## UC San Diego

JACOBS SCHOOL OF ENGINEERING Corporate Affiliates Program

## Welcome CAP Executive Board Thursday, May 25, 2017



## CAP CHAIRMAN



## Interim Chairman

Nik Devereaux, Director of Software Engineering, ViaSat



## Welcome New CAP Members



## SONY



## Welcome TESC Leadership

Student Organization Project Leaders

### Society of Women Engineers (SWE)

### Triton Engineering Student Council (TESC)





Corporate Affiliates Program

Established 1981 The Society of Women Engineers





## **Inclusion Diversity Leadership**





# Triton Engineering Student Council

We connect students with companies for:

- Career opportunities
- Product Exposure
- Brand Engagement

Let's talk! <a href="mailto:sponsor@tesc.ucsd.edu">sponsor@tesc.ucsd.edu</a>



## **DEAN'S BRIEF**



## Albert P. Pisano

Dean, Jacobs School of Engineering



JACOBS SCHOOL OF ENGINEERING Corporate Affiliates Program

## **Securing Excellence**

## Jacobs School Ranks #13

- #8 Among Public Engineering Schools
- #1 Public for Research Expenditures Per Faculty Member
- Largest Engineering School in California with over 8,700 students





## UC San Diego Designated as a Ashoka Changemaker Campus

- First in the UC System to obtain this distinction
- 1 of 40 Universities to achieve Ashoka Changemaker designation **GLOBALLY**
- San Diego is home to TWO of these 40 Universities: UC San Diego & USD



global EAMS IN ENGINEERING SERVICE



Everyone A Changemaker™







## **New Endowed Chairs**

### **Professor Tajana Rosing**



John J. & Susan M. Fratamico Endowed Chair

### Professor Stefan Savage



Irwin Mark & Joan Klein Jacobs Chair in Information & Computer Science



Corporate Affiliates Program

## Strategic Plan

- **Grow Faculty** to Increase Research Breadth in Focus Areas and Meet Intense Demand for Engineering Talent.
- Fuel Initiatives that Address Grand Challenges and Spawn Industry Clusters of the Future for the San Diego Region.
- Augment Infrastructure to Accommodate Growth and Accelerate Faculty Research Productivity.



## Jacobs School Trajectory

### 228 Professors

- 50 faculty hired over last 3 years
- 34% Female and URM hires, AY14-16
- 12 recruitments in AY17
- 18 faculty to be hired over next 3 years

### 8,696 Students (6,061 ugrad, 2,635 grad)

• 42% Increase in Graduate Enrollment over last 2 years

### \$168M Annual Research Funding

- + 11% increase in 2 years
- + YTD Research Up 17% over last year





Corporate Affiliates Program

### Campus-Wide Data Science Initiative

- Education: Undergrad, Graduate, Professional
- Research Agenda: Machine Learning and Data Analytics to Fuel Digital Future
- Distinguished Lecture Series: Rick Rashid, founder Microsoft Research



Taner Halicioglu \$75M Pledge to Launch Halicioglu Institute for Data Science



## **10** Agile Research Centers

- Machine Integrated Computing and Security (MICS)
- Center for Wearable Sensors (CWS)
- Center for Extreme Events Research (CEER)
- Center for Visual Computing (VisComp)
- Sustainable Power and Energy Center (SPEC)
- CHO Systems Biology Center

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**Corporate Affiliates Program** 

- Cali-Baja Center for Resilient Materials and Systems
- Center for Microbiome Innovation (CMI)
- Deep Decarbonization Initiative (D2I)
- Center for Engineered Natural Intelligence (CENI)



## Institute for the Global Entrepreneur

- Innovation-Corps Training Site Receives 3-Year Renewal
- 100 Teams Trained during First Three Years
- 17 Companies Launched and Raised More Than \$2.45 M
- Technology Accelerator Launched
- Business Advising and Funds for Proof of Concept/Prototype
- Prototype to be Tested/Verified with Industry Partner
- Commercialization Pathway Defined
- Selection
  - 60 Teams Applied
  - 14 Teams Participated in Bootcamp Training
  - 9 Teams Presented to Technology Review Panel
  - 5 Selected
  - Second Cohort Fall 2017

