Belonging Pre-to-post SEI Participation Change for Cohorts 2019-2022



**“SEI was where I formed the key friendships and relationships with people of similar major/interest. These people are still among my closest UCSD friends and have offered a lot of support throughout my academic and personal life.”**  
**—SEI Alumni**

**\*Significant difference pre-to-post, Wilcoxon Signed Rank,  $p < 0.05$**

# Prepare for Engineering Coursework

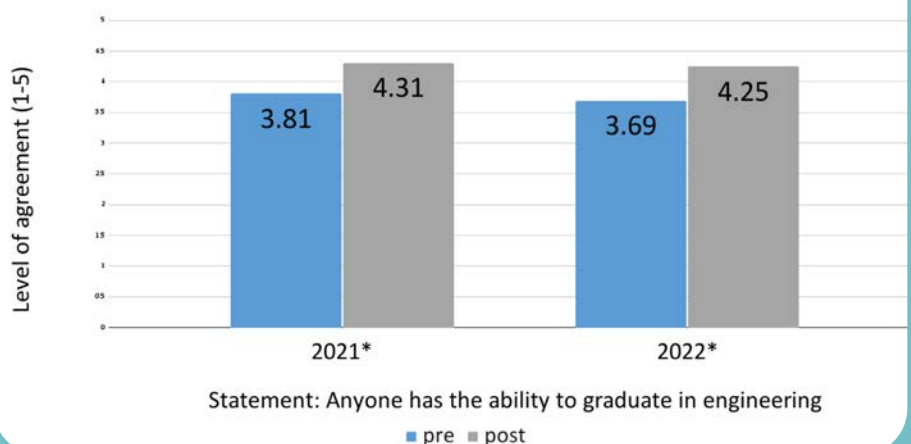
SEI participants enroll in two courses, one from their Engineering major and one from the IDEA Center. Enrolling in a 4-credit course from their Engineering major gives participants a head start on fulfilling major requirements. By taking an introductory course related to their major, students build a solid foundation for their future engineering path and learn to navigate academic resources such as office hours. Students also gain the chance to meet with their peers and form study groups before the fall quarter begins, which helps construct active learning habits.

All SEI participants also enroll in a 2-credit IDEA Center course. In 2019, participants took **ENG 10: Fundamentals of Engineering Applications**, where they were introduced to foundational math, programming, electronics, and design topics, which they applied in a hands-on group project. In 2021 and 2022, participants took **ENG 15: Engineer Your Success** where they developed individual plans for growing academic and personal skills to support their

success as engineering students. With the addition of Engineer Your Success in 2021 and 2022, participants showed significantly greater development of growth mindset, which is the belief that effort can improve outcomes. Relatedly, participants showed acceptance of the need to change their study strategies to be successful in college compared to the 2019 cohort. The Engineer Your Success course explicitly addresses these topics, and the significant change was true regardless of program format (remote in 2021 and in-person in 2022). According to a follow-up survey with the 2021 cohorts, **the growth mindset that participants developed during SEI persisted throughout their first year of college.** Through Engineer Your Success, students also generated awareness of the need to use new strategies to succeed in college, such as the importance of outside-of-class activities. These outcomes afforded by the Engineer Your Success course enhance the goals of SEI to support engineering students' academic success in their first year.

**“SEI provided me with friends that I encounter often in courses and allow me to work together. It was also a relief to be able to experience the same kinds of stress and struggles as another person and know that everyone else is going through it together.”**  
—SEI Alumni

Figure 2: Pre to Post Change in Growth Mindset for 2021 and 2022



**Rated on a scale from 1-5 where 1 is “Disagree strongly” and 5 is “Agree strongly”**  
**\*Significant difference pre-to-post Wilcoxon Signed Rank,  $p < 0.05$**



After experiencing their first fall quarter, **2022 SEI participants described how the Engineer Your Success helped them to plan their studies, apply study habits, and maintain motivation to get through their first quarter courses.** 70% or more said they reached out to faculty or TAs for support, information, or guidance at least a few times during the quarter and 65% said they reached out to student study groups at least a few times. Examples of course takeaways that students applied during their first fall quarter include:

**“Your mindset and reminders about your reason for being in engineering to keep yourself motivated and to not burn out.”**

