

UC San Diego

JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program



Welcome
CAP Executive Board
October 10, 2019

CAP Chairman and Vice Chairman



Nik Devereaux

Director of Software Engineering
Viasat



GB Singh

Director, Package & Systems Engineering
Solar Turbines

Welcome

UC San Diego

JACOBS SCHOOL OF ENGINEERING
Corporate Affiliates Program

WELCOME NEW CAP PARTNERS



WELCOME TRITON ENGINEERING STUDENT COUNCIL

TESC

Triton Engineering Student Council

We empower engineers.

Jonathan Luck, President; Senior, Computer Science
Summer Batasin, VP External; Senior, Bioengineering

What is TESC?

The Triton Engineering Student Council (TESC) empowers UC San Diego engineering students by connecting them with impactful communities, projects, and career building opportunities.

We do this through:

1. Hosting events for engineering students
2. Supporting 40+ engineering student organizations
3. Advocating for engineering students



Connect with Us & Our Community!



TESC always values insight and support from industry. Working with industry partners enables us to support the engineering community and prepare students for their post-college careers.

Interested in collaborating?

sponsor@tesc.ucsd.edu -- TESC Sponsorship Team

summer@tesc.ucsd.edu -- TESC VP External

jonathan@tesc.ucsd.edu -- TESC President

WELCOME SOLAR TURBINES CO-OP TEAM

Solar[®] Turbines

A Caterpillar Company

Garrett Tse, Senior, Environmental Engineering
Kenneth Iccayan, Senior, Aerospace Engineering



UC San Diego Jacobs School of Engineering Co-op Additive Manufacturing

Garrett Tse, Senior, Environmental Engineering
Kenneth Icyan, Senior, Aerospace Engineering



PROJECT OVERVIEW

How do we utilize 3D Printers

to:

- Improve design
- Reduce cost
- Increase production



Picture of Printed Swirler

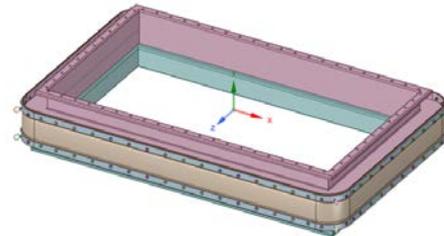
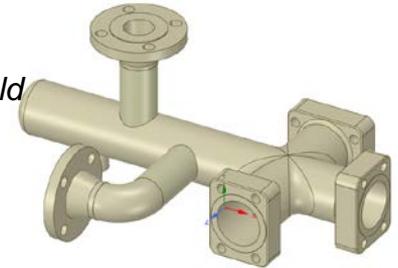


AM Concept Laser Machine

Project Goals:

- Explore a list of parts
- Provide a process map for AM
- Outline overall benefits

1) Lube Oil Manifold
(Design Process)

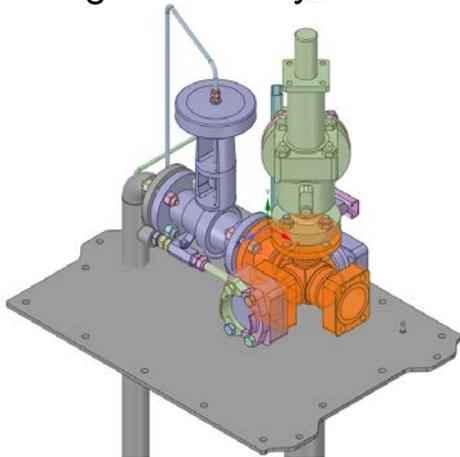


2) Exhaust Joint Bellow
(Solving Specific Problems)

LUBE OIL MANIFOLD

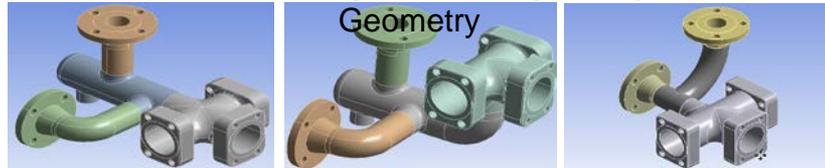
Why Optimize:

- Strange Geometry
- Made from “off the shelf” parts
- Large Assembly



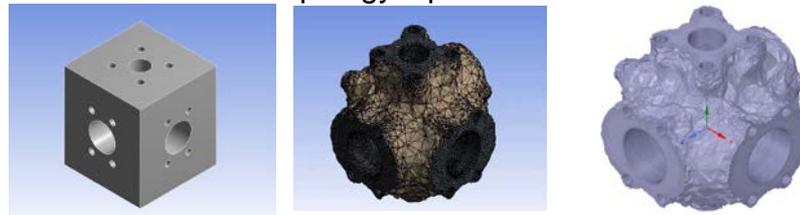
Manifold shown in gold

Consolidating Parts/Reorganizing



Geometry

Topology Optimization



Design for AM



Evaluation



EXHAUST JOINT

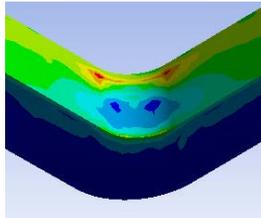
Why Optimize:

- Thermal stress in corners
- Cracking in the metal frame
- Expensive: \$20000-\$50000

Previous Findings:

