

UC San Diego

JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program



Welcome
CAP Executive Board
June 13, 2024

CAP Chair and Vice Chair



Magaly Drant

Vice President, Developer Productivity
ServiceNow



Rob Vasquez

Chief Operating Officer, Energy Group
General Atomics

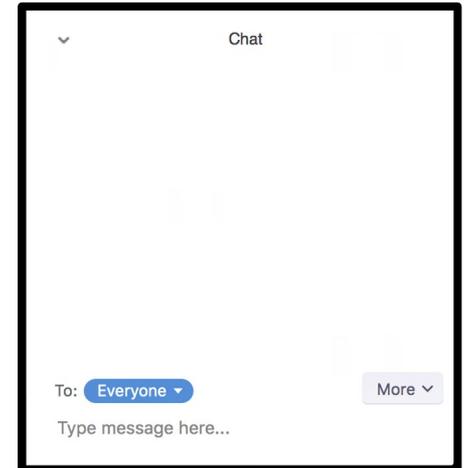
Welcome

UC San Diego

JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Virtual Attendee Protocol

- We will be recording this meeting
- You will be muted; Use chat box for questions & comments
- We will create a Zoom room for the discussion portion of the meeting, please turn on your cameras at that time.



Agenda

5:00-5:10pm

CAP Executive Board Chairwoman Welcome

Magaly Drant

Vice President of Developer Productivity, ServiceNow

5:10-5:15pm

Student Presentation

Triton Unmanned Aerial Systems

5:15-5:35pm

Dean's Report

Al Pisano

Dean, Jacobs School of Engineering

Special Adviser to the Chancellor

5:35-5:50pm

Student Success and Retention Initiatives

Alex Phan

Executive Director, Inclusion, Diversity, Excellence & Achievement (IDEA) Center

5:50-6:20pm

CAP Executive Input

6:20-6:30pm

CAP Business

Wil Dyer

Director, Corporate Affiliates Program

6:30pm

Adjournment

Welcome New CAP Partners



Welcome Guests

Adaptive Sensory Technology

Callaway Golf

STR

Thank you, Rob Vasquez!

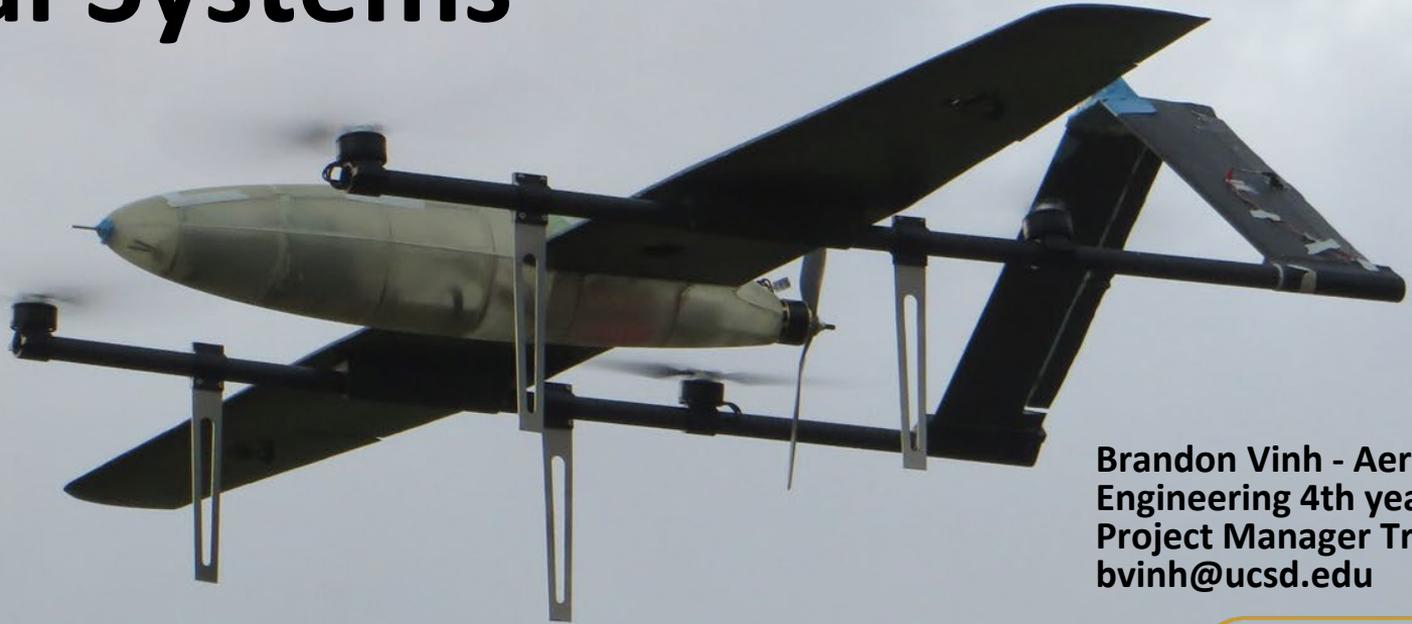
- Outgoing CAP Vice Chairman
- CAP Executive Champion and COO, General Atomics Energy
- Led CAP efforts towards Fusion Engineering