**—SEI Alumni**

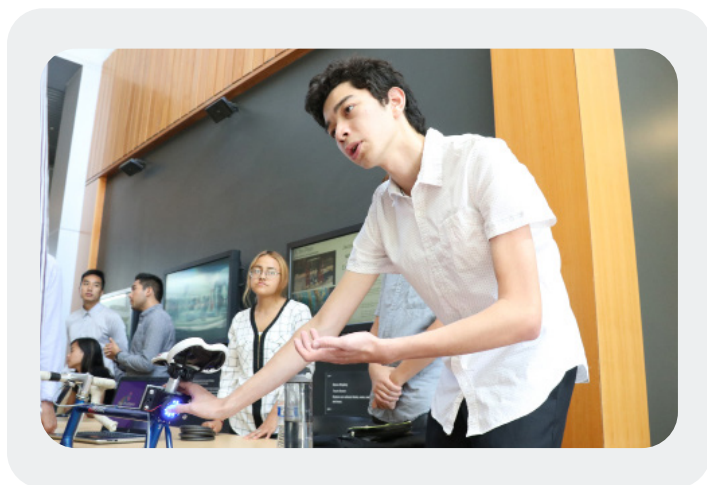
**“Time management, interacting with professors and TAs, knowing what to prioritize, and having a balance between school and social life.”**

**—SEI Alumni**

## Navigate Resources

SEI participants identified navigating resources during their first year as a major impact of SEI. The SEI Academic Workshops focused on orientation to resources and academic enrichment opportunities on campus and within the Jacobs School of Engineering. Through 10 or more workshops,

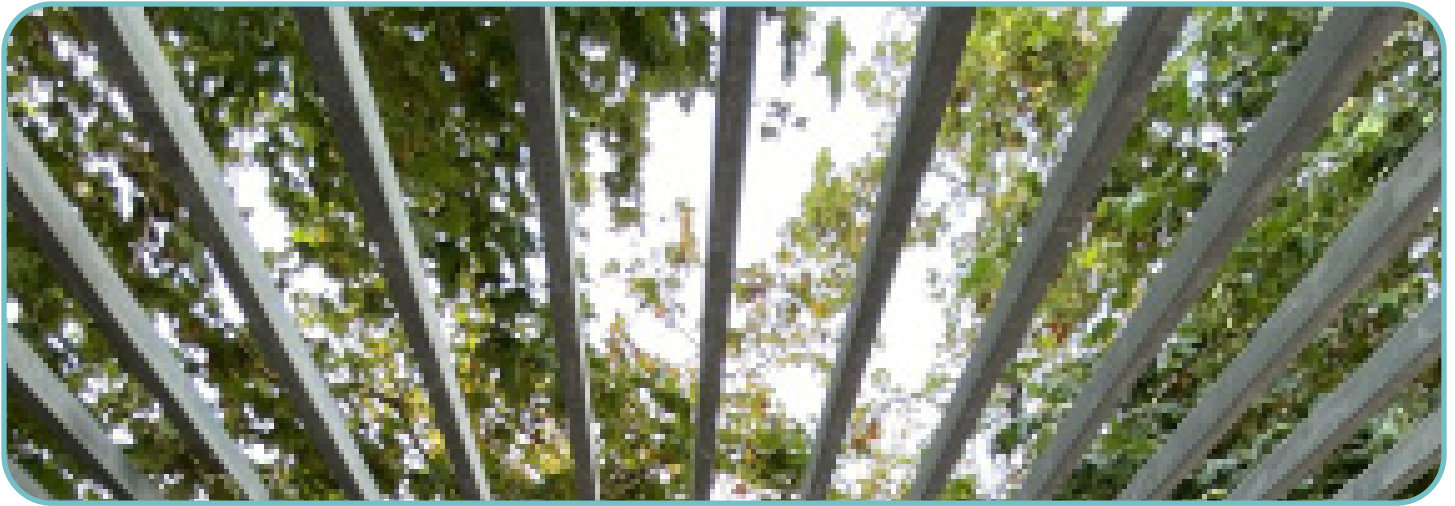
in the past three years to increase student awareness about dozens of campus resources and provide opportunities for students to explore how to prepare for engineering careers. These resources span the Campus Community Centers and Counseling and Psychological Services (CAPS) to programs of the Jacobs School’s Corporate Affiliates Program.



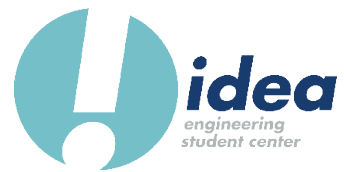
students listen to and work on topics related to academic excellence, career development, and campus resources. Based on pre-post survey results, the workshops have proven

## Continued Commitment to Engineering Student Success

In keeping with our mission to promote equity, community, and success for all engineering students at UC San Diego, the IDEA Center is committed to supporting engineering student success through programs like the Summer Engineering Institute. This program is a critical component of the successful transition to life as a student at UC San Diego’s Jacobs School of Engineering. Our analysis provides evidence that this first-year experience serves as a strong foundation for academic success.



**UC San Diego**  
JACOBS SCHOOL OF ENGINEERING



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