CAP Leadership - update

Cody Noghera  
Director  
Corporate Affiliates Program  
Jacobs School of Engineering

Anne O’Donnell  
Executive Director  
Corporate Research Partnerships  
Jacobs School of Engineering
Message from Rich Goldberg, Outgoing CAP Executive Chairman

Thank You!
CAP Executive Leadership 2014 - 2015

CAP Chairman:
Jeff Carter  CS Alumnus ‘86
Vice President and General Manager of Teradata Platforms

CAP Vice Chairman:
Mark Ambrose
San Diego Site Executive, Raytheon
Thank you David Hadacek and Ennodio Ramos
Solar Turbines for ‘Spirit of Solar’ Cruise
September 22, 2014
Welcome New CAP Members!

IRIS TECHNOLOGY

SRC SCIENTIFIC RESEARCH CORPORATION
Welcome Distinguished Students

Triton Engineering Student Council (TESC)

Team Internship Program Students
Welcome Distinguished Students - Team Internship Program

Team Internship Program builds the next generation of engineers

330 Students | 82 Teams | 42 Companies
Team Internship Program – Featured Presentations

Cubic Transportation Systems
Android NFC Host card emulation
Daniel Mariano, Computer Science Senior
Frank Chao, Computer Science Senior
Navjot Cheema, Computer Science Senior
Ruochen Yang, Computer Science Senior

UTC Aerospace Systems
High-rate, Low-cost cascades
Tayelor Mckay, Aerospace Engineering Senior
Shawn Mailo, BioEngineering, Masters
Jennifer Davis, Structural Engineering Senior
Katherine Riley, Structural Engineering Senior

UC San Diego
Jacobs School of Engineering
CORPORATE AFFILIATES PROGRAM
Emulating transit passes using HCE

Cubic Transportation Systems
Presented by: Navjot Cheema, Frank Chao, Yang Ruochen, Daniel Mariano
Features and purpose

- **Host Card Emulation (HCE)** simulates a virtual smart card using only software.
- Demonstrate that our application allows HCE-compatible android devices to safely emulate transit passes as an alternative to using Secure Element.
- Implement a secure soft token architecture and establish communication between the android device and reader.

**Secure Element:**

**HCE:**
NFC & device Communication

- **Request**
- **Token**
- **Android device contains a list of tokens.**
- **When token is expired/used Android device request new token to server**
- **AES encrypted soft token expires at a defined time**
- **Authentication**
- **Session key exchange**
- **Encrypted Soft-Token**
- **Validation outcome**
- **Process Time:** ~400 ms

Valide authenticity of the soft token

Open gate

UC San Diego
Jacobs School of Engineering
CORPORATE AFFILIATES PROGRAM
UTC Aerospace Systems
2014 TIP Team

High Rate Low Cost Structural Cascade

Jennifer Davis  Structural Engineering
Shawn Mailo  Mechanical Engineering
Tayelor McKay  Aerospace Engineering
Katie Riley  Structural Engineering
Sreeni Narayanan  Project Advisor
Judd Frost  Project Advisor
Background

Cascades

• Key Component of Thrust Reverser:
• Redirects airflow to generate reverse thrust while avoiding impingement on structure
• Current manufacturing method is slow and costly

Image from UTC Aerospace Systems
Objective

- Explore and evaluate advanced manufacturing technologies for cost-effective fabrication of cascades relative to current technologies in use.
Research

- 57 manufacturing methods researched
- Process | Materials | Tolerances | Advantages and Disadvantages

Contacted 75 suppliers, obtained 16 non-disclosure agreements
## Ranking methodology

<table>
<thead>
<tr>
<th>Weighted:</th>
<th>Required:</th>
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<tbody>
<tr>
<td>Recurring cost</td>
<td>Temperature requirement</td>
</tr>
<tr>
<td>Weight</td>
<td>Corrosion resistant</td>
</tr>
<tr>
<td>Supplier base</td>
<td>Abrasion resistant</td>
</tr>
<tr>
<td>Initial cost</td>
<td>Structural integrity</td>
</tr>
<tr>
<td>MRL/TRL</td>
<td></td>
</tr>
<tr>
<td>Tolerance</td>
<td></td>
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<tr>
<td>Precedent in aerospace</td>
<td></td>
</tr>
</tbody>
</table>
Results