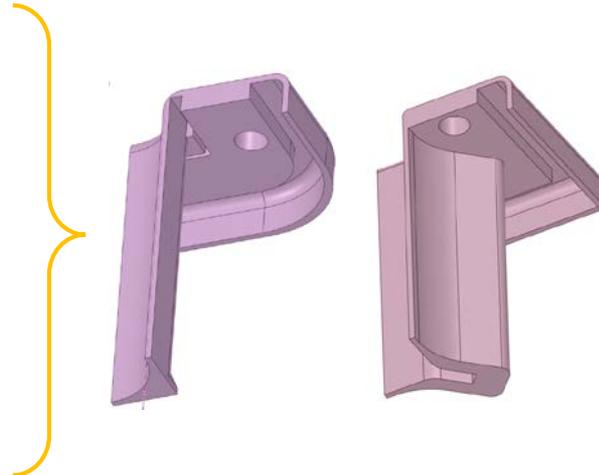
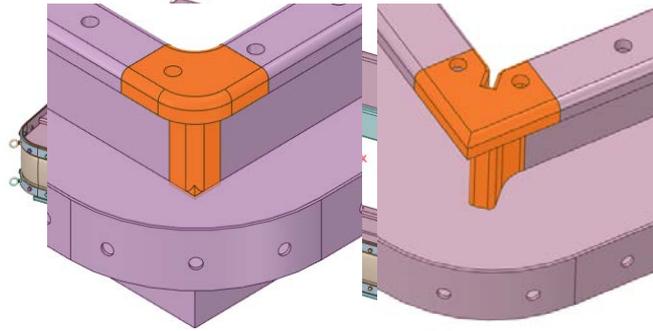
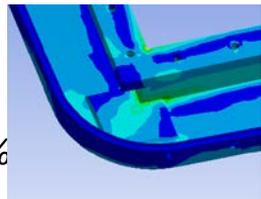
Rounding edges:

Lowers max stress by 26%



Adding mass at stress concentrations:

Lowers max stress by 43%



Printing Corner Piece:

- ✓ Added mass support
- ✓ Rounded edges
- ✓ Increased wall thickness

50 - 60%
Improvement!

OVERCOMING CHALLENGES

Project

New Technology:

Prices are improving,
analysis tools in
development



Current Printing Size:

Parts from Solar's Packaging
are relatively large



Designing For AM:

Understanding/applying
printing limitations to designs



Co-Op Experience

First industry experience:

Applying concepts to real
world situations



Learning New Software:

Creo, ANSYS, FEA, CFD



Working Environment:

Adapting from college to
corporate environment



CO-OP HIGHLIGHTS

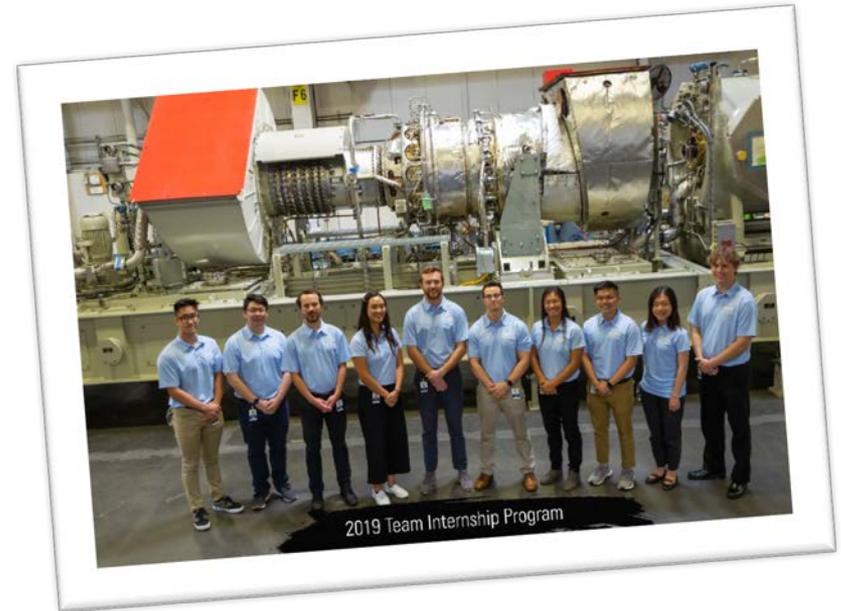
Working with a variety of engineers and manufacturers

Working with emerging technology

Free Coffee!

Thank you:

- Dean Pisano and MAE Chair Coimbra
- Corporate Affiliates Program
- GB Singh and Solar Turbines!



