Welcome
CAP Executive Board
February 13, 2020
CAP Chairman and Vice Chairman

GB Singh
Director, Package & Systems Engineering
Solar Turbines

John Black
Senior Vice President, New Product Development
Brain Corporation

Welcome
Welcome New CAP Executive Board Vice Chairman

John Black
Senior Vice President
New Product Development
Brain Corporation

- Over 25 years of experience in engineering and product management
- Moved to San Diego from Minnesota to join Brain Corporation in 2015
- CAP Executive for Brain Corporation since 2018
- Executive focal for Team Internship Program (TIP), Cooperative Education (Co-op) Program, and Contextual Robotics Institute
Welcome New CAP Partners
Overview

• About Me
• About Viasat
• About Viasat SCC
• Projects
• Learning Experiences
About Me

- My name is Tina Kafel
- I am a Transfer Student from Glendale, CA
- My Major is Electrical Engineering
- My area of study is Computer Systems
- Additional areas of Interest: Cyber Security, Data Analysis, Big Data, network security
About Viasat

• A communication company
• Headquarters in Carlsbad, CA
• CEO: Mark Dankberg
• Provides high speed broadband services for commercial and military markets
About SCC

- Satellite Control Center
- Established in 2017
- The goal is to conduct Satellite operations independently and protect intellectual property
- The center monitors the satellite 24/7
- Conducts Satellite operations to maintain the health of the Satellite
Projects

• Project1
  • Onboarding

• Project2
  • Working with Servers to extract data for further analysis

• Project3
  • Satellite maneuver reporter

• Project4
  • Database for various FDS procedures and reports

• Project5
  • An application to gather TLM data Analysis

• Project6
  • Working with Air Force databases and APIs for tracking down important information regarding our Satellite
Project 1

- About a month of training
- Satellite Subsystems
- Terminology
- Satellite Operations
- Network infrastructure
- Agile project management; Jira, confluence, GitHub
- Company culture
Project 2

• Studies about SCC flights network and data center
• Extract data from the servers using a TCL script
• Use python to run TCL script and store information in data frames using pandas
• Data prep and Data cleaning
• Additional Data Analysis requested by the Satellite engineers
Project 3

- Learned about regular flights dynamic operation and why they are necessary
- Types of Maneuver
- Satellite thrusters
- Automate maneuver report
- Potential problems
Project 5

- Study of various databases including MySQL, MongoDB, Oracle Database
- Developed a program to extract FDS data from AF Database
- Use of RESTful APIs
- Automate the process
My Thoughts on the Co-op

• This co-op is a pilot program for the duration of 6 months
• Coop was extended for an extra quarter totaling to 9 months
• CSE classes and hands-on ECE classes were a great help for my interview
• Help in my current classes
• Industry experience is invaluable
• Viasat has amazing culture, friendly environment, and encouraging
• Great events: Halloween party, Navy Birthday celebration, Veteran’s day, Thanksgiving, Christmas, CEO quarterly reports, etc.
Thank you

• Jacobs School of Engineering, Dean Pisano & Corporate Affiliates Program
• Viasat Inc.
• My fellow coworkers and engineers
Questions?
Dean’s Report

Albert P. Pisano
Dean, Jacobs School of Engineering

Accelerating the March to Cachet
Record-breaking Research Expenditures!

$212.5M research expenditures in 2019 ($63M private)
The Jacobs School of the next Decade: from Reputation to Cachet

- Spent the last 10 years growing in size and building our reputation as an engineering institution
- Drive towards relevance and cachet, not measured solely by ranking.
- Known for the company we keep, projects we create, and impact we have
<table>
<thead>
<tr>
<th>YOU SAID</th>
<th>WE DID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three month internships are too short</td>
<td>Launched a 6-month Co-op pilot program</td>
</tr>
<tr>
<td>Industry needs a new generation of systems thinkers</td>
<td>SYSE White Paper, reviewed current curriculum, launched first courses, hired faculty director</td>
</tr>
<tr>
<td>Need innovations in materials for healthcare and energy solutions</td>
<td>Launched Center for Nano Immuno-Engineering and Institute for Materials Discovery &amp; Design</td>
</tr>
<tr>
<td>AI must be taught across disciplines at undergraduate level</td>
<td>Created cross-disciplinary faculty committee with goal to infuse AI into curriculum</td>
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Jon Wade to lead Convergent Systems Engineering Program