Will announce a new Vice Chair by next board meeting

Welcome Triton Unmanned Aerial Systems

Triton Unmanned Aerial Systems



Brandon Vinh - Aerospace
Engineering 4th year
Project Manager TritonUAS
bvinh@ucsd.edu

Who we are:



- Interdisciplinary student-run project team that **designs, builds, tests, and flies** our own autonomous aircraft
 - Airframe
 - Software
 - Embedded
 - Business
- **Compete and place in the top 5** in the annual **international Student Unmanned Aerial Systems** competition in California, Maryland hosted by RoboNation
 - Includes autonomous waypoint mission and water bottle drop onto targets

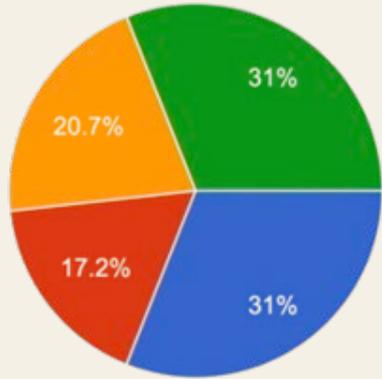
What we do:



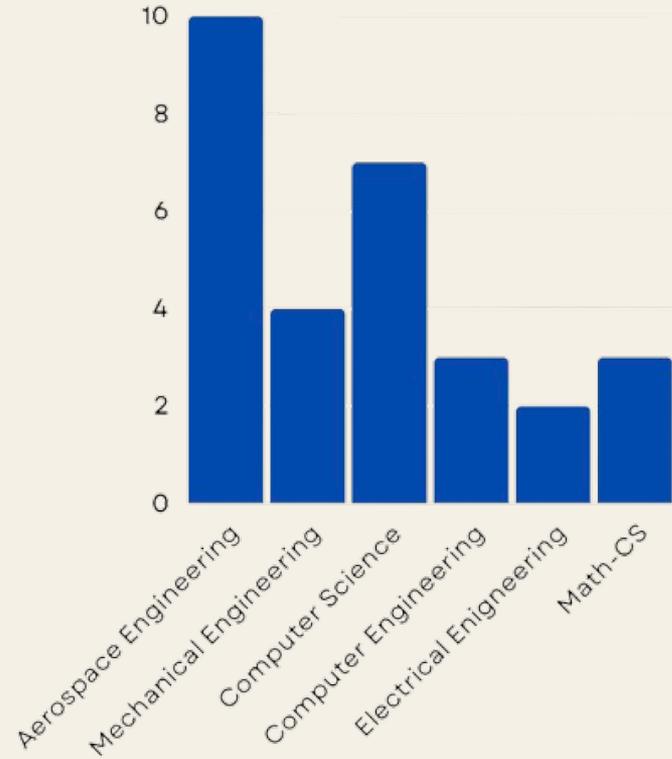
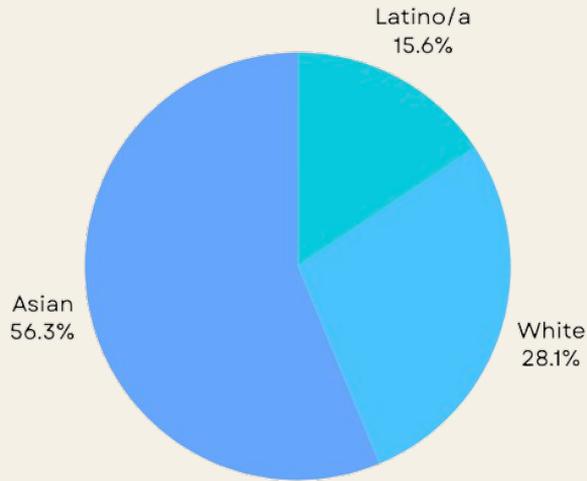
- **5th place finish** in 2022 out of 71 competitors
- **4 aircrafts** built in the last 3 years
- Highest recruitment and retention rate in 2024
- Invited to outreach events like **SD Engineering and Science festival** in 2024



Demographics



- Freshman
- Sophomore
- Junior
- Senior



Opportunities for Industry Engagement



- Monetary Sponsorships for materials, competition fees, and more
- Mentorships to help with our design and manufacturing process
- Host events through TritonUAS for recruitment



Connect with us!



ucsdtuas@gmail.com



[tritonuas](https://www.linkedin.com/company/tritonuas)



[@tritonuas](https://www.instagram.com/tritonuas)