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## We Are Building the Digital Future

### DATA ANALYTICS IN REAL-TIME

- Data Streams.
- Cognitive Computing.
- Actions and Agents.
- Inspire New Research Directions
- Enable Large Collaborative Research Efforts and Success on Center Grant
- Facilitate Connections Across Collaboratories for Systems-Level Projects
- Encourage Industry Participation
- Support Commercialization of Research





JACOBS SCHOOL OF ENGINEERING Corporate Affiliates Program Designed from Ground Up for Collaboration Bring Together Faculty, Students and Strategic Industry Partners

## Vision for the Building

- Inspire New Research Directions
- Enable Large Collaborative Research Efforts and Success on Center Grants
- Facilitate Connections Across Collaboratories for Systems-Level Projects
- Encourage Industry Participation via IP-Protected Spaces
- Support Commercialization of Research



## **Technology Drivers for the Digital Future**



Research, Development and Commercialization (RD&C)



## Encourage Industry Collaboration and Research Translation

#### Institute for the Global Entrepreneur

- Technology and business accelerators
- Outreach to strategic partners for validating technology and market
- Demonstration studio, incubator space

#### **Research Co-Location**

- Visiting Industry Fellow co-located in collaboratory
- IP Protected lab space, rented by industry partner within a collaboratory
- IP Protected meeting rooms

#### **Education and Research Exchange**

- Flexible meeting rooms for research summits
- Executive Education with distance learning capability and breakout rooms
- Large classroom/auditorium

#### **Public Spaces**

Café, Lobby Areas, Accidental Meeting

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## Building Milestones and Anticipated Timeline

Milestones	Estimated Date
Architect Selection	9 May 2017
Detailed Project Programming	June-Sept 2017
Preliminary Plans (Regents Approval Item)	September 2017
Project Planning Guide (PPG)/Budget Complete	November 2017
Budget and Financing (Regents Approval Item)	January 2018
Design & Environmental (Regents Approval Item)	October 2018
Construction Begins	Summer 2019
Building Opens	Fall 2021



## **Faculty Presentation**



## Olivia Graeve

Prof. MAE, Dir. Center for Resilient Materials & Systems

'Jacobs School of Engineering Student Success Initiative (SSI)'



## **Student Success Initiative**

Promoting Student Excellence and Achievement for all Our Students

## Olivia A. Graeve

Professor of Mechanics and Materials Department of Mechanical and Aerospace Engineering University of California, San Diego ograeve@ucsd.edu



Student success is everyone's responsibility and within everyone's reach



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The Student Success Initiative is a holistic approach to undergraduate and graduate recruitment, matriculation, retention, and graduation that connects students at all levels of the K-20 educational continuum.

Our vision is to foster an atmosphere of excellence and support for all our students and to prepare future engineers who have the skills to engage effectively with an increasingly diverse society.

We hope our graduates will be able to recognize the world from the perspective of others, have the ability to work cooperatively, negotiate controversial and complex issues with people from a wide range of backgrounds, and be open to new ideas and different perspectives.

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Retention and success of our students rests on four pillars:

- (1) Academic support: Helping students before they are in trouble academically and providing an environment that supports students during academically tough times.
- (2) Leadership opportunities: Helping students see what it takes to be an engineering student and feel as if they have control over their engineering experience by providing leadership opportunities that allow them to shape their engineering experience.
- (3) Maintaining interest: Exposing students to various disciplines and opportunities and help them see the connection between engineering courses and engineering in real-world applications.
- (4) Building community: Helping students believe they are more than a number and that JSOE cares about their success and achievement as individuals.