- Most recently a research professor in the School of Systems and Enterprises at the Stevens Institute of Technology, Director of the Systems and Software Engineering Division, CTO of the Systems Engineering Research Center (SERC), DoD University Affiliated Research Center

- Elected as INCOSE Fellow in 2018 and serves associate director for academic research. Co-author of INCOSE SE Vision 2025 white paper

- Former executive at International Game Technology (IGT), Sun Microsystems and Thinking Machines Corporation

- First of a cluster hire of faculty
AI Tools for Engineering Practice

- AI techniques are increasingly used for new engineering applications
- Faculty committee reviewing curriculum of all six engineering departments to include AI principles/applications
- New courses are being created to expand on existing AI curriculum in each department
- Planned launch of new courses in 2020-2021 Academic Year
Strategic University-Industry Relationships
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
Drive Relevancy and Ensure Exponential Impact

Transformative
- Partner ecosystem to drive innovation in blue sky verticals

Strategic
- Holistic, sustained institutional relationship with multiple points of engagement

Tactical
- Company looks to campus for specific research expertise or talent pipeline

Opportunistic
- Single point connection between professor and project manager
Strategic Relationship Characteristics

- Clear sense of mutual benefit to both Jacobs School and partner
- Holistic and coordinated institutional approach to engaging multiple corporate divisions to reach goals
- Sustained, multi-year engagement with branded corporate presence on campus

Many thanks to our new Franklin Antonio Hall strategic partners!
Roundtable Discussion Topic

Discussion: What initiatives, rooted in our departments, can we set-up in order to drive value across the entire Jacobs School of Engineering?

Previous examples:

- Convergent Systems Engineering
- AI Tools for Engineering Practice
- What’s next?
Faculty Presentation

Kun Zhang
Professor & Chair, Bioengineering

State of the Department:
Bioengineering
Overview of Bioengineering

Kun Zhang
Frontiers of BE/BME

1966

Fung/Zweifach/Intagliaetta

1988: Shu Chien

- Biomechanics
- Tissue Engineering … Regenerative Medicine
- Systems Biology … Genomics
- Synthetic Biology
- Human/machine interface
- Multi-scale imaging
- Genome editing
- Microbiome
- AI/Data science
UCSD Bioengineering (2019)

33  Core Faculty
28  Affiliate Faculty
4    Adjunct Faculty

14 Research/Project Scientists
42 Postdoctoral Fellows
20 Research Associates

32 Staffs

135 Ph.D. Students
66 M.S. Students
8 M. Eng. Students
579 Undergraduate Students in 4 Majors (3 ABET accredited)
Our star faculty

YC Fung, Shu Chien
• Members of all three national academies
• Recipients of National Medal of Science

New recruits in 2017

2019

Lingyan Shi
Ben Smarr
National ranking

• National Research Council (evidence based, 2010)
  • S-Rank (Scholarship): #1
  • Research: #2
  • R-Rank (faculty peer assessment): #1

• US News (Dept. chair peer assessment)
  • #5 (#2-5 in the past two decades)
UC San Diego Bioengineering Department Makes Strong Showing in List of Highly Cited Researchers Around the World

2019 Web of Science
BE faculty brings the campus together

• **Joint appointment:**
  • with SOM: Ludmil Alexandrov (CMM); Shu Chien (Medicine); Kevin King (Medicine); Andrew McCulloch (Medicine); Rob Knight (Pediatrics); Elliot McViegh (Radiology); Bernhard Palsson (Pediatrics); Ben Smarr (HDSI)
  • with Biology: Jeff Hasty
  • with MAE: Ratneshwar Lal