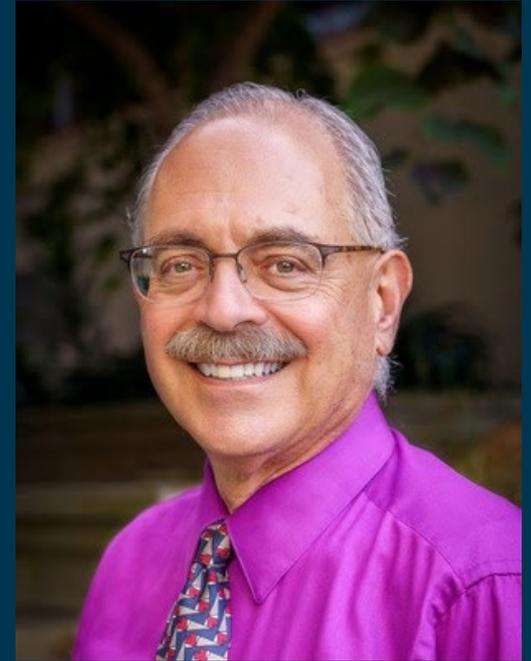
tuas.ucsd.edu



Dean's Report

Albert P. Pisano

Dean, Jacobs School of Engineering
Special Adviser to the Chancellor



Engineering: Campus-wide

UC San Diego

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AGENDA

1. Recent Wins
2. Campus-wide Initiatives
3. Closing Comments

Remembering Joan Jacobs



Mrs. Joan Klein Jacobs left a legacy of vast positive impact on UC San Diego, the region, and around the globe. Together with her husband, Irwin, Jacobs' philanthropic support spanned the entirety of the UC San Diego campus – from engineering and computer science to health and medicine to arts and culture and global transformation.

BIG NEWS: Strengthening the Links between Chemical and Nano Engineering



Business leader and philanthropist Aiso Yufeng Li (Jeff) and his wife, DongDong Li (Doreen), made a \$21 million gift to chemical and nano engineering at UC San Diego. In recognition of this gift, the department will be renamed the Aiso Yufeng Li Family Department of Chemical and Nano Engineering.

The **NanoEngineering Department is now the Chemical and Nano Engineering Department**, reflecting its strengths in both chemical and nano engineering

Thank you to the Li Family for their \$21M gift in support of Chemical and Nano Engineering, which will now be named the **Aiso Yufeng Li Family Department of Chemical & Nano Engineering**

18 New Endowed Chairs!!!

- These **18 endowed chairs** will be announced very soon
- These **new** endowed chairs are critical for retention and recruitment of faculty
- I can not overstate the value of endowed chairs to the continued success of the Jacobs School
- These endowed chairs are possible thanks to Irwin and Joan Jacobs



Campus-wide Initiatives

- Institute for Clinical Wearables
- Carbon-negative Biomanufacturing
- Artificial Intelligence
- Fusion Engineering
- Heterogeneous Semiconductors

Institute for Clinical-grade Wearables

UC San Diego Center for Health Innovation

Feb 2023: \$22M gift from Irwin and Joan Jacobs



“The vision for a **hospital-based, AI-enhanced mission control** center will be one of the first in the U.S.”

“Our goal is to be a **leader in all digital health tools** that can improve the delivery of health care across the continuum, from inpatient rooms to clinic spaces to home environments.”

-Christopher Longhurst, MD, Chief Medical Officer and Chief Digital Officer at UC San Diego Health.

Carbon Negative Biomanufacturing

A type of manufacturing or biotechnology that utilizes **biological systems to produce** commercially important biomaterials and biomolecules for use in medicines, food and beverage processing, and industrial applications.



The biodegradable "living plastic" is made by combining thermoplastic polyurethane (TPU) pellets (left) and *Bacillus subtilis* spores (right) that have been engineered to survive the high temperatures used to produce the plastic.

- **Example: Biodegradable "living plastic"**
It's made by combining plastic and bacteria that break down the plastic
- The adaptive laboratory evolution used to make the bacteria heat tolerant is part of our strength **tied directly to carbon-negative biomanufacturing**
- **MRSEC research example**
Materials Research Science and Engineering Center which is a prestigious and renewable NSF center

New Artificial Intelligence Initiatives

Lab for Emerging Intelligence (LEI): Develops and deploys end-to-end reliable intelligent systems. Current areas of research include: improving information retrieval and information extraction systems, scientific investigation of large language models, and applications of AI in education.

AI Tutor: Provides tailored, in-context support to students during reading assignments and while working through problem examples. Pilot course: NANO 11; student feedback positive - now looking to scale across other departments and courses in fall 2024.

Proposed AI Major: Proposed undergraduate AI major housed in the Computer Science & Engineering department, in cooperation with Halicioğlu Data Science Institute, with courses drawn from many other departments across campus. Anticipated pilot cohort in fall 2025.