- Identified two technologies with savings potential of up to 40% over 19 years
- Further analysis needed to determine structural integrity, exact costs
Dean’s Report

Dean Albert P. Pisano
Jacobs School of Engineering
#20 among World-Wide engineering schools
U.S. News ranking of Best Global Universities, 2014

#7 among U.S. engineering schools
U.S. News ranking of Best Global Universities, 2014

#5 among U.S. best public engineering schools
U.S. News ranking of Best Global Universities, 2014
## Jacobs School 2020 Plan by the Numbers

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>2020</th>
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<tbody>
<tr>
<td>Faculty</td>
<td>201</td>
<td>214</td>
<td>250</td>
</tr>
<tr>
<td>Undergraduates</td>
<td>6,500</td>
<td>6,833</td>
<td>5,000</td>
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<tr>
<td>Ugrad/Faculty</td>
<td>32:1</td>
<td>31:1</td>
<td>20:1</td>
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<tr>
<td>Masters &amp; Ph.D.</td>
<td>1,715</td>
<td>1,850</td>
<td>2,500</td>
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<tr>
<td>Graduate/Faculty</td>
<td>8.5:1</td>
<td>8.6:1</td>
<td>10:1</td>
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</tbody>
</table>
Jacobs School Hires 19 New Faculty

George Porter  
Padmini Rangamani  
Nuno Bandeira  
Aaron Drews  
James Friend  
Julian McAuley  
Leo Porter  
Antonio Sanchez  
Yi Chen  
David Fenning  
Jesse Jokerst  
John McCartney  
Ravi Ramamoorthi  
Michael Tolley  
Jiun-Shyan Chen  
Stephanie Fraley  
Daniel M. Kane  
Mia Minnes  
Prashant Mali

UC San Diego  
Jacobs School of Engineering
Jacobs School Strategic Vision

**Focus**
Look, Think and Act as a Top 10 Professional Engineering School

**Strategies**
- **Strategic Institutes**
  Cross-campus education/research/practice collaborations
- **Agile Research Centers**
  Systems-level engineering research with industry partners
- **Experience Engineering Education**
  Design/build/test project courses, beginning in freshman year

**Values**
- **Engineering for the Global Good**
- **Exponential Impact through Entrepreneurism**
- **Collaboration to Enrich Relevance**
One University: Collaboration to Enrich Relevance
Institute for Contextual Robotic Technologies

- Arts & Humanities
- Maker Space Design
- Global Entrepreneur
- Production & Innovation
- Contextual Robotics
- Jacobs School
- Engineering & Clinical Medicine
- Oceans & Environment
- Materials & Energy
- Scripps
- Physical Sciences
- Social Sciences
- IRPS
- Rady School
Destination UC San Diego

tsensorssummit.org

Contextualrobotics.ucsd.edu
Qualcomm chief technology officer Matt Grob displays a tiny flying drone during Friday's future of robotics symposium at UC San Diego. His company will help UCSD expand its research in robotics. The day may be coming when a swarm of tiny flying robots will appear at your door if you dial 911 for help.

“Robots can be there in a matter of seconds and provide police with the information they need when they respond,” said Vijay Kumar, a researcher who is developing such robots at the University of Pennsylvania.

He tossed out this little mind grenade on Friday at UC San Diego, where some of the nation’s top scientists met to discuss the potential of robotics.

The futuristic, but not too futuristic, topics ranged from self-driving cars to drones that check moisture levels in crops to robots that help older people cook, clean and fluff the laundry.