Dean's Report

Albert P. Pisano

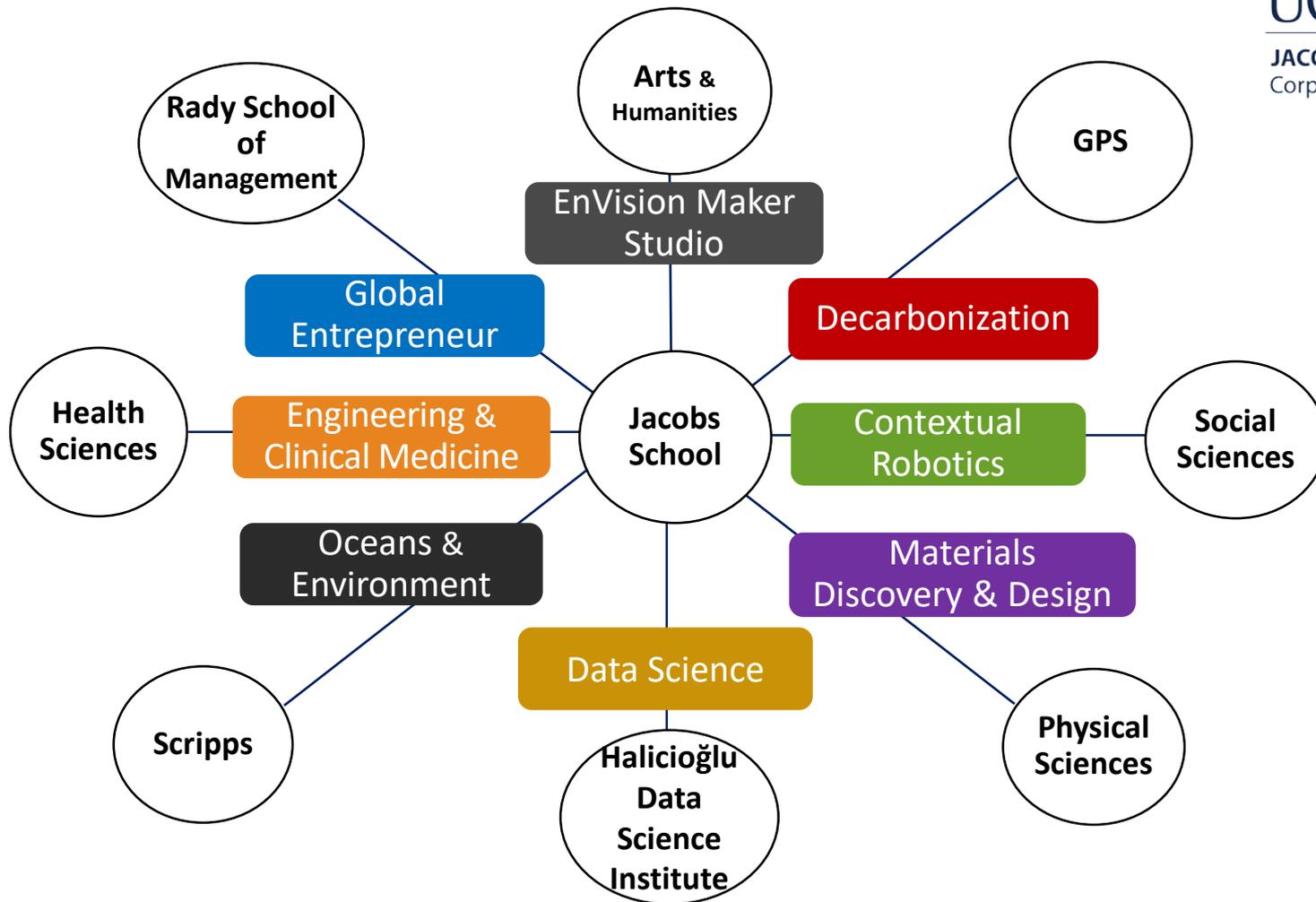
Dean, Jacobs School of Engineering



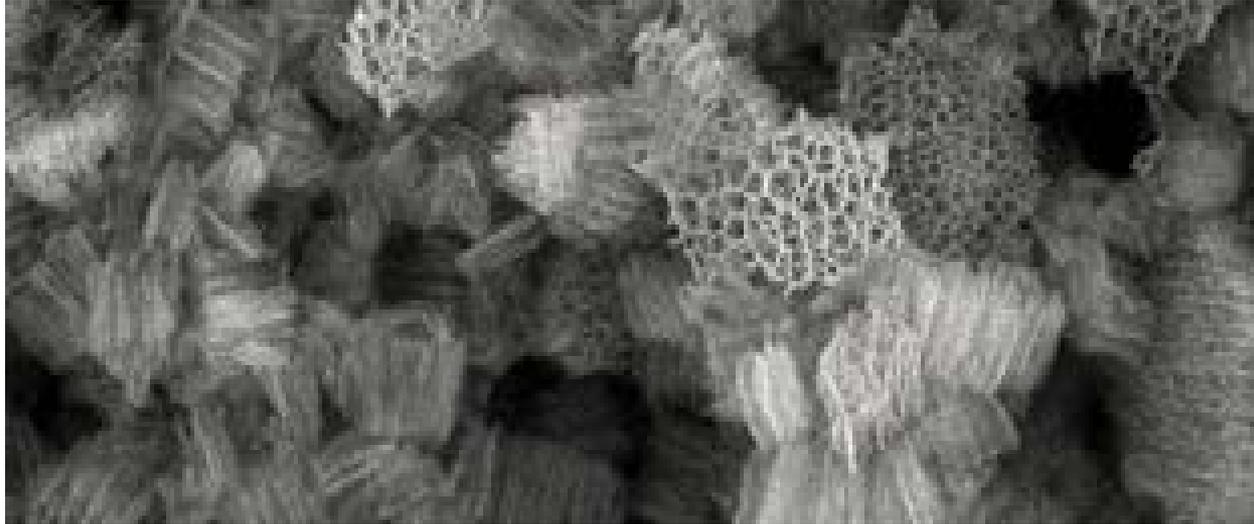
Accelerating the March to Cachet

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Institute for Materials Discovery and Design



Apply machine learning and rapid materials synthesis/characterization to accelerate development of novel functional materials for energy, information technology, medicine and more.



Shirley Meng,
Prof of NanoEngineering



Michael Sailor
Prof of Chemistry

New Rady School of Management Dean Lisa Ordóñez



Continuing Partnership through
Institute for the Global Entrepreneur

Please Join Us!

IGE Technology Showcase

November 1

Atkinson Hall

Contact:

Dennis Abremski

Executive Director, IGE

dabremski@eng.ucsd.edu

Institute for the Global Entrepreneur

*Serving more than 100 Teams & Startups
in Energy, Medtech, AI and Nanotech*

- **Technology Management & Entrepreneurism Education** with Rady School of Management
- **Technology Accelerator** – For teams to develop prototypes and validate with industry partners, refine business plans, build teams and engage investors.
- **MedTech Accelerator** – New Partnership with Altman Clinical Translational Research Institute to be announced November 1



*South 8 Technologies team
developing lithium batteries
for extreme cold*

Convergent Systems Engineering Update

- Faculty Leadership:
Cluster of 5 New Hires Underway
- Academic Coordinator (Rick Gessner) working with three departments on curricula plans: ECE, MAE, SE
- “Topics in Systems Engineering” industry guest lectures Fall 2019

TOPICS IN SYSTEMS ENGINEERING

Professor Todd Hylton, Executive Director, Contextual Robotics Institute
Professor David Whelan, Electrical and Computer Engineering

*Mondays, September 30–December 2, 2019
Atkinson Hall Auditorium 5:00pm – 7:00pm*

14 October 2019

Sagnik Nandy – Google – “Handling Scale (System and Developer) and Reliability in Large and Critical Systems”

21 October 2019

David Whelan – UC San Diego – “An Integrated Medium Earth Orbit – Low Earth Orbit Navigation, Communication and Authentication System of Systems”

28 October 2019

David Harris – Cubic Transportation Systems – “The Cost of Taking Shortcuts”

04 November 2019

Srinivas Chennupati – Intel – “Scaling the Third Dimension in Silicon Integration”