Making California the Fusion State

Jacobs School hosted the California Fusion Technology, Research and Engineering (FUTRE) workshop, bringing together industry, government and academic experts, including:

- Seven UC Campuses + UC Office of the President
- Three National Labs + U.S. Department of Energy
- Eight Companies, led by General Atomics



Heterogeneous Semiconductors

California DREAMS (Defense Ready Electronics And Microdevices Superhub)

- We are creating an easy-access platform to design and manufacture prototypes of advanced electronic modules such as heterogeneous semiconductors.
- The \$27M annual funding for the DOD-funded consortium is just the start.
- Funded projects will be announced in July 2024.
- The SoCal microelectronics ecosystem is already strengthening!
- **Powerful example:** In a California DREAMS group chat, a UC San Diego technical staff working in our Nano3 facility provided a Northrop Grumman general manager with a solution to a potential supply chain issue on a material that could disrupt the production of a microchip!

Strategic Faculty Moves in Wireless



New Hire:
Robert Heath
Electrical & Computer
Engineering
Charles Lee Powell Chair
in Wireless Communications



New Hire:
Nuria González Prelcic
Electrical & Computer
Engineering
IEEE Award-winning Signal
Processing Researcher



New Appointment:
Bill Lin
Electrical & Computer
Engineering
Associate Dean for
Strategic Initiatives

Summary: Engineering Campus-wide

- **Phase 3 has begun**
- **Solutions forward**
- **Engineering at the core**

Questions/Comments/Input?

Special Presentation



Alex Phan

Executive Director

Inclusion, Diversity, Excellence & Achievement (IDEA) Engineering Student Center

Student Success and Retention Initiatives

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idea *engineering
student center*

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Student Success at the Jacobs School of Engineering

Corporate Affiliates Program Board Meeting
June 13, 2024

Alex Phan, Ph.D.

Executive Director, Student Success
IDEA Engineering Student Center
Jacobs School of Engineering

Student Success: Data Driven Initiatives

Analytics and Reporting
Targeted Skill Building



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Data Driven Student Success



First Year Transition Undergraduate Program



Summer Engineering
Institute (SEI)



IDEA Scholars





IDEA STUDENT CENTER

Engineering Institute

JACOBS SCHOOL OF ENGINEERING

Summer Engineering Institute: IDEA Center's flagship summer transition program for incoming freshman. Students participate in workshops, events, and enroll in their first engineering class.

- 5-week Residential Program
- Earn six credits towards engineering degree
- Head start on transition to UC San Diego
- Engage in activities to get to know the campus, community and fellow students

Applications: ~180 students

Participants: ~120 students (65 IDEA Scholars)

30% Attrition: Mostly Due to Program Cost

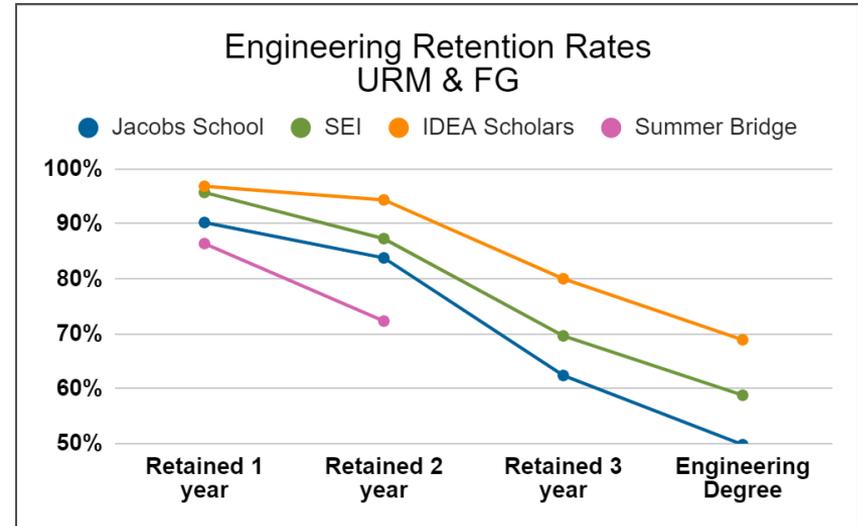
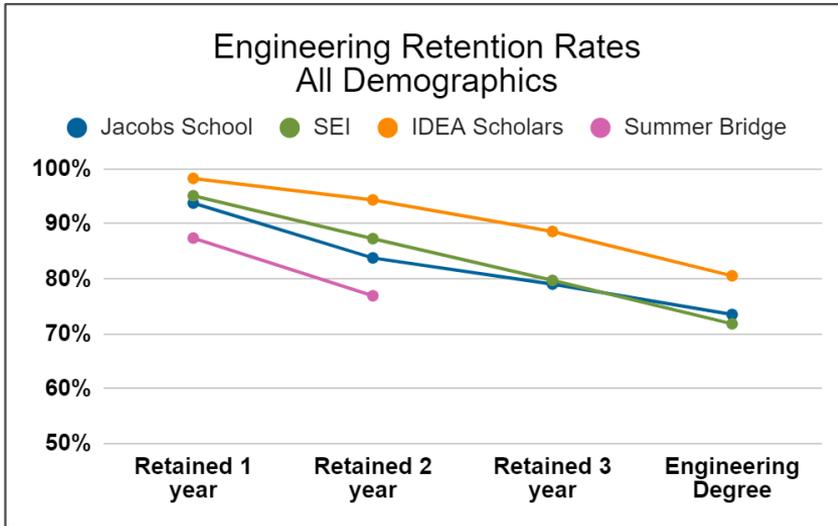
Impact of SEI / IDEA Scholars on Retention

