BCOE College Meeting
June 6, 2012
Special thanks to Jay Farrell who served as Chair of the Executive Committee
Bourns College of Engineering at a Glance

U.S. News Ranking: 64th nationally (38th among public)
NRC Rankings: CEE, CSE, EE and ME in top quartile
Undergraduate Enrollment: 2,138 (projected to increase to 2,500 by 2020)
Graduate Enrollment: 520 (projected to increase to 850 by 2020)
Research Expenditures: $30+ million per year
Endowment Support: $37 million
Endowed Professorships: 9
Accreditation: ABET (CHE, CEN, CS, EE, EnVE, ME)
(BIEN and MSE new)
Diversity: 33 percent URM (recipient of 2009 Claire Felbinger Award for Diversity from ABET for outstanding service to under-represented students)
BCOE Welcomes 11 Distinguished New Faculty to Its Ranks
Mission and Vision

The Vision of the College of Engineering is to become a nationally recognized leader in engineering research and education.

Our Mission is to:

• Produce engineers with the educational foundation and adaptive skills to serve rapidly evolving technology industries
• Conduct nationally recognized engineering research focused on providing a technical edge for the U.S.
• Contribute to knowledge of both fundamental and applied areas of engineering
• Provide diverse curricula that will instill in our students the imagination, talents, creativity and skills necessary for the varied and rapidly changing requirements of modern life
• Enable our graduates to serve in a wide variety of other fields that require leadership, teamwork, decision making and problem solving abilities
• Be a catalyst for industrial growth in the Inland Empire
Departments and Programs

• Bioengineering
• Chemical and Environmental Engineering
• Computer Science and Engineering
• Electrical Engineering
• Mechanical Engineering
• Materials Science and Engineering program (college-wide UG, campus-wide G)

Degrees

• B.S.: Bien, CHE, CEN, CS, EE, ENVE, Bus Info, ME, MSE
• BS/MS for high achieving students
• M.S. and Ph.D.: Bien, CEE, CEN, CS, EE, ME, MSE
• Online M.S. in engineering approved 2012
• First specialization to be offered in Bioengineering beginning in 2013
Research Centers

- Collaborative centers and initiatives attract research funding, providing valuable opportunities for students to prepare for careers of discovery and innovation:
  - Center for Bioengineering Research
  - Center for Environmental Research Technology (CE-CERT)
  - Center for Nanoscale Science and Engineering (CNSE)
  - Center for Research in Intelligent Systems (CRIS)
  - Southern California Research Initiative for Solar Energy (SC-RISE)
  - Center for Ubiquitous Communication by Light (UC-Light)
  - Winston Chung Global Energy Center
  - NSF I/UCRC --new

- Annual research expenditure: $35 million
  - (Represents 29 percent of UCR funding)
MS Online

- The MS online degree program is self-supporting ($30k/student).

- The income (10-10-80 model) goes to the department offering specialization to supports faculty (~$400 per student/offering), TA, direct costs and PhD student support.

- The program is targeted at practicing engineers allowing them to earn a master’s degree through online courses or attending on-campus classes.

- The program combines engineering and professional development classes.

- The program allows student involvement in projects developed jointly between faculty and participating companies.

- Director, Professor Kambiz Vafai
<table>
<thead>
<tr>
<th>Course Type</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Core Courses (offered at the college level)</td>
<td>(16 units)</td>
</tr>
<tr>
<td>Specialization Courses (offered by each department)</td>
<td>(16 units)</td>
</tr>
<tr>
<td>Independent Study Project (Supervised by the faculty)</td>
<td>(4 units)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>36 units</strong></td>
</tr>
</tbody>
</table>

**Specializations**
- Bioengineering in 2013
- Additional specializations, 1-2 per year, up to maximum of 10.

**Academic Standards**
- Students entering the online M.S. in Engineering Program must meet same admission standards as those for BCOE’s traditional M.S. degrees.
- In order to graduate, each student must complete a comprehensive exam or a M.S. project.
- Each course is taught under the oversight of an existing UCR department.
MS online classes

• The core courses will be taught by either BCOE faculty or practicing professionals.

• The specialization courses will be taught by BCOE faculty as regular classes to on-campus MS and PhD students while being stored (video, DVD or streaming) for students in remote locations. These students can attend regular on campus courses if they so choose. E.G., BIEN 223, 224, 249, and 264 for Bioengineering specialization.