18 November 2019

Nirmal Velayudhan – Viasat – “Applying a Decision Theoretic Framework for Evaluating System Trade-Offs”

25 November 2019

Robert Plummer – LLNL – “Systems Engineering the World’s Most Energetic Laser”

02 December 2019

Ariele Sparks – Northrop Grumman – “The Criticality of Systems Engineering to Autonomous Air Vehicle Development”

cri-info@eng.ucsd.edu - seminars open to public

2019 New Faculty Hires

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ALYSSA POWELL

MECHANICAL & AEROSPACE ENGINEERING

EXPERTISE

Enzyme engineering and protein production

MOST RECENTLY

Lecturer, University of California San Diego



MICHAEL R. DAVIDSON

MECHANICAL & AEROSPACE ENGINEERING

EXPERTISE

Low-carbon energy at scale

MOST RECENTLY

Postdoctoral Research Fellow, Harvard Kennedy School



JINGBO SHANG

COMPUTER SCIENCE & ENGINEERING

EXPERTISE

Data-driven text mining

MOST RECENTLY

Ph.D. University of Illinois, Urbana-Champaign



XIAOLONG WANG

ELECTRICAL & COMPUTER ENGINEERING

EXPERTISE

Computer vision and machine learning

MOST RECENTLY

Ph.D. Carnegie Mellon University



DAVID KAMENSKY

MECHANICAL & AEROSPACE ENGINEERING

EXPERTISE

Computational mechanics

MOST RECENTLY

Postdoctoral researcher, Brown University



MACHEL MORRISON

STRUCTURAL ENGINEERING

EXPERTISE

Enhancing civil infrastructure resilience

MOST RECENTLY

Research Assistant Professor, North Carolina State University



NADIA HENINGER

COMPUTER SCIENCE & ENGINEERING

EXPERTISE

Security and cryptography

MOST RECENTLY

Assistant Professor, University of Pennsylvania



LINGYAN SHI

BIOENGINEERING

EXPERTISE

Visualizing complex biology in real time

MOST RECENTLY

Postdoctoral Research Associate, Columbia University



ALBERT CHERN

COMPUTER SCIENCE & ENGINEERING

EXPERTISE

Computational mathematics

MOST RECENTLY

Postdoctoral research, Technische Universität Berlin



HANH-PHUC LE

ELECTRICAL & COMPUTER ENGINEERING

EXPERTISE

Advanced electronic systems

MOST RECENTLY

Assistant Professor, University of Colorado Boulder



PENGTAO XIE

ELECTRICAL & COMPUTER ENGINEERING

EXPERTISE

Machine learning for healthcare

MOST RECENTLY

Senior Director, Petuum Inc



GERALD SOOSAI RAJ

COMPUTER SCIENCE & ENGINEERING

EXPERTISE

Computer science education for diverse learners

MOST RECENTLY