Admission Range: 2016-2023

Total Jacobs School Students: 7744

Total SEI Participants: 465 (no SEI in 2020-2022)

Total IDEA Scholars: 288



SEI participants and IDEA Scholars showed higher level of retention and graduation
Most prominent impact on Underrepresented (URM) & First Generation Students

idea engineering
student center

UC San Diego
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Problem Solving Skills Building for the Technical Workforce



WHAT'S THE REAL PROBLEM?

In real world engineering, problem solving is more than troubleshooting

Reliability Engineers at Viasat share engineering challenges:

Observations: Material delamination on satellite
Initial inspection point to adhesive

Perceived Problem: The adhesive is not strong enough, causing delamination

Possible Solution: Apply a stronger adhesive

What's the real problem?

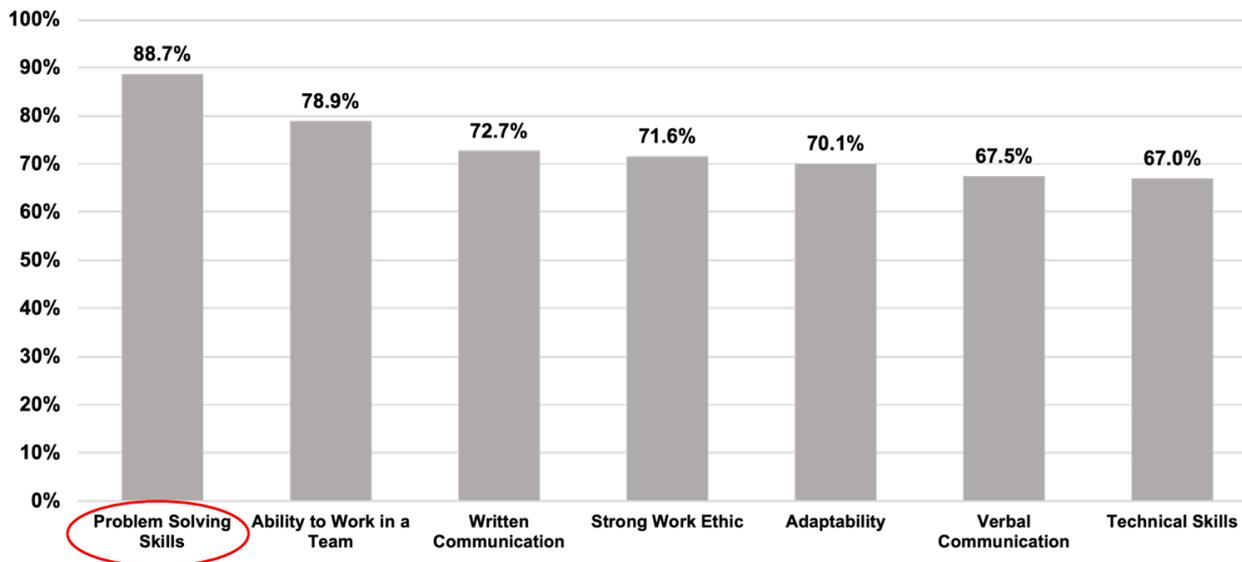
- Operating Temperatures
- Material Compatibility
- Surface Contamination

Having the right tools (theory, instruments) is important to an engineer. Our goal is to focus on **the ability to identify the root cause** that makes these tools **effective**



Problem Solving in the 21st Century

Problem solving ranks among the top three highly demanded skills for employers
Problem solving is a necessary skill that all students should have regardless of career path



Percent of Respondents Identifying Attributes as Very/Extremely Important

Source: Job Outlook 2024, National Association of Colleges and Employers

Background

Problem Solve Like an Expert project started in 2020 to increase the San Diego regional technical workforce

Problem solving skills were identified as a highly demanded skill and a barrier to entry for STEM

Jacobs School of Engineering and Division of Extended Studies spearheaded curriculum development and deployment for high school



Our Team



Al Pisano, Ph.D.
Dean, Professor
Jacobs School of Engineering



Hugo Villar, Ph.D.
Dean
Extended Studies



Edward Abeyta, Ph.D.
Associate Dean
Extended Studies



Morgan Appel, Ph.D. Assistant
Dean
Extended Studies



Curt Schurgers, Ph.D.
Teaching Professor
Electrical and Computer Eng.



