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
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

CISCO

GKN AEROSPACE
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
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
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
- @tritonuas
- tuas.ucsd.edu
Dean’s Report

Albert P. Pisano
Dean, Jacobs School of Engineering
Special Adviser to the Chancellor

Engineering: Campus-wide
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

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 Aiiso Yufeng Li Family Department of Chemical & Nano Engineering.

Business leader and philanthropist Aiiso 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 Aiiso Yufeng Li Family Department of Chemical and 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.

- **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

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.
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 Halıcıoğlu 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?
Student Success and Retention Initiatives
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
Data Driven Student Success
First Year Transition Undergraduate Program

Summer Engineering Institute (SEI)

IDEA Scholars
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

<table>
<thead>
<tr>
<th>Retained 1 year</th>
<th>Retained 2 year</th>
<th>Retained 3 year</th>
<th>Engineering Degree</th>
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<tbody>
<tr>
<td>Jacobs School</td>
<td>SEI</td>
<td>IDEA Scholars</td>
<td>Summer Bridge</td>
</tr>
<tr>
<td>100%</td>
<td>90%</td>
<td>80%</td>
<td>70%</td>
</tr>
<tr>
<td>90%</td>
<td>80%</td>
<td>70%</td>
<td>60%</td>
</tr>
<tr>
<td>80%</td>
<td>70%</td>
<td>60%</td>
<td>50%</td>
</tr>
</tbody>
</table>

SEI participants and IDEA Scholars showed higher level of retention and graduation

**Most prominent impact** on Underrepresented (URM) & First Generation Students
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.

<table>
<thead>
<tr>
<th>Skill</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Problem Solving Skills</td>
<td>88.7%</td>
</tr>
<tr>
<td>Ability to Work in a Team</td>
<td>78.9%</td>
</tr>
<tr>
<td>Written Communication</td>
<td>72.7%</td>
</tr>
<tr>
<td>Strong Work Ethic</td>
<td>71.6%</td>
</tr>
<tr>
<td>Adaptability</td>
<td>70.1%</td>
</tr>
<tr>
<td>Verbal Communication</td>
<td>67.5%</td>
</tr>
<tr>
<td>Technical Skills</td>
<td>67.0%</td>
</tr>
</tbody>
</table>

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
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
- 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)

### Module 2: Troubleshooting
- Identify interconnectivities between various elements of the problem
- Anticipate and mitigate unintended consequence of potential solutions
- Develop effective communication skills (oral, written, visual)

### Module 3: Solution Development
- 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)

### Module 4: Problem ID Strategies
- 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)

### Module 5: Problem ID Strategies II
- 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)

### Module 6: Assumptions and Assumption Reduction, Bias
- 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)

### Module 7: Unintended Consequences
- 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)

### Module 8: Risk and Ethics
- 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)**

**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**

2,300+ High School Students Impacted

**Teacher Participation**

<table>
<thead>
<tr>
<th>Year</th>
<th>School Sites</th>
<th>Teachers</th>
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<tbody>
<tr>
<td>2021-22</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>2022-23</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>2023-24</td>
<td>14</td>
<td>15</td>
</tr>
</tbody>
</table>

**Student Assessment**

- Fall 22-23, 33 Students: Pre-Eval +21%
- Spring 22-23, 122 Students: Pre-Eval +14%
- Fall 23-24, 86 Students: Pre-Eval +33%
Undergraduate Education

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**
- The lessons are challenging
- I am very familiar with at least...
- I learned that there is more...
- The PSLAE content is fun and...

**STEM Sentiment**
- The lessons are challenging
- I am very familiar with at least...
- I learned that there is more...
- The PSLAE content is fun and...

**Problem Solving Abilities Self Assessment**

- Pre Self Eval: +16%
- Post Self Eval: +26%

- Non-STEM Students
- STEM Students
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

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

Industry Engagement
- Potential training programs for new employees and engineers
**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
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?
Jacobs School Corporate Affiliates Program

[Logos of various companies]
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

Contact: Julie Choi, jchoi@ucsd.edu
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.

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

Contact:
Gary Henderson
Director, Executive Education
grhenderson@ucsd.edu

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:
Thank you!

Next CAP Executive Board Meeting:
October 3, 2024