Ph.D. University of Wisconsin-Madison



NIEMA MOSHIRI

COMPUTER SCIENCE & ENGINEERING

EXPERTISE

Computational HIV epidemiology

MOST RECENTLY

Ph.D. UC San Diego



HUIHUI QI

MECHANICAL & AEROSPACE ENGINEERING

EXPERTISE

Sustainable engineering systems

MOST RECENTLY

Assistant Professor, Grand Valley State University



EDWARD WANG

ELECTRICAL & COMPUTER ENGINEERING

EXPERTISE

Intelligent mobile health monitors

MOST RECENTLY

Ph.D. University of Washington



YIYING ZHANG

COMPUTER SCIENCE & ENGINEERING

EXPERTISE

Hardware and software for next-gen data centers

MOST RECENTLY

Assistant Professor, Purdue University



BORIS KRAMER

MECHANICAL & AEROSPACE ENGINEERING

EXPERTISE

Methods to reduce computational complexity

MOST RECENTLY

Postdoctoral researcher, MIT



PAT PANNUTO

COMPUTER SCIENCE & ENGINEERING

EXPERTISE

Connecting digital and physical worlds

MOST RECENTLY

Ph.D. UC Berkeley

New Faculty Welcome:
October 17, 2019 at 5:00pm

Welcoming our Incoming Academic Leadership



Christine Alvarado
*Associate Dean
Students*



Karen Christman
*Associate Dean
Faculty Affairs & Welfare*

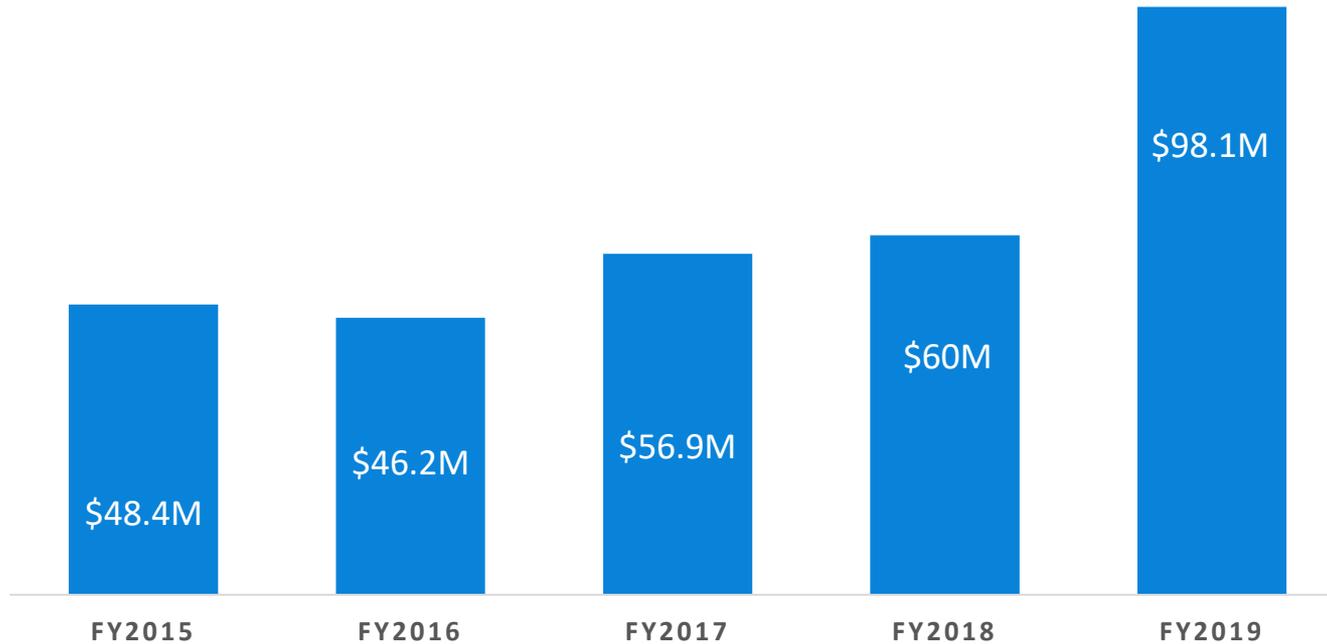


Bill Lin
*Department Chair
Electrical & Computer
Engineering*



Shaochen Chen
*Department Chair
NanoEngineering*

Research Funding Growth: New Awards



FY19Q2, Total Dollars Authorized by Sponsor, awards and supplements. Source, UC San Diego Office of Contract and Grant Administration

The Jacobs School of the next Decade: 2020 Strategic Plan



Sustained Performance → **Reputation** (10 Yrs)
Sustained Reputation → **Cachet** (20 Yrs)

- One of the nation's largest engineering schools, providing leadership, talent and technology at scale.
- Graduates recognized for core engineering knowledge that enables them to solve new problems
- Working with industry is part of our DNA drive towards relevance and cachet
- No silver bullet—broad set of coordinated efforts
- Striving toward recognition (not ranking)

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Franklin Antonio Hall

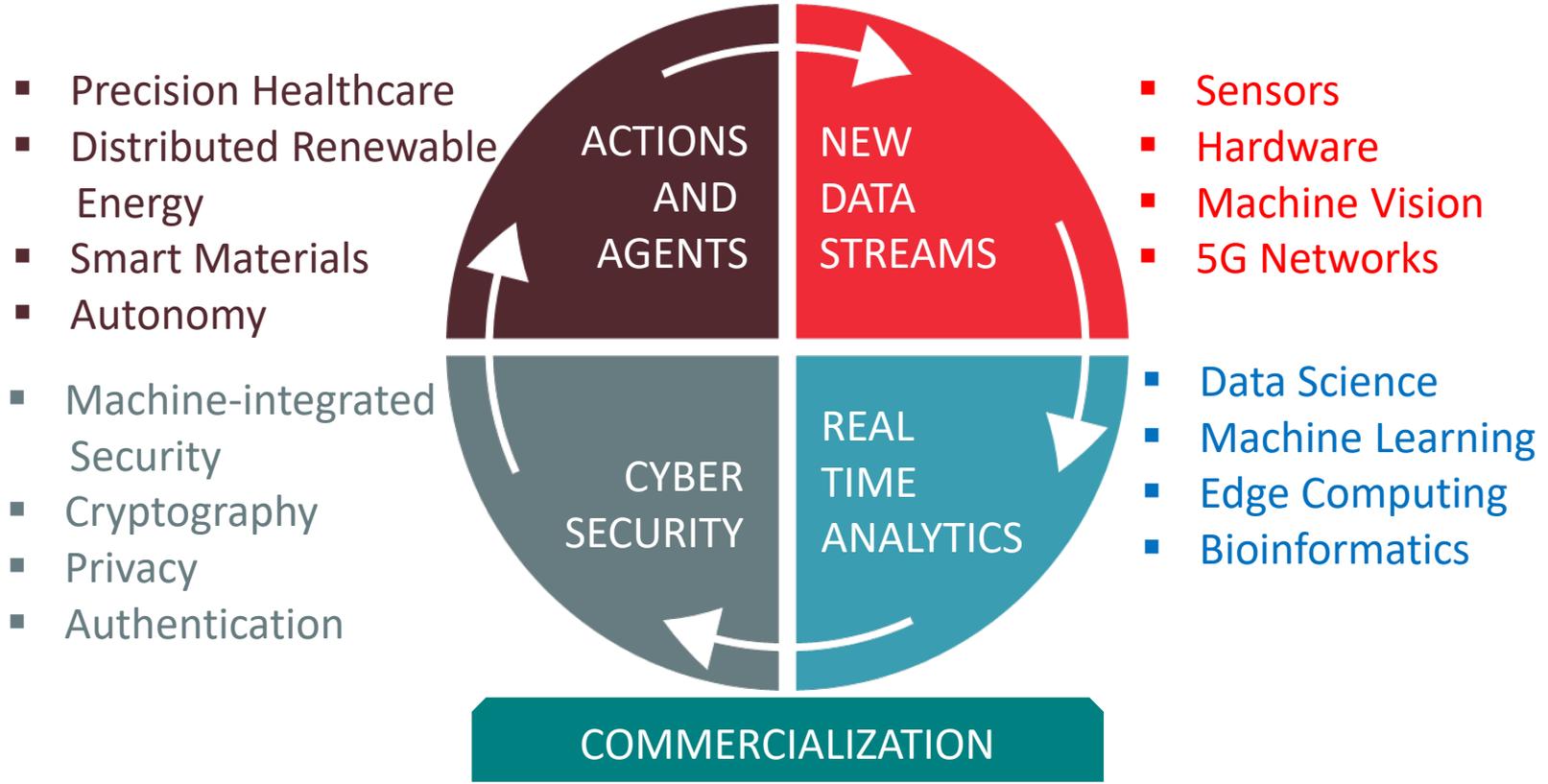
GROUNDBREAKING CELEBRATION | NOVEMBER 15, 2019



Guidelines for Design

- Maximize the circulation of people and ideas
- Flexible laboratories to stand the test of time
- Welcoming to industry partners
- Benefits the entire Jacobs School