1<sup>st</sup> Priority

- Learning Communities
- ENG 1-2-3 Course Series
- ENG 10
- Engineering Early Intervention Warning System
- Engineering Overnight Stay Program (together with other campus efforts)
- Transfer Summer PrEP
- Summer Engineering Institute

Second round

- Strengthening undergraduate research experiences (together with EAP), connecting them to "Research Experiences for Teachers".
  - Development of economies of scale across all K-12 outreach efforts.
- Focus on image (improved communications and web site), "Parents Day @ JSOE"

Third round

- "Teachers Day @ JSOE"
- Focus on graduate recruitment and mentorship
- Expanded ENG GRAD and Scholarly Talks
- Expanding IDEA Scholars Cohort Size
- Strengthening and evaluating mentorship and professional development programs (T.E.A.M., JUMP, SWEET) for all JSOE students

#### Fourth round

•

- Tomorrow's Professor Conference
- Support for students and faculty to develop their own "named" programs, development of guidelines for implementation of creative concepts at JSOE within the framework of the Master Plan.





### **Undergraduate** Programs



## Graduate and Post-doctoral Programs

<ul> <li>Graduate Recruitment:</li> <li>Calling campaign</li> <li>Online/live faculty question and answer sessions</li> <li>Significant participation in recruitment conferences (SHPE, NSBE, McNair, Diversity Forum, SACNAS, Institute for Teaching and Learning</li> </ul>	<b>Grad Diversity Mentorship:</b> Tiered mentorship (advanced graduate students with new students; advanced post-doctoral researchers with new post- docs).	
<b>ENG GRAD and Scholarly Talks:</b> The enhanced version of GRAD Talks, now also for post-doctoral researchers and with the participation of outside speakers.	<ul> <li>Tomorrow's Professor Conference (Diversifying Academia):</li> <li>The main objective would be to recruit minorities and women to academia and pursue careers in academia.</li> <li>This program should be connected with our Excellence Diversity hiring efforts.</li> </ul>	

### Summer Engineering Institute

The Summer Engineering Institute is a key element of the Jacobs School of Engineering **Student Success Initiative**. The program is specifically structured to ease the academic and social adjustment to college life for incoming freshmen through academic coursework, peer and faculty mentoring, tutoring, academic and technical workshops, and the creation of a community of scholars.



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### Institute Goals

The five major goals of the Engineering Institute are:

- To provide newly admitted students academic preparation and support in first-year engineering coursework;
- to build a diverse community of learners by providing a strong and supportive academic and social environment;
- to acclimate students to the norms and culture of scientific inquiry;
- to integrate students to the Jacobs School of Engineering and the UC San Diego community; and
- to address progress toward degree.

The high schools and community colleges that feed into the Jacobs School of Engineering are resourced very differently. Some have educational advantages over others. A student should not be measured by what they know today, but by their future capabilities and aptitude, thus we need to provide students with the means to come to speed and stand toe-to-toe with their peers starting from day 1... actually before day 1.

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## **Student Demographics**

Summer 2016: 63 participants Summer 2017: Goal of 100 participants





## Findings for Summer 2016

There were predominantly four large findings and/or assertions that promoted engineering student success during the Summer Engineering Institute. The findings and themes were:

- ✓ program strengthened academic and social integration to engineering,
- ✓ program increased engineering knowledge and specific technical skill development,
- ✓ program provided comprehensive support within the engineering educational ecosystem, and
- ✓ program provided ongoing monitoring and advising that is inclusive of student's academic, personal/social, and cultural needs, thus creating an inclusive learning environment.

http://chancellor.ucsd.edu/chancellorkhosla/blog/preparing-for-success

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## A few comments from students . . .