Alex Phan, Ph.D.
Executive Director
IDEA Eng. Student Center



Maysoon Dong, Ed.D.
Sr. Program Manager
Extended Studies



Rob Schlom, M.S.
Instructional Designer
Jacobs School of Engineering

Problem Solving Curriculum (Skills Focused)

Grounded on the self-regulated learning (SRL) framework, students learn problem-solving strategies and heuristics to exercise critical thinking skills and apply them in hands-on projects. Strategies include Dunker Diagram, fishbone diagram, systems thinking, KT analysis, Five Why's, and more.

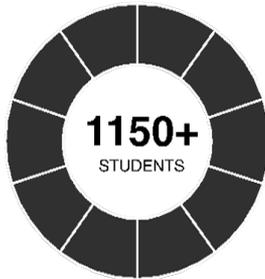
Module 1	Problem Solving 101	Module 5	Problem ID Strategies II
Module 2	Troubleshooting	Module 6	Assumptions and Assumption Reduction, Bias
Module 3	Solution Development	Module 7	Unintended Consequences
Module 4	Problem ID Strategies	Module 8	Risk and Ethics



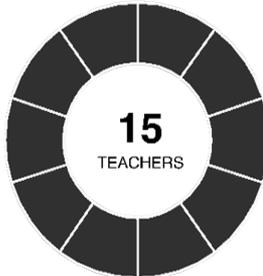
KEY LEARNING OUTCOMES

- Develop a systematic approach to **identifying root cause**
- Employ various strategies to develop **creative solutions**
- Cultivate a positive learning environment that embraces **diversity in thought**
- Recognize the **value of teamwork**, recognize and resolve team conflicts
- Identify **interconnectivities** between various elements of the problem
- Anticipate and mitigate **unintended consequence** of potential solutions
- Develop **effective communication** skills (oral, written, visual)

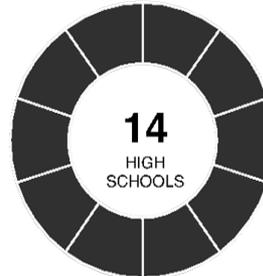
Key Milestones (2023 – 2024)



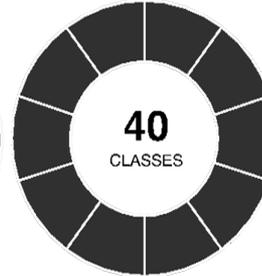
Students Reached



Participating Teachers



High School Campuses



High School Classrooms

District-Wide Adoption

Collaboration with San Diego Unified teaching leaders to create a hybrid Physics and Problem-Solving curriculum for district-wide deployment.

Large-Scale Deployment

1150+ students enrolled in problem-solving curriculum for 23-24 school year. Program taught across five school districts in San Diego County

Community of Practice

New teachers in open communication with returning teachers and program developers

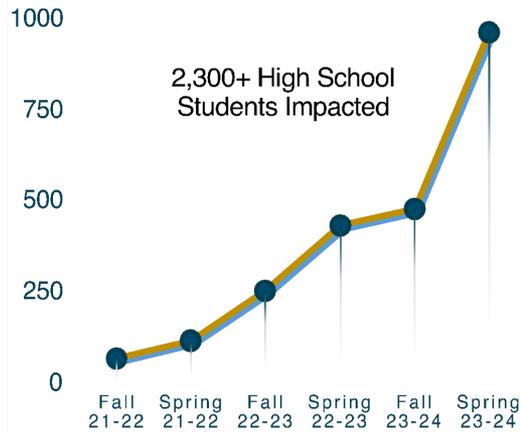
Total Reach & Impact

Curriculum is taught in 70 classrooms across 5 school districts in 2022-2024

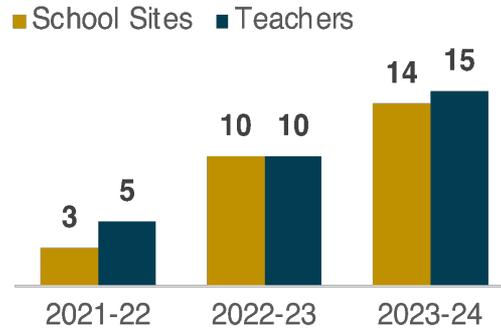


Impact & Engagement

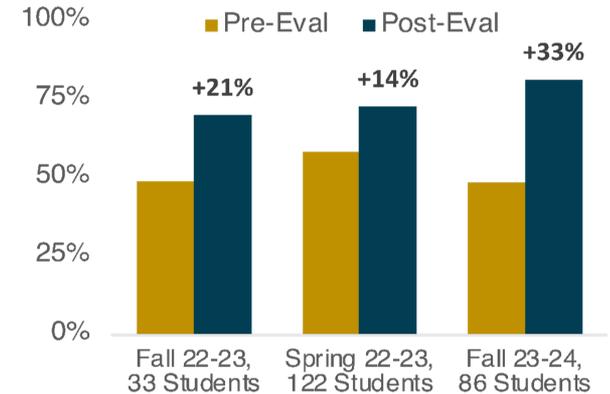
Student Enrollment



Teacher Participation



Student Assessment



Undergraduate Education

Institute for the
Global Entrepreneur



UC San Diego
The Design Lab



Accessibility of Problem Solving as a Skill for Majors and Non-Majors (General Education)