The University of California San Diego’s Jacobs School of Engineering held the public symposium as part of a formal announcement that it’s investing big in robotics. Its plans include hiring five robotics professors during the next two years, plus expanding research in that field from $800,000 to between $6 million and $8 million annually.
Institute for Contextual Robotic Technologies
Status Report

- Engaging 60 faculty in discussion
- Completed inventory of existing strengths
- Leadership commitment to hire 5 faculty in robotics
- First hire completed (Mike Tolley, Printable Robotics)
- Hosted International Forum featuring world’s thought leaders
- Consulting with thought leaders on directions in the field
- Began process of industry input

We are eager to hear your input, and plan for two Leaders to return and tell us more.
Global Production and Innovation
Jacobs School Goals and Opportunities in CaliBaja

Why Now?
• Advanced manufacturing is a fertile field for new technology development
• Wave of federal government and industry investment in manufacturing

Why Cali-Baja/Mexico?
• Proximity to San Diego
• Positive policy reform in Mexico and desire to partner with San Diego
• Cali-Baja comprises 30% of all manufacturing in Mexico

Why UC San Diego?
• Jacobs School is largest school in CA/only research university in San Diego
• Research strengths in materials, electronics, communications, medical devices synergistic with Mexican manufacturing focus
• Strong innovation ecosystem
• IR/PS expert in macro view of regional and worldwide ecosystems
Existing Resources That Could Be Tailored to Manufacturing Ecosystem

- Relevant Faculty Research
- Project-based Internships
- Master Degree Programs
- Innovation Training Programs
NanoPrinting for Advanced Manufacturing
Example of School-Wide Research Opportunities

(Bioengineering, Electrical Engineering, Computer Science, Mechanical Engineering, NanoEngineering, Structural Engineering)

Quality nanoparticle (NP) generation via microreactors

Generation of Ink (choose solvent, ligands, etc.)

Nanoprinting

Several Applications

MEMS SAW Devices

UV Sensors

Biosensors

Organic Electronics
The Jacobs School’s *Agile Center* Initiative

- Agile Center: two or more faculty from various disciplines who collaborate to be *highly responsive* to industry needs for *innovation* and *talent*.

- The Dean’s Initiative:
  - Research Reviews twice each year- hired events expertise
  - Student Resume Database
  - Website, Press Releases by expert Communications and Marketing staff
  - Password protected access to technical papers

- Seed Graduate Student Fellowships

- Fast-Track Agreements

- Recruit the new faculty talent with corporate collaboration

- Visiting Industry Fellows

- Corporate Affiliates Program membership
Joining **Agile Centers** provides access to UC San Diego faculty, researchers, and graduate students who are transforming their field in ways highly relevant to industry.

**Key benefits:**

- Access to multidisciplinary innovation via bi-annual workshops & research reviews
- Student recruiting: Access to the most promising students for:
  - Full-time employment
  - Internships
- 1:1 collaborations with faculty, researchers and graduate students
- Visiting-scholar opportunities for research staff
- Directed research projects and non-directed research gifts
- Branding for your company
- Continuing education for your employees
- Influence: shape the direction of this research through input on research projects, faculty hiring priorities, etc.
- First access to startups coming out of center using our commercialization engine: von Liebig Center of Entrepreneurism
CAP Business

Cody Noghera
Director
Corporate Affiliates Program
Jacobs School of Engineering
Team Internship Program
Talented teams tackling significant projects
Summer 2014 | 330 Students | 82 Teams | 42 Companies

Time to start budgeting for Summer 2015 Projects!
*Stay ahead by submitting projects early*

UC San Diego
Jacobs School of Engineering
CORPORATE AFFILIATES PROGRAM
Master of Advanced Study Updates

A master’s degree for engineering professionals

Fall 2014

• 130 Master of Advanced Study students
  • 87 new students
  • 43 returning students (2nd year)

• 4 Programs
  • Data Science and Engineering (NEW FA14)
  • Wireless Embedded Systems
  • Architecture-based Enterprise Systems Engineering
  • Medical Device Engineering