- Before I came to the Summer ENG Institute I would have never asked for help, or gone to tutoring. This was something that I felt was an absolute last resort, and even then I did not really speak up and ask for help when I needed to. This program has forced me to get out of my comfort zone and talk, and ask for help when I need it.
- For ENG 10, the coursework was a mixture of coding in Python, learning mathematics, and applying skills towards our project. I use to always be a visual learner -- almost similar to the idea of "learning by following", but ENG 10 made me focus on learning by experimenting.
- The coursework and the way that the classes were structured changed the way I was learning in that I no longer was learning 'alone' but rather had a group of other students, professors, and TAs to reach out to if I ever needed the help. It changed my learning from individual learning to collaborative group learning.
- I learned that engineering is much more broad and interdisciplinary than I had originally thought. Since I have been here, I have worked with people from a variety of majors other than my own.
- SEI was an amazing and unique opportunity. I'm glad that i registered for it because I will cherish the friendships that i've made here.
- > Oh God I love this program, its one of my best summer.
- I absolutely recommend this program to any engineering student that will join UCSD in the future. Yes it may take time out someone's Summer, but being here still felt like summer. It is a great transition from summer vibes to school vibes. If I can do it all over again, I would.







### **Engineering Learning Communities**



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### **Diversity Student Organizations**



UNIVERSITY OF CALIFORNIA, SAN DIEGO

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### **Triton Engineering Student Council**



HIV DIAGNOSTICS + HUMAN POWERED SUBMARINE + QUADCOPTER + MADE in SPACE + ROVER CHALLENGE + PROJECT DRIVE + TRITON RACING + AUTONOMOUS AIRPLANE + ChemE CAR + SOLAR CAR + MICROMOUSE + SKYNET + SEISMIC DESIGN + CONCRETE CANOE + STEEL BRIDGE, & more

# AWARDED **\$538,550** UC San Diego

## **Engineering Traineeship Program**

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The design and implementation of an engineering traineeship program with industry partners, similar to the proven model in the medical field, with a focus on sophomore-senior undergraduate students of lower GPA.

- Students would have a <u>2.5-3.3 GPA (rationale</u>: do not qualify for traditional industry internships and/or are not as competitive for possible internships). Leverage future job placements.
- A year-long industry rotation during the academic year and/or summer; or a Spring/Summer schedule (Fall & Winter recruitment and training).
- A mentorship component in which students are paired with professional engineers which will expose students to networks that can support job placement efforts.
- A series of professional development workshops that address workforce issues, as well as ethics in engineering practice.
- Regular industry site visits; rotation amongst industry partners.

Funding request currently being prepared to the Office of Naval Research



### Questions . . . next steps . . .

- **Engineering Traineeship Program:** We need partners and letters of support, as well as commitment to help us build this program sustainably.
- **STEM and URM Education Programs:** Does your company provide support? We need advocacy and introductions.
- Become a member of the IDEA Engineering Student Center Industry Advisory Board
  - Current members:

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Solar Turbines, Qualcomm, Envision Engineering, Northrop Grumman, CalTrans, Boeing, Intel, ViaSat, Batswadi Pharmaceuticals, UTC Aerospace Systems



## IGE and Jacobs-RADY Programs



Sujit Dey, Director Institute for the Global Entrepreneur Professor, Electrical and Computer Engineering Jacobs School of Engineering

Vish Krishnan, Associate Director Institute for the Global Entrepreneur Professor of Innovation, Technology & Operations Rady School Faculty Director





## **INSTITUTE FOR THE GLOBAL** ENTREPRENEUR

Sujit Dey Professor, Jacobs School of Engineering Director, Institute for the Global Entrepreneur

Jacobs School of Engineering CAP Board Meeting May 25, 2017





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- Train influential technology leaders who will drive innovation from concept to commercialization using principles of engineering, business, and practical entrepreneurial thinking
- Provide comprehensive and customized pathways from labs to market
- Enable enhanced industry partnerships by facilitating market-driven research and PoC







- A gap exists between education/training programs and ability to form fundable start-ups with customer traction
- Many industry engagements fall short of potential impact for lack of ways to validate and translate inventions





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#### **Comprehensive Acceleration Ecosystem**







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### **Technology Accelerator**