• **Operates outside of JSOE:** Elliot McViegh (CTRI); Francisco Contijoch (CTRI); Ludmil Alexandrov (CMM-E); Kevin King (Leichtag); Karen Christman (SCRM); Adam Engler (SCRM); Ester Kwon (SCRM); Bernhard Palsson (BRF II); Rob Knight (BRF II); Jeff Hasty (Urey)
### Our trainees

<table>
<thead>
<tr>
<th>Total Alumni</th>
<th>4,079</th>
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<tbody>
<tr>
<td>Male</td>
<td>2,705</td>
</tr>
<tr>
<td>Female</td>
<td>1,367</td>
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- **Ann Lee Karlon**  
  (Genentech SVP)
- **Makoto Suematsu**  
  (AMED President, Japan’s NIH)
- **Raj Krishnan & Erik Engelson**  
  (Entrepreneurs)
- **Brian Clary**  
  (UCSD Dept Surgery Chair)
- **Tom Skalak**  
  (Tsai Foundation)
- **Christophe Schilling**  
  (Genomatica CEO, Biocom, Board Chair)
**Commercialization efforts by BE faculty/trainees**

<table>
<thead>
<tr>
<th>Sangart</th>
<th>Biological Dynamics</th>
<th>Neuroverse</th>
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<tbody>
<tr>
<td>Glysens</td>
<td>NanoCollect</td>
<td>Arytha</td>
</tr>
<tr>
<td>Genomatica</td>
<td>Ventrix</td>
<td>Sonrgy</td>
</tr>
<tr>
<td>InSilicomed</td>
<td>Cognionics</td>
<td>Singlera</td>
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<tr>
<td>TearLab</td>
<td>Nanovision</td>
<td>Genemo</td>
</tr>
<tr>
<td>InflammaGen</td>
<td>DevaCell</td>
<td>GenCirq</td>
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- **Bio-based production of 1,4-butanediol**

- **Continuous glucose monitoring**

- **Tumor killing bacteria**

- **Lab-on-chip for blood tests**
BE Board of Trustee

- Long-term education objectives
- Fund raising

Walt Baxter, PhD
Senior Principal Scientist
Medtronic Neuromodulation

Ann Lee-Karlon
Senior Vice President, Genentech

Joseph Y. Lucisano, PhD
President, Lucisano Consulting

Erik T. Engelson, MS
President & CEO of Lucira Health, Inc

Paul Citron, MSEE, Ph.D. (hon.)
Retired, ex-SVP, Medtronic
Thank you! Questions?
Faculty Presentation

Dean Tullsen
Professor & Chair, Computer Science & Engineering

State of the Department: Computer Science & Engineering
CSE

Our numbers:

67 Faculty

~1900 Undergraduate Students

~520 MS Students

~250 PhD Students

2011 Snapshot

~45 Faculty
~1200 UG
~125 MS
~150 PhD
CSE

Three Majors:

Computer Science
Computer Engineering
Bioinformatics
CSE Rankings

USNWR
CS #16
CE #12
ARWR (Shanghai)
#14
CSRankings.org
#9
Our Graduates

Undergraduates are in great demand locally and across the US, etc. Many end up in Silicon Valley. Many go on to graduate school.

MS students distributed similarly, many go on to PhD, about 15/year stay here for PhD.

PhD students most typically go to top industry research labs, but every year we place several at top-ranked Research Universities as faculty.
Highly Recognized Faculty

12 ACM Fellows
9 IEEE Fellows
28 NSF Career Awards
12 Sloan Fellows

25 major awards in the last year or so
Bioinformatics and Computational Medicine

Nuno Bandeira
Melissa Gymrek
Debashis Sahoo
Pavel Pevzner
Vineet Bafna
Rob Knight
Cryptography and Security