• 13 classes at Jacobs and Rady
  • Alternating Friday/Saturdays

• Integration with MS/PhD students
  • Jacobs Graduate School Council events

Stay Technical.
Move Up.
Invent.
### Master of Advanced Study Updates

#### MAS Corporate Representation

*indicates student enrolled 2014-15

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<tr>
<th>Company Name</th>
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<td>Abbott Vascular*</td>
<td>ED&amp;K Engineering</td>
<td>Panasonic</td>
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<td>Advanced Brain Monitoring*</td>
<td>ntrropic Communications*</td>
<td>Peregrine Semiconductor*</td>
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<td>AeroAstroTech*</td>
<td>Fallbrook Engineering*</td>
<td>Qualcomm*</td>
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<td>ai-one Inc.</td>
<td>Galaxy, Inc.*</td>
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<td>Alcatel-Lucent*</td>
<td>Genentech*</td>
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<td>Alphatec Spine</td>
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<td>Samsung*</td>
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<td>Apex Biotechnology Corp*</td>
<td>GlySens*</td>
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<td>BAE Systems</td>
<td>Harper Construction</td>
<td>Sentek Global</td>
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<td>Bank of America Home Loans*</td>
<td>Hewlett Packard</td>
<td>Servicios Quirugicos S.A.*</td>
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<td>Hospira*</td>
<td>SIO, UCSD*</td>
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<td>Callaway Golf*</td>
<td>LifeNet Health*</td>
<td>The Boeing Company*</td>
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<td>Thermo Fisher Scientific</td>
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<td>TrellisWare*</td>
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<td>Makena Technologies</td>
<td>UCSD Medical Center</td>
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<td>Covidien</td>
<td>MITRE*</td>
<td>Universal Hospital Services*</td>
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<td></td>
<td>NuVasive*</td>
<td>West Arbor Group*</td>
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<td>Oncore Manufacturing</td>
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<td>Optum360, a division of United Health Group*</td>
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Trillion Sensors Summit

Ultrahigh volume sensor applications and markets for the coming decade

BIOTECHNOLOGY | BIOINFORMATICS | MEDICINE | NANOMATERIALS | NANOTECHNOLOGY | NETWORKS | DIGITAL MANUFACTURING | INFINITE COMPUTING | COMPUTATIONAL SYSTEMS | ARTIFICIAL INTELLIGENCE | ROBOTICS

CAP Members Receive $300 Discount

www.tsensorssummit.org
Corporate Affiliates Program Welcomes Research Expo Sponsorships

600+ Graduate Students, Faculty, Alumni, VC’s and Industry Attendees

200+ Graduate Research Posters

Faculty Innovation Talks to Feature Agile Research Centers

Jacobsschool.ucsd.edu/re
Largest student-run job fair on the West Coast
Friday, February 20, 2015 9:30 AM to 2:00 AM in Price Center Ballrooms
86 Companies and over 1800 personnel in attendance in past DECaF
Fantastic way to connect with UCSD talent!
Multiple package levels to suit company needs
Registration now open at: tesc.ucsd.edu/decaf/recruiters
Launch San Diego’s 1st Premier Hackathon

- Attract multidiscipline and diverse talent and attention to our region
- Showcase student innovation
- Companies and students alike diving into the creative solutions to modern problems
- Corporate challenges and judging
- Expecting over 1000+ attendees
- Many different packages to suit company needs

Contact:
Ryan Hill - ryanjohill@gmail.com
sdhacks.io
UC San Diego Bioengineering Students win National Academy of Engineering ‘Peoples Choice’ award

“The Future is Boundless”
UC San Diego Bioengineering Students win National Academy of Engineering ‘Peoples Choice’ award

“The Future is Boundless”
CAP Business:

Dates to Remember:

Wed-Thu, November 12-13, 2014
Trillion Sensors Summit – San Diego

Thur-Fri, November 20-21
Center for Wireless Communications 5G Forum

Thursday, February 5, 2015
CAP Executive Board Meeting

Friday, February 20, 2015
Disciplines of Engineering Career Fair (DECaF)

Thursday, April 16, 2015
Jacobs School Research Expo

Thursday, June 11, 2015
CAP Executive Board Meeting

Thursday, October 1, 2015
CAP Executive Board Meeting
Welcome CAP Executive Board