Welcome
CAP Executive Board
Thursday, May 25, 2017
Interim Chairman

Nik Devereaux, Director of Software Engineering, ViaSat
Welcome New CAP Members

Nordson

SONY
Welcome TESC Leadership

Student Organization Project Leaders

Society of Women Engineers (SWE)

Triton Engineering Student Council (TESC)
The Society of Women Engineers

Established 1981

Technical Skills

Future of SWE

Inclusion  Diversity  Leadership

Professional Development

Community
We connect students with companies for:

- Career opportunities
- Product Exposure
- Brand Engagement

Let’s talk! sponsor@tesc.ucsd.edu
DEAN’S BRIEF

Albert P. Pisano
Dean, Jacobs School of Engineering

UC San Diego
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
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
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
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
- 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
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

UC San Diego
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)

UC San Diego
Jacobs School of Engineering
Corporate Affiliates Program
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
# Building Milestones and Anticipated Timeline

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Estimated Date</th>
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<tbody>
<tr>
<td>Architect Selection</td>
<td>9 May 2017</td>
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<tr>
<td>Detailed Project Programming</td>
<td>June-Sept 2017</td>
</tr>
<tr>
<td>Preliminary Plans (Regents Approval Item)</td>
<td>September 2017</td>
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<tr>
<td>Project Planning Guide (PPG)/Budget Complete</td>
<td>November 2017</td>
</tr>
<tr>
<td>Budget and Financing (Regents Approval Item)</td>
<td>January 2018</td>
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<tr>
<td>Design &amp; Environmental (Regents Approval Item)</td>
<td>October 2018</td>
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<tr>
<td>Construction Begins</td>
<td>Summer 2019</td>
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<tr>
<td>Building Opens</td>
<td>Fall 2021</td>
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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
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.
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.
<table>
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<th>1st Priority</th>
<th>Second round</th>
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<td>• Learning Communities</td>
<td>• Strengthening undergraduate research experiences (together with EAP),</td>
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<tr>
<td>• ENG 1-2-3 Course Series</td>
<td>connecting them to “Research Experiences for Teachers”.</td>
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<td>• ENG 10</td>
<td>• Development of economies of scale across all K-12 outreach efforts.</td>
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<td>• Engineering Early Intervention Warning System</td>
<td>• Focus on image (improved communications and web site), “Parents Day @</td>
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<td>• Engineering Overnight Stay Program (together with other campus efforts)</td>
<td>JSOE”</td>
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<td>• Transfer Summer PrEP</td>
<td>• “Teachers Day @ JSOE”</td>
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<tr>
<td>• Summer Engineering Institute</td>
<td>• Focus on graduate recruitment and mentorship</td>
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<td>• Strengthening and evaluating mentorship and professional development</td>
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<td>• Support for students and faculty to develop their own “named” programs,</td>
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**UC San Diego**
Undergraduate Programs

Student-led Programs
- Society of Hispanic Professional Engineers
- National Society of Black Engineers
- Society of Women Engineers
- American Indian Science and Engineering Society
- Triton Engineering Student Council

IDEA Center Programs
- T.E.A.M.
- JUMP
- IDEA Scholars
- Freshmen Summer PrEP
- Transfer Summer PrEP
- S.W.E.E.T.
- Breakfast with Deans
- Brunch with Deans
- Engineering Overnight Stay Program
- Engineering 1-2-3 Course Series
- Learning Communities
- Undergraduate Research Experiences
- Study Center & Expanded Tutoring
- Introductory Mathematics for Engineering Applications
- Engineering Early Intervention Warning System

Retention Coordinators + Peer Mentors

Faculty-led Programs
- Research Experiences for Undergraduates
- MAE Math Open House
- SPIS (CSE)
## Graduate and Post-doctoral Programs

### Graduate Recruitment:
- Calling campaign
- Online/live faculty question and answer sessions
- Significant participation in recruitment conferences (SHPE, NSBE, McNair, Diversity Forum, SACNAS, Institute for Teaching and Learning)

### Grad Diversity Mentorship:
Tiered mentorship (advanced graduate students with new students; advanced post-doctoral researchers with new post-docs).

### ENG GRAD and Scholarly Talks:
The enhanced version of GRAD Talks, now also for post-doctoral researchers and with the participation of outside speakers.