Mihir Bellare

Daniele Micciancio

Nadia Heninger

Stefan Savage
Programming Languages

Deian Stefan

Nadia Polikarpova

Ranjit Jhala

Sorin Lerner
Robotics

Laurel Riek

Henrik Christensen
Software Engineering and Human-Computer Interaction

Bill Griswold

Scott Klemmer

Larry Smarr

Nadir Weibel
Teaching Faculty

Mia Minnes Kemp

Niema Moshiri

Christine Alvarado

Gerald Raj

Joe Politz

Leo Porter
Faculty Hiring 2020

Focus Areas

- Reinforcement Learning/Trustworthy AI
- Software Engineering
- Quantum Computing
- HCI
- Security
Undergraduate Curriculum
(BS in CS)

Lower Division
• Programming, Data Structures, Discrete Math, Computer Organization

Required Upper Division
• Data Structures, Algorithms, Software Engineering, Architecture, Systems, PL or DB, Security/Cryptography, ML or vision/graphics

Upper Division Electives
• All specializations listed on prior slides, more
Questions for me?
Questions for you

1. What are the skills you would most like to see in CSE graduates that come into your company?

2. In what technical areas would you like to see the CSE department grow/expand?
CAP Business

Wil Dyer
Director, Corporate Affiliates Program

CAP News & Updates
Jacobs School Corporate Affiliates Program
Talent Programs

Recruiting Timeline

| OCT - DEC | Companies define and submit projects and recruitment starts; offers extended |
| JAN - MAR | Companies continue to submit their projects and recruitment continues; offers extended |
| APR       | Finalize recruitment & offers. Strategy calls for next year start |
| MAY       | Internship selections completed Intern pre-deployment training |
| JUN - DEC | TIP/Regular Internships period during 10-12 consecutive weeks (Jun-Sept) Co-op period up to 6 months (Jun-Dec) |

WHAT WE DO FOR YOU:

- Talent Acquisition strategy:
  - Brand development
  - Streamlining recruiting
  - Talent Programs (TIP and Co-op, on campus projects)

WHAT COMPANIES RECEIVE:

- Brand recognition; Access
- Greater ROI; Reduced cost per hire
- Event at Fall CAP board meeting
Team Internship Program (TIP)

Jacobs School Student Teams:

• 2-5 members

• Undergraduate, Masters, and Ph.D. Levels

• All engineering majors - we encourage multi-disciplinary teams

• May include other majors on occasion – e.g. one business student

Internship Details:

• Paid Internships

• 10-12 weeks over the summer

• Full-time, i.e., 40 hour/week commitment
Cooperative Education (Co-op)

- **6 months** - Summer and Fall
- **Full-time** (30-40 hours per week)
- **Ugrads**: CSE and ECE
- **Ugrads and MS**: MAE, NENG, SENG

- **First** in the UC System
- Pilot run July-December 2019; **next edition starts** July 2020
- Over 450 student applicants in 2019, **22 hired**, 50/50 Int. VS Dom.

**2019 Participating Partners**

[Logos of participating companies]
TALENT PROGRAMS POLL

IF you usually target PhD students:

CAP – PhD students Mentor Program?

Your engineering leaders partnered with our PhDs for a monthly mentorship session + one annual event at Jacobs

Strategic goal: Build your PhD pipeline
Center for Extreme Events Research Summit

March 12, 2020

Data-driven Computational and Experimental Techniques for Extreme Events Applications

CEER.ucsd.edu
Call for:

1. Distinguished CAP Executive Judges
2. CAP Partner University Relations/Recruiters
3. CAP Partner Sponsorships

JacobsSchool.ucsd.edu/re
Action Items

✓ Write down your input on the back of the agenda and leave on table so we can collect

✓ Contact Rocio de Lis (mdelis@eng.ucsd.edu) for TIP/Co-op 2020 participation

✓ Send CAP Executive judges and recruiters to Research Expo (jacobsschool.ucsd.edu/re)

All Upcoming Events

March 12, 2020  Center for Extreme Events Research Summit
April 16, 2020  Jacobs School Research Expo
May 12, 2020   Gordon Center Engineering Leadership Awards Gala
May 28-29, 2020  Center for Visual Computing Retreat
June 4, 2020   Spring CAP Executive Board Meeting
Thank you!
Next Board Meeting:
June 4, 2020