- Enhancing and distilling down **problem-solving strategies and techniques for systematic thinking and self-regulation (lifelong learning)**. Lowers the barrier to entry, engages with hands-on exercises, and can be broadly applicable to a spectrum of subjects and open-ended problems.

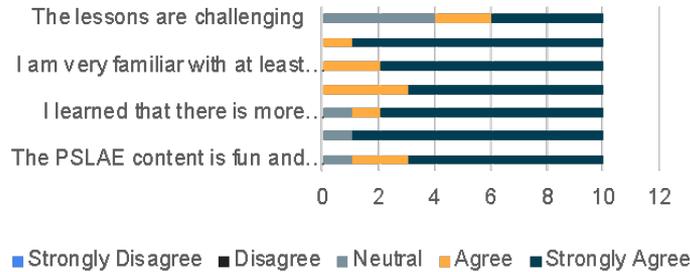
Fueling Innovation (IGE, Design Lab, IDEA Center)

- Foster innovation via creative solution development strategies
- This is a stepping stone for impactful research in academia or leadership in industry

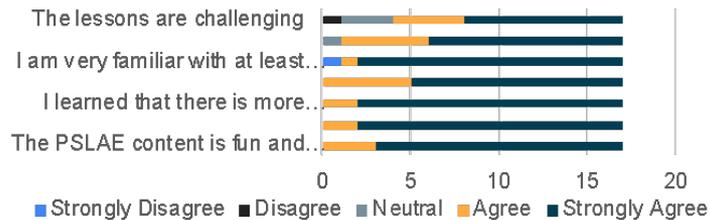
Community College Program Evaluation

Results show curriculum is engaging and impactful to both STEM and non-STEM majors

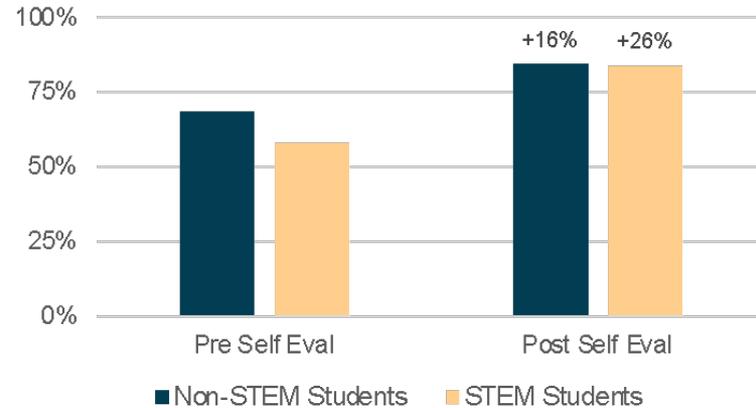
Non STEM Sentiment



STEM Sentiment



Problem Solving Abilities Self Assessment



Vision and Growth: Regional and Community Impact

National & International

- Interests from community (i.e., The Sage School, University of Amsterdam) to adapt for their curriculum

Professional Development

- Professional development for staff and faculty to enhance skill building and pedagogy

05

04

03

02

01

Industry Engagement

- Potential training programs for new employees and engineers

San Diego Unified District

- Physics Hybrid Curriculum
- Deployment across STEM Classrooms + College Prep (AVID)

Jacobs School of Engineering

- Enhance problem solving skills in engineering students in hands-on classrooms
- General education course proposal to campus

CAP Partner Opportunities

Summer Engineering Institute

Host a cohort of students at your company

Sponsor a student to participate: \$5,500 per student

Sponsor cohort of students: \$330,000 total for cohort of 60 students

IDEA Scholar Program

Lead a technical workshop with the scholars

Sponsor cohort of students: \$20,000 annual cohort cost; \$80,000/4yrs

Problem Solving for Technical Workforce

Provide real-world problem-solving case studies

Deploy this training at your company





QUESTIONS?

Alex Phan, Ph.D.

Executive Director, Student Success
IDEA Engineering Student Center
Jacobs School of Engineering

CAP Executive Board Input

- Which campus-wide initiatives can draw your partnership?
- What alternative campus-wide initiative would your company propose?
- How do we maximize the impact of the problem solving curriculum to increase the technical workforce in San Diego?
- Would the problem solving curriculum be a valuable training program for new employees at your company, and if so, ideas for partnership?
- Other input/feedback from the briefings?