Research and Development Focused on Commercialization Path







#### **Technology Accelerator Selected Teams**

#### Esophageal Deflection Device For Cardiac Surgery



Lead: Karcher Morris Faculty: Frank Talke Mechanical & Aerospace Engineering

E-Shielded Catheters and Guidewires



Lead: Sanjeet Hedge Faculty: Prabhakar Bandaru Mechanical & Aerospace Engineering Stretchable, Conformal Batteries for Wearable Applications



Lead: Rajan Kumar Faculty: Joseph Wang, Ying Meng NanoEngineering

#### Compact, Solid State Lasers for Autonomous Vehicles



Lead: Ashok Kodigala Faculty: Boubacar Kante Electrical & Computer Engineering

#### Cardiac Risk Assessment Imaging



Lead: Lorenzo Rossini Faculty: Juan Carlos del Alamo Mechanical & Aerospace Engineering



Corporate Affiliates Program

### **Business Accelerator**



#### **Triton Technology Fund**

\$12M Professionally-Managed Venture Fund Dedicated to Investing in UC San Diego-Affiliated Early-Stage Companies

















JACOBS SCHOOL OF ENGINEERING RADY SCHOOL OF MANAGEMENT

#### International Training and Accelerator Programs

Fostering Global Innovation Partnerships

#### **Innovation Workshop**

Introduction to Commercialization Skills and US Markets.

- 1-2 Weeks
- 10 Participants
- Classroom: customer discovery to business planning
- Visit San Diego companies

#### **Visiting Entrepreneurial Fellow**

For Corporate Engineers who want to increase innovation skills and learn how to bring a research project to market.

- 3-6 months at UC San Diego
- Individual business advisor
- Milestone-based coaching
- Commercialization training

#### **Business Accelerator**

For Entrepreneurial Teams seeking immersion into US and global innovation ecosystems and markets

- 6-12 months
- Domain-specific business advisor
- Commercialization milestones
- Connections to industry and investment ecosystem





JACOBS SCHOOL OF ENGINEERING RADY SCHOOL OF MANAGEMENT



## **INSTITUTE FOR THE GLOBAL** ENTREPRENEUR

### **Educating the Engineering Leaders of Tomorrow**

Vish Krishnan Professor and White Endowed Chair May 25 2017





JACOBS SCHOOL OF ENGINEERING

## **IGE Mission and Programs**

#### Mission Statement (Feedback Welcome):

• Inspire and Prepare market-savvy engineers with leadership traits, business knowledge, entrepreneurial mindset and execution skills that make them highly valuable for society and industry.

#### **IGE Education Programs**

- Business Certificate for Graduate Engineering Students (Pilot Completed; Second Generation Launched)
- Business/Engg Degree Program for Working Professionals
- New Courses and Degree Programs on Global Engineering Management





### IGE carves out a distinctive position for UC San Diego – integrating Engg and Mgmt Content



#### For the Top 25 Business Schools

68% Schools do not have an MBA with a Technology Concentration

Of the top 50 Engineering schools:

52% of schools do not have business/management education programs.





JACOBS SCHOOL OF ENGINEERING RADY SCHOOL OF MANAGEMENT

## IGE Certificate Program (Pilot) - Results

- Year-long Program catering to Graduate students in Engineering.
- 32 students enrolled in the program: two-third are doctoral students
- Courses on Product Management and Marketing, Execution, Entrepreneurship with components on Leadership
- Student Satisfaction Ratings: 95% Very Satisfied.
  - <u>Comments from Teryn Johnson</u>
  - Grad student in Bio-Engg.
  - More flexible certificate program preferred
  - More on Team science and project mgmt.