Research Vision for the Digital Future



Collaboratories for the Digital Future

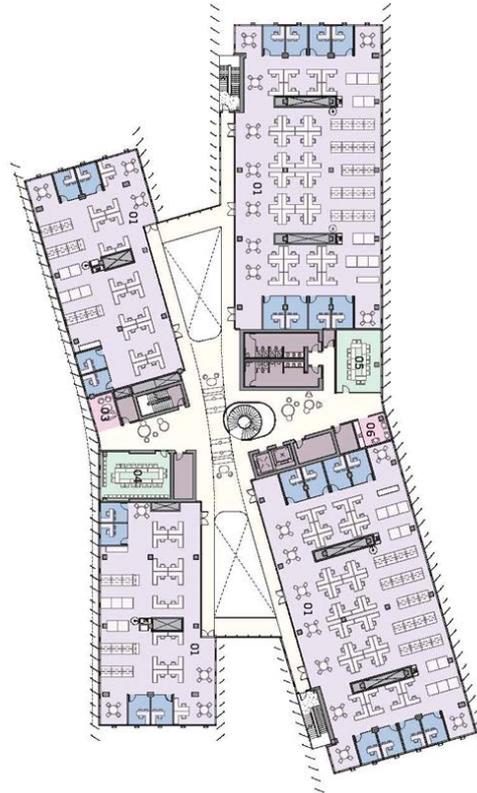
Machine-Integrated Computing
and Security

Convergent Systems
Engineering

Halicioğlu Data Science Institute

Wearable Sensors

High Energy Density Science



NanoImmuno Engineering | IEM

Precision Genomics | Salk

Contextual Robotics Institute

Sustainable Power and Energy

Wireless Communications

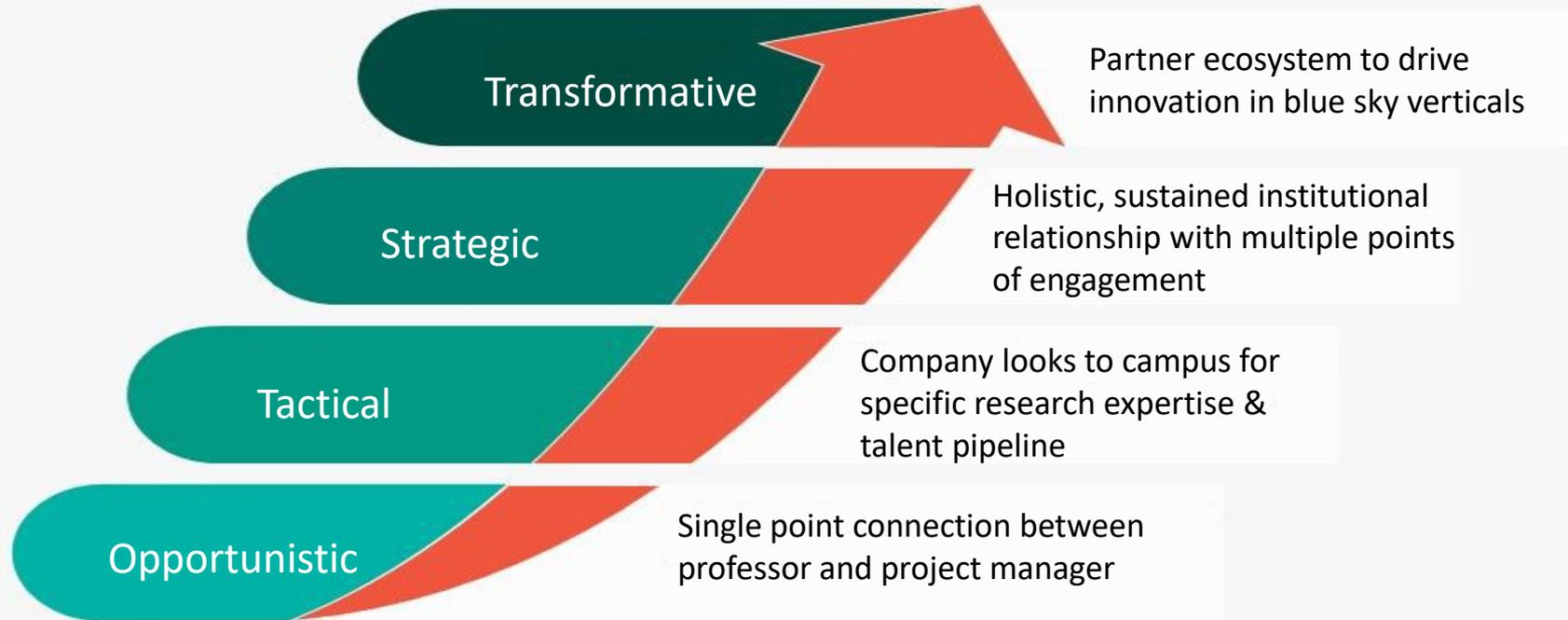


Strategic University-Industry Relationships

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Drive Relevancy and Ensure Exponential Impact



A Single Point Connection with an Expert Faculty Member is Necessary, but not Sufficient

*“We sponsor more than 500 projects at about 100 universities.
But somehow we feel we are not fully leveraging our investment.*

*We are changing course and instead building trusted strategic
relationships with selected schools.”*

Global Partner Company in current
negotiations with Jacobs School for
strategic relationship

Jacobs School Corporate Affiliates Program is a National Model for University-Industry Partnerships

- Dedicated team works with company to develop annual engagement plan
- 90% retention of industry members year over year
- Benchmarked by national engineering schools



Jacobs School Corporate Affiliates Program: 75 Strategic Corporate Partners

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16 Agile Research Centers and Institutes

New

- Machine Integrated Computing and Security
- Wearable Sensors
- Contextual Robotics Institute
- Visual Computing
- Nano Immuno-Engineering
- Microbiome Innovation
- CHO Systems Biology
- Extreme Events Research
- Engineered Natural Intelligence (AI)
- Sustainable Power and Energy
- Institute for Materials Discovery and Design