### Tomorrow’s Professor Conference (Diversifying Academia):
- The main objective would be to recruit minorities and women to academia and pursue careers in academia.
- This program should be connected with our Excellence Diversity hiring efforts.
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.
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.
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/chancellor-khosla/blog/preparing-for-success
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 used 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
Diversity Student Organizations

oSTEM
University of California, San Diego

UC San Diego
Triton Engineering Student Council

20 TEAM PROJECTS

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

$58,550
Engineering Traineeship Program

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 **2.5-3.3 GPA** (rationale: 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:
    - 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
• 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

Internal Resources
- Research Centers
- Mentors
- EIRs

External Resources
- Industry Partners
- Strategic Investment Partners
- Incubators

Next Generation Technology Leaders
Start-ups with Core Innovation
Industry Collaborations with Impact

Education: Engineering Leadership, Entrepreneurism
Certificate and Degree Programs
Working Professionals, Engineering Students

Training: NSF I-Corps (market discovery)
Hack4Defense (solving real national security problems)

Accelerators
Global Entrepreneurship
• 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
Technology Accelerator

*Research and Development Focused on Commercialization Path*

Enabling the most critical steps towards commercialization

- Market-Ready Prototype
- Pilot with Customer/Industry Partner
- Validated Value Proposition and Market
- Milestones driven one year program
- $50k grant (No IDC)
- $25k equipment/facilities use
- Business Mentor/EIR
- Industry Sponsor Collaborator

License to Industry Sponsor

Startup (Path to Market Program)

Customer Acquisition

Status:
- April’17: 5 teams selected (from 60) through a screening process including boot camps and reviewer panel
- May’17: Program started
Technology Accelerator Selected Teams

**Esophageal Deflection Device For Cardiac Surgery**

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

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

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

**Stretchable, Conformal Batteries for Wearable Applications**

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

**E-Shielded Catheters and Guidewires for MRI Heart Imaging**

Lead: Sanjeet Hedge  
Faculty: Prabhakar Bandaru  
Mechanical & Aerospace Engineering

**Cardiac Risk Assessment Imaging**

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

- Commercialization Assessment
  - Students
  - Faculty
  - Alumni
  - Global Teams

Business Plan Development
- EIR Coaching/Mentoring

Company Formation
- Entrepreneur Showcase

Access to Capital
- Triton Fund
- Rady Fund
- Strategic Funds

Triton Technology Fund
$12M Professionally-Managed Venture Fund Dedicated to Investing in UC San Diego-Affiliated Early-Stage Companies
# International Training and Accelerator Programs

**Fostering Global Innovation Partnerships**

<table>
<thead>
<tr>
<th>Innovation Workshop</th>
<th>Visiting Entrepreneurial Fellow</th>
<th>Business Accelerator</th>
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<tbody>
<tr>
<td><strong>Introduction to Commercialization Skills and US Markets.</strong></td>
<td><strong>For Corporate Engineers who want to increase innovation skills and learn how to bring a research project to market.</strong></td>
<td><strong>For Entrepreneurial Teams seeking immersion into US and global innovation ecosystems and markets</strong></td>
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<tr>
<td>- 1-2 Weeks</td>
<td>- 3-6 months at UC San Diego</td>
<td>- 6-12 months</td>
</tr>
<tr>
<td>- 10 Participants</td>
<td>- Individual business advisor</td>
<td>- Domain-specific business advisor</td>
</tr>
<tr>
<td>- Classroom: customer discovery to business planning</td>
<td>- Milestone-based coaching</td>
<td>- Commercialization milestones</td>
</tr>
<tr>
<td>- Visit San Diego companies</td>
<td>- Commercialization training</td>
<td>- Connections to industry and investment ecosystem</td>
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INSTITUTE FOR THE GLOBAL ENTREPRENEUR

Educating the Engineering Leaders of Tomorrow

Vish Krishnan
Professor and White Endowed Chair
May 25 2017
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.
IGE Certificate Program (Pilot) - Results

- Year-long Program catering to Graduate students in Engineering.
- 32 students enrolled in the program: two-thirds are doctoral students.
- Courses on Product Management and Marketing, Execution, Entrepreneurship with components on Leadership.
- Student Satisfaction Ratings: 95% Very Satisfied.
  - Comments from Teryn Johnson
  - 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**

Diagram:

- Interactional Expertise Across cultures, disciplines
  - (understanding & communications)
  - Deep in few domains
  - Deep in a discipline
  - Contributory expertise
  - (analytic thinking & problem solving)
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?
Cody Noghera
Executive Director, Corporate Research Partnerships
Jacobs School of Engineering
200+ Graduate-level research posters

90+ Industry Judges

Maximum Capacity ~ 600 Attendees

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

Dean Pisano

UC San Diego

JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program
Thank you to 2017 Sponsors!
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!

Enabling machine ‘thinking’ and new ideas in cognitive computing systems. And using these capabilities to put humans on Mars.
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!
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 34
• Data Science and Engineering 22
• Medical Device Engineering 17
• Wireless Embedded Systems 22

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

95 Class of '17 Graduates

Master’s Degree for Working Engineering Professionals
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

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

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<td>June 7, 2017</td>
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<td>June 9, 2017</td>
<td>Center for Resilient Materials &amp; Systems Summit</td>
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<td>June 15, 2017</td>
<td>MAE Senior Design Competition Showcase</td>
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<td>September 25, 2017</td>
<td>Spirit of Solar Executive Cruise</td>
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<td>October 5, 2017</td>
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