• The approach will
  • assure the utmost in educational quality
  • Provide the greatest convenience to students
  • Provide efficiency to the faculty
  • Minimize the cost
Common Core Courses - (16 units)

- Four 4-unit courses from the following tentative courses:
  - ENGR 200--Engineering in the Global Environment
  - ENGR—201--Principles of Engineering Management
  - ENGR 202--Introduction to Systems Engineering
  - ENGR 203--Technology Innovation and Strategy for Engineers
  - Others (Professional Communication & Information Management, Engineering Project Planning & Management, Engineering Analysis, Computer Methods in Engineering, Professional Practice, Management of Technology-based companies, Innovation and Entrepreneurship, Managerial Economics, …….)

- ENGR 296A (preparation for M.S. Comprehensive Examination).

- Each student will also be required to take a comprehensive examination or complete a M.S. design project.
## Comparisons with Top 25 Engineering Colleges

<table>
<thead>
<tr>
<th></th>
<th>2010-11</th>
<th>2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>US News 1–25*</td>
<td>US News 20–25*</td>
</tr>
<tr>
<td><strong>No. of Faculty</strong></td>
<td>278</td>
<td>247</td>
</tr>
<tr>
<td><strong>BS Degree/Faculty</strong></td>
<td>3.5</td>
<td>3.1</td>
</tr>
<tr>
<td><strong>BS Enroll/Faculty</strong></td>
<td>18.5</td>
<td>17.2</td>
</tr>
<tr>
<td><strong>MS Enroll/Faculty</strong></td>
<td>2.6</td>
<td>2.1</td>
</tr>
<tr>
<td><strong>PhD Enroll/Faculty</strong></td>
<td>4.4</td>
<td>3.7</td>
</tr>
<tr>
<td><strong>Research K$/Faculty</strong></td>
<td>$598.1</td>
<td>$503.6</td>
</tr>
</tbody>
</table>

*Indicates averages were used.

NOTE: several institutions ranked 1–25 did not report research $$$. Amounts reflected include only those institutions that reported data.
Comparisons with UCSB COE

(UCSB data is from FY 08/09; BCOE data is latest available)

UCSB Model for Modified Student Workload = 1xLD+ 1.5xUD+ 2.5xG1+ 3.5xG2

<table>
<thead>
<tr>
<th>METRIC</th>
<th>UCSB</th>
<th>UCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ladder Faculty Headcount</td>
<td>141</td>
<td>79</td>
</tr>
<tr>
<td>Undergraduates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Undergraduates</td>
<td>1,090</td>
<td>2,050</td>
</tr>
<tr>
<td>Undergrads/Ladder Faculty Headcount</td>
<td>7.73</td>
<td>25.95</td>
</tr>
<tr>
<td>Graduate Students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Grad Students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>117</td>
<td>84</td>
</tr>
<tr>
<td>PhD</td>
<td>515</td>
<td>399</td>
</tr>
<tr>
<td>Grad Student/Ladder Faculty Headcount</td>
<td>4.48</td>
<td>6.11</td>
</tr>
</tbody>
</table>

Student Workload FTE/Faculty Headcount:

- Undergrad (Unweighted): 4.74, 10.61
- Undergrad (Weighted)*: 6.41, 13.14
- Grad (Unweighted): 4.45, 5.62
- Grad (Weighted)*: 12.59, 15.85
- Total Undergrad & Grad (Unweighted): 9.19, 16.23
- Total Undergrad & Grad (Weighted)*: 19.00, 28.99

Extramural Support:

- Proposals Submitted/Faculty Headcount/yr: 3.87, 3.19
- Average Proposal Dollars: $667,913, $219,224
- Awards/Faculty Headcount/yr: 2.37, 2.49
- Proposal Win Rate: 61.17%, 78.17%
- Average Award Dollars/Faculty Headcount: $430,616, $444,440
## Permanent Budget Comparison

**UCSB COE vs. UCR BCOE**

<table>
<thead>
<tr>
<th></th>
<th>2008-09 UCSB COE</th>
<th>2010-11 UCR BCOE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COE Permanent Budget</strong></td>
<td>$28,642,506</td>
<td>$18,939,271</td>
</tr>
<tr>
<td><strong>COE Ladder Faculty Headcount</strong></td>
<td>141</td>
<td>79</td>
</tr>
<tr>
<td><strong>COE Total Student Headcount</strong></td>
<td>1,721</td>
<td>2,533</td>
</tr>
<tr>
<td><strong>COE Permanent Budget:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>per Ladder Faculty Headcount</td>
<td>$203,138</td>
<td>$239,738</td>
</tr>
<tr>
<td>per Total Student Headcount</td>
<td>$16,643</td>
<td>$7,477</td>
</tr>
<tr>
<td>per Total Student Workload FTE (Unweighted)</td>
<td>$22,101</td>
<td>$14,773</td>
</tr>
<tr>
<td><strong>Percent of Total University Budget</strong></td>
<td>6.10%</td>
<td>4.00%</td>
</tr>
</tbody>
</table>