Existing

- Center for Wireless Communications
- Center for Networked Systems
- Institute for Engineering in Medicine
- Center for Memory and Recording Research
- Qualcomm Institute



70+ New Relationships Enable Use-Driven Research



Strategic Relationship Characteristics

- Clear sense of mutual benefit to both the Jacobs School and the Partner
 - Advances research and education mission for public good
 - Synergistic with corporate roadmap
- Holistic and coordinated institutional approach engaging multiple corporate divisions to reach goals.
 - Human Resources
 - Research and Development
 - Business Development
 - Community Relations
 - New Ventures
- Sustained, multi-year engagement with branded Corporate Presence on campus

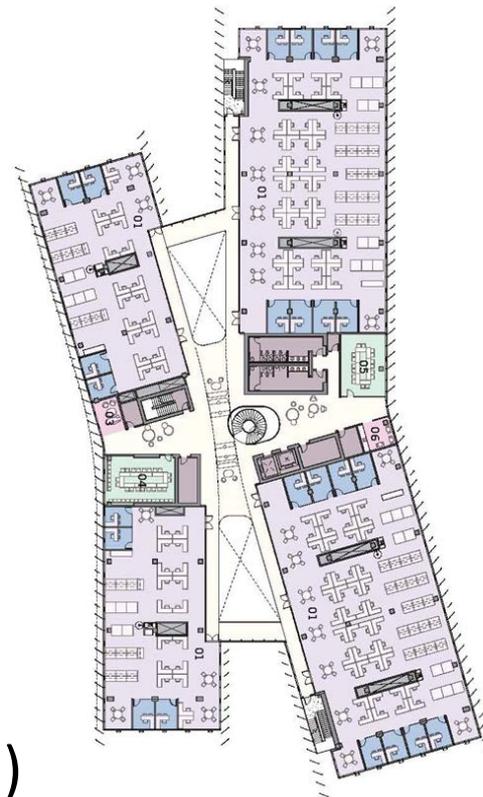
Collaboratories for the Digital Future: Innovation Ecosystems

1. Mobile AI at the Edge
2. Connected Health
3. Smart, Safe, Sustainable Mobility
4. Materials Design & Discovery



Collaboratories for the Digital Future: Innovation Ecosystems

1. Mobile AI at the Edge
2. Connected Health
3. Smart, Safe, Sustainable Mobility
4. Materials Design & Discovery
5. Precision Medicine for Infections Diseases (?)



Faculty Presentation

Nicole Steinmetz

Professor, NanoEngineering

Director, Center for Nano Immuno-Engineering



NanoEngineering Gone #Viral

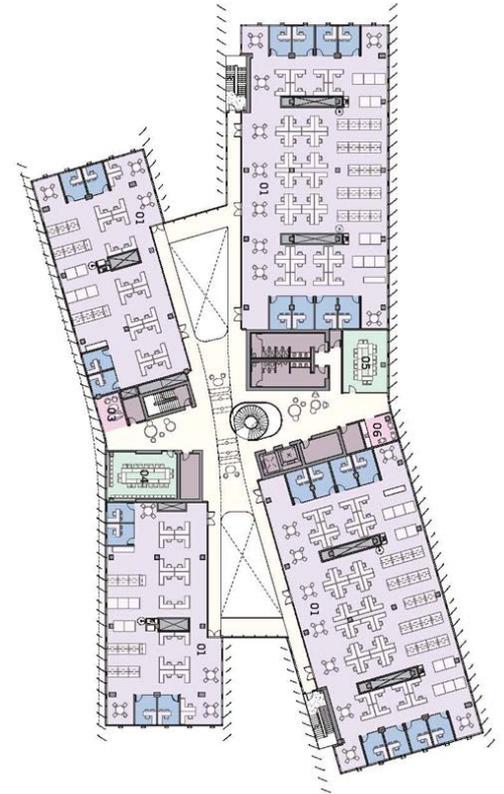
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CAP Executive Input: Innovation Ecosystems

Discussion Topic:

What other emerging innovation ecosystems should the Jacobs School pursue?



CAP Business



Wil Dyer

Director, Corporate Affiliates Program

CAP News & Updates

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Corporate Affiliates Program

Jacobs School Corporate Affiliates Program: 75 Strategic Corporate Partners

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CAP Talent Programs

We help you define and execute your talent acquisition strategy on campus

- Corporate Day@Jacobs
- Tech Talks
- Information Sessions
- Professional Student Organizations
- Internships & Full-time jobs
- Team Internship Program (TIP)
- Cooperative Education (Co-op)



*Top CSE students network with CAP Partners
at CSE Tutor Networking Night*

Team Internship Program (TIP)

- 2-5 members; Undergraduate, Masters, and Ph.D. Levels
- All engineering majors - we encourage multi-disciplinary teams; other majors on occasion
- Paid Internships, 10-12 weeks over the summer
- Full-time, i.e., 40 hour/week commitment

Cooperative Education (Co-op)

- First in the UC System
- Cohort #2: June-December 2020
- CSE, MAE, ECE only
- Full-time (30-40 hours per week) for up to 6 months - Summer and Fall quarters
- Undergraduate only - any year, international students included

Recruiting Timeline

October - December	Companies include TIP/Co-op in budget planning. Companies define and submit projects and recruitment starts
January - March	Companies continue to submit their projects and recruitment continues; offers extended
April	Finalize recruitment & offers
May	Selections completed Intern pre-deployment training
June-December	TIP period during 10-12 consecutive weeks (Jun-Sept) Co-op period up to 6 months (Jun-Dec)

New Jacobs School Student Recruitment Database

- Post full/part-time opportunities, internships, TIP & Co-op
- Proactively identify qualified students through tailored resume book
- Request/sign up for targeted recruiting events and promote to students

More Information:

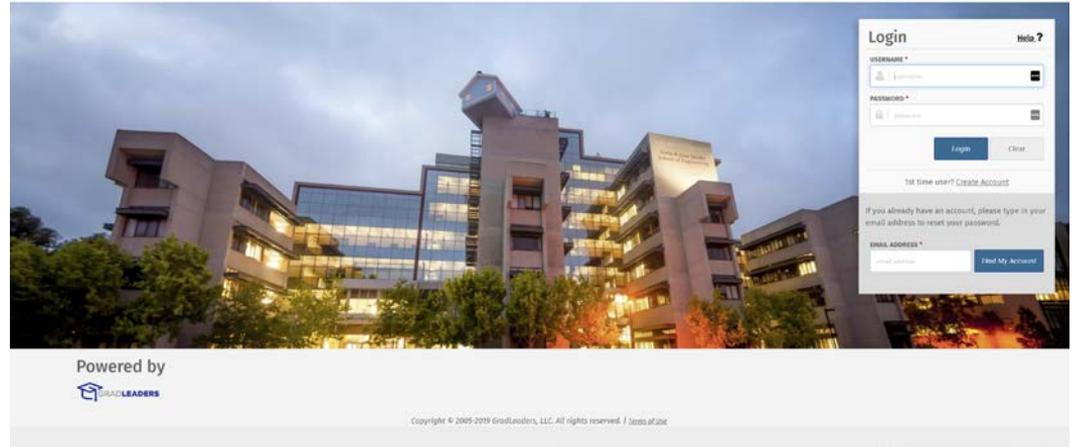
Rocio de Lis

Assistant Director

Corporate Affiliates Program - Talent Programs

mdelis@eng.ucsd.edu

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<http://jacobsschool.ucsd.edu/talent>

Core Research Invitations for CAP Executives



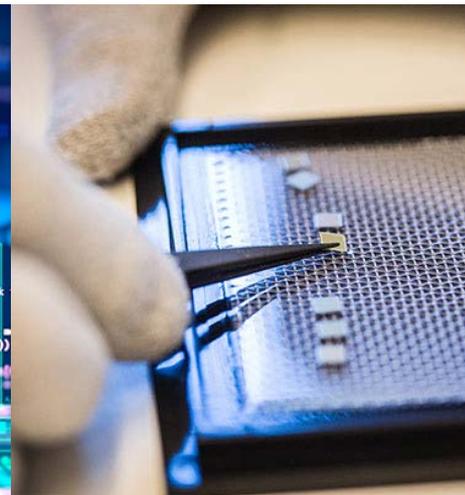
Center for Wearable
Sensors
(cws.ucsd.edu)
October 23, 2019



Contextual Robotics
Institute
(cri.ucsd.edu)
November 7, 2019



Machine-Integrated
Computing & Security
(mics.ucsd.edu)
November 13, 2019



Center for Engineered
Natural Intelligence
(ceni.ucsd.edu)
January 28-29, 2020

RESEARCH EXPO

THURSDAY APRIL 16 2019 AT UC SAN DIEGO - JACOBSSCHOOL.UCSD.EDU/RE

200+

GRADUATE-LEVEL RESEARCH POSTERS

ENGINEERING FACULTY PRESENTATIONS

CONNECT WITH STUDENTS, FACULTY AND INDUSTRY!

Call for: 1. CAP Partner Sponsorship & 2. CAP Executive Distinguished Judges

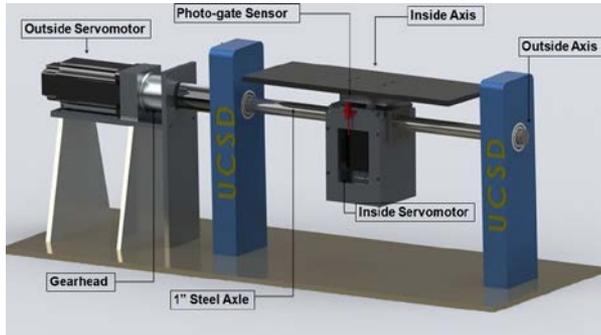


MAE 156B: Senior Design Course

Industry Sponsored Projects

What the Course Provides

- Teams of 3-6 students
- 15 week project durations
- Deliver working prototype to sponsors
- IP assigned to sponsor
- Parts Budgets range: \$1,000 to \$10,000
- Shared Shop Expense: \$1,800
- Title due in October 7 and January 7



Projects can be interdisciplinary

- Mechanical
- Electromechanical
- Fluid mechanics
- Heat transfer
- Computer Control

For more information contact:

Nathan Delson PhD, ndelson@ucsd.edu

Jerry Tustaniwskyj PhD, jtust@eng.ucsd.edu

Sample MAE 156B Projects

Teradata



Server Rack
Cabinet Movers

Delta Design



IC Testing &
Handling

NAVWAR



Surface Towed
Geolocation
System,
Robotically
Controlled ATV

ATA Engineering



Modal Analysis Shaker

All Upcoming Events

October 14, 2019	Systems Engineering Seminar: Sagnik Nandy, Google
October 17, 2019	New Faculty Welcome
October 17-18, 2019	Center for Memory & Recording Research (CMRR.ucsd.edu) Research Review
October 23, 2019	Center for Wearable Sensors (CWS.ucsd.edu) Research Summit
October 25-27, 2019	SD Hacks – student-run hack-a-thon
November 1, 2019	Institute for the Global Entrepreneur (IGE.ucsd.edu) Start-up Showcase
November 7, 2019	Contextual Robotics Institute (CRI.ucsd.edu) Forum
November 13, 2019	Machine-Integrated Computing & Security (MICS.ucsd.edu) Research Summit
November 15, 2019	Franklin Antonio Hall Groundbreaking Ceremony – by CAP invitation only
November 20, 2019	Center for Wireless Communications (CWC.ucsd.edu) Research Review
December 5, 2019	National Academy of Engineers (NAE) Celebration
January 28-29, 2020	Center for Engineered Natural Intelligence (CENI.ucsd.edu) Research Summit
February 6, 2020	Winter CAP Executive Board Meeting
April 16, 2020	Jacobs School Research Expo

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Thank you!
Next Board Meeting:
February 6, 2020