CAP Business

Wil Dyer

Director, Corporate Affiliates Program



CAP Updates

UC San Diego

JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

Jacobs School Corporate Affiliates Program



Take Advantage of Your VIP Parking Permits

- Chancellor's "C" permit - park anywhere on campus!
- Register up to 5 license plates
 - Only one car can use permit at a time
- Permit runs from July 1 - June 30
- **Details coming from donorrelations@ucsd.edu mid-June**

CAP Talent Programs: Talent Strategy Planning this Summer

Let's discuss your 2024-2025 talent strategy!

- Tailored events for your organization
- Internships
- Team Internship Program (TIP)
- Cooperative Education (Co-op)

Year-round: send us your openings

- New college graduate roles (students graduate June 14)
- Alumni for experienced roles (0-5 years)



Contact Alice Grgas at agrgas@ucsd.edu; Learn more at jacobsschool.ucsd.edu/talent

CAP Talent Programs: Targeted Fall Talent Programming

- CSE Tutor Networking Night
- National Security Networking Night (Defense Industry)
- Early Access to Student Population:
 - CSE Graduate Orientation,*
 - Transfer Prep,*
 - Summer Engineering Institute,*
 - and more.*





Save-the-date for the
annual CAP Executive
Cruise aboard the
Spirit of Solar

September 23, 2024

*Special thanks to GB Singh
and Solar Turbines*

Research Expo 2024 a great success!



Thank You Sponsors and Thank You to your 110+ Judges!

Premier sponsors: **ASML Viasat**

Partner sponsor: **Qualcomm**

Accepting Applications: Master of Advanced Studies

MAS programs are interdisciplinary engineering degrees designed for working professionals with classes taught on Fridays and Saturdays every other week.



Contact:

Gary Henderson

Director, Executive Education
grhenderson@ucsd.edu

jacobsschool.ucsd.edu/mas

Convergent Systems Engineering (CoSE)

Engineering and Supply Chain professionals focused on intersection of systems thinking, supply chain and social sciences; modeling, AI and machine learning, and analysis. **Two new programs: Value Supply Chain, Cyber-Physical Social Systems.**

Wireless Embedded Systems (WES)

Engineering professionals with a background in CS / EE who want to enhance their understanding of IoT, edge computing, 5G and beyond (6G...)

Data Science and Engineering (DSE)

Engineering professionals with a background in CS / Math / Statistics with substantial experience in data analysis

Fall 2024 Application Deadline:

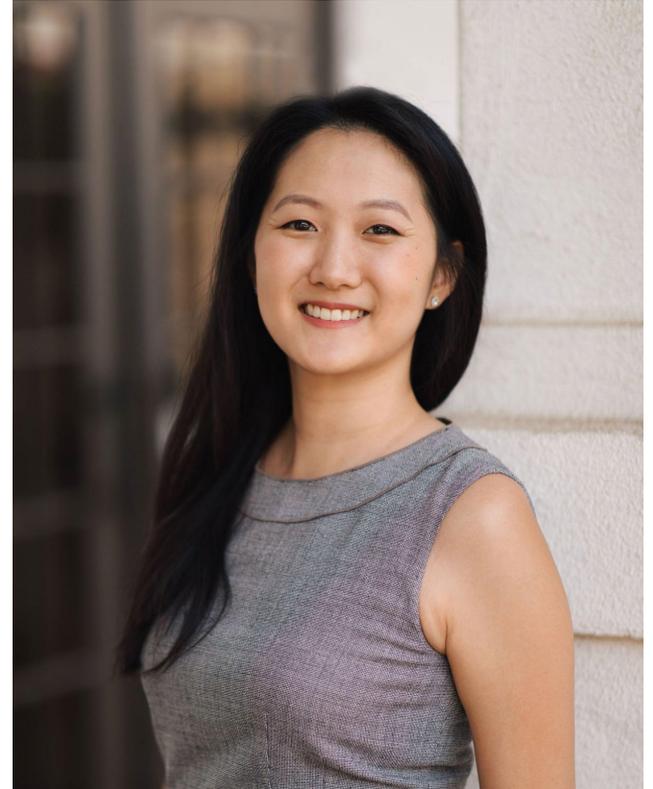
July 19, 2024 (extensions available upon request)

Welcome Julie Choi, CAP Services Manager

CAP Services Manager works with our partners to administer their CAP benefits

- Talent Programming
- Campus Visits
- Access to campus resources
- Membership renewals

Contact: jchoi@ucsd.edu



Happy Retirement, Paula Kreger!



Thank you, Paula, for your **20 years** of service to CAP!

Retirement celebration on
June 26, 2-5pm.

RSVP and other ways to participate:



UC San Diego

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Thank you!
Next CAP Executive Board Meeting:
October 3, 2024