### IGE: Plans for Degree Programs

- Degree Programs for Working Professionals
  - Systems Engineering and Management building on the AESE program catering to the defense sector.
- Professional Full-time Masters Program in Engineering/Operations Management and Leadership

Interactional Expertise Across cultures, disciplines (understanding & communications) Deep in a discipline rew domains (analytic thinking & problem solving)





JACOBS SCHOOL OF ENGINEERING RADY SCHOOL OF MANAGEMENT

### Summary – Next Steps

- IGE Education Programs off to a fast start; We would like to hear from you on your organization's needs in educating the Engineering leaders of tomorrow.
- How should we design our Education programs to better prepare our current and future students?
  - How to combine technical depth and pragmatic business skills?
  - What kind of skills are you looking for in newly hired graduate students?
  - What would be the ideal degree programs for your employees at the intersection of Engineering and Management?





## CAP BUSINESS



## Cody Noghera

Executive Director, Corporate Research Partnerships

Jacobs School of Engineering





## $RESEARCH E \times PO$



THURSDAY APRIL 20 2017

200+ Graduate-level research posters

90+ Industry Judges

### Maximum Capacity ~ 600 Attendees

### "Their research moves the needle. It truly changes the world."

Dean Pisano





## RESEARCH EXPO



THURSDAY APRIL 20 2017

## Thank you to 2017 Sponsors!











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JACOBS SCHOOL OF ENGINEERING Corporate Affiliates Program ASML CYMER



Center for Engineered Natural Intelligence

# Achieving 'creative thinking' in machines

### The IBM Watson AI XPRIZE® UCSD CENI competition team

Enabling machine 'thinking' and new ideas in cognitive computing systems. And using these capabilities to put humans on Mars.

CENI selected to take part in the IBM Watson AI XPRIZE ®.

**Our goal:** enable cognitive computing systems the ability to come up with new ideas and perform "creative machine thinking" in order to solve complex problems

Why would industry partners want to join CENI and the XPRIZE team: Access to the core technology for industry and business specific applications. Access to the team and people!



## **Team Internship Program**

### Thank you to our 2017 sponsors!

### **TIP Training Day May 31st 4-8pm**

Team Challenge Course Will Focus On:

- Communication Activities
- Advanced Problem Solving
- Understanding & Developing Leadership Styles
- Healthy Risk Taking
- Interconnectedness & Interdependence





### Next Year: TIP 15 Year Celebration!



**Corporate Affiliates Program** 

## Master of Advanced Study AY 2016-17 Summary

### 175 Total students enrolled in 4 MAS Programs

### Graduating in June 2017

- Architecture-based Enterprise Systems Engineering
- Data Science and Engineering
- Medical Device Engineering
- Wireless Embedded Systems

### Over 30 UCSD Faculty/Lecturers

- Bioengineering
- Computer Science
- Electrical and Computer Engineering
- Mechanical and Aerospace Engineering
- Rady School of Management
- San Diego Supercomputer Center
- UCSD School of Medicine

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JACOBS SCHOOL OF ENGINEERING Corporate Affiliates Program Master's Degree for Working Engineering Professionals

34 22 17 22 95 Class of '17 Graduates

## **Master of Advanced Study**

A Master's Degree for Working Engineering Professionals

### MAS at Jacobs (2011-2017)

More than 140 companies have students in/graduated from an MAS Program

### **Total Number of Graduates**

Architecture-based Enterprise Systems Engineering	244	
Data Science and Engineering (launched 2014)	78	
Medical Device Engineering	86	
Wireless Embedded Systems	148	

**556** Total Degrees Awarded

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**Corporate Affiliates Program** 

### Sign Up for 2017-18 Programs

## Spirit of Solar CAP Executive Cruise

## Please RSVP for the September 25, 2017 Spirit of Solar Cruise

## Dates to Remember

May 31, 2017	Team Internship Training Day
June 7, 2017	Endowed Chair Reception: Stefan Savage
June 9, 2017	Center for Resilient Materials & Systems Summit
June 10, 2017	ECE Design Competition Showcase
June 15, 2017	MAE Senior Design Competition Showcase
September 25, 2017	Spirit of Solar Executive Cruise
October 5, 2017	CAP Fall Board Meeting



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## Thank You

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