**Campus-Wide**

<table>
<thead>
<tr>
<th></th>
<th>2008-09 UCSB COE</th>
<th>2010-11 UCR BCOE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Permanent Budget</strong></td>
<td>$471,928,795</td>
<td>$469,769,058</td>
</tr>
<tr>
<td><strong>Ladder Faculty Headcount</strong></td>
<td>880</td>
<td>654</td>
</tr>
</tbody>
</table>
Distinguished Faculty

Our faculty are our greatest asset. They continue to distinguish themselves through research, teaching and service

- Number of faculty: 83
- Goal for 2020: 140
- Searches underway: 10
- Fellows of professional societies: 69
- NSF CAREER and Young Investigator Awards: 25
- Members of NAE: 1+1
Faculty Awards, examples

Career Award Winners

Harsha Madhyastha  
Akua Asa-Awuku  
Iulian Neamtiu  
Vagelis Hristidis

Bourns College of Engineering
Professors David Kisailus (left) and Dimitrios Morikis (right) have been selected as this year’s recipients of the Chancellor’s Faculty Mentor Award for Excellence in Undergraduate Research and Creative Activity.
Gupta Earns 2012 Doctoral Dissertation Advisor/Mentor Award

Albert Wang Named President-Elect of IEEE Electron Devices Society

Assistant Professor of Bioengineering B. Hyle Park has been chosen to receive the Outstanding Engineering Educator Award

Alex Balandin Elected Fellow of the Institute of Physics & Fellow of the American Physical Society
From Restoring Carousel Horses to Winning $300,000 Innovation Prize

Huinan Liu and Lorenzo Mangolini earn NSF BRIGE Awards

Congratulations to Assistant Professor of Electrical Engineering Anastasios Mourikis for being named a UC Riverside Hellman Fellow for 2011-12
Srikanth Krishnamurthy Named Fellow of IEEE

Yingbo Hua Elected Fellow of AAAS

Congratulations to Professor of Mechanical Engineering Kambiz Vafai for receiving the Interpore Honorary Member Award 2011

Video Bioinformatics NSF IGERT Fellow Albert Cruz Wins NSF 2012 Video and Poster Competition (June 5. 2012)

Bourns College of Engineering
Cengiz Ozkan, named editor-in-chief of the new International Journal *Nano Communications*.

Jie Chen named 2011 International Federation of Automatic Control (IFAC) Fellow.
Karleigh Ricks born March 20 to proud Momma Amy Ricks from CSE

Jennifer Parker UCR BS Biochemistry ’03, PhD Cell, Molecular & Developmental Biology ’08) graduated from Golden Gate Law School in San Francisco with a specialization in Intellectual Property Law.
Don Davidson won the 2012 Southern California Time Trial Series Championship (cycling) for his age group.
Regional Resource for a Highly Skilled Workforce
Student Achievements

• Five NSF graduate fellowships 2011
• First place at WERC International Environmental Design competition
• Finalists at EPA P3 competition
• Winners of Microsoft Imagine Cup programming competition
• Outstanding Engineering Student Award, Orange County Engineering Council
Scientific discoveries and creativity

A Dendritic Baby Giraffe Born Inside Ni-Al-C Melt

Shaahin Amini
and
Reza Abbaschian
Dep. of Mechanical Engineering
University of California Riverside

Scanning electron microscopy (SEM) image depicts a baby giraffe formed within a jungle of Ni-Al-C dendrites. As the molten alloy was being solidified inside a graphitic crucible, the melt was decanted, leaving behind a little dendrite wetted by a thin molten blanket. As the jungle got colder, the blanket froze and rejected carbon which eventually crystallized as a graphite cover. Upon further cooling, the graphitic cover wrinkled, due to its thermal expansion coefficient mismatch with metallic substrate, creating a faceted network of creases resembling the familiar skin patches of a giraffe.
End of the year celebration
The Dream Team
Community Outreach

The college engages in numerous ways with the local community, the region and world

- Bourns Space, Science and Engineering Day
- MESA Robotics Competition
- Engineers Without Borders - Guatemala
- Wind Turbine Competition for region’s community colleges
- SPIRIT Program to engage local teachers in promoting math and science
- IEEE Boy Scout Merit Badge Day
Global Partnerships

The college has numerous research and collaborative agreements with organizations throughout the world.

**China:**
- Jiao Tong University
- Nanjing University
- Tsinghua University

**Japan:**
- City of Sendai
- Josai International University
- Tohoku University

**Korea:**
- Chungnam National University
- Hanbat University
- Hanyang University
- Korea Institute of Materials Science
- LG Innotek

**United States:**
- Naval Surface Warfare Center
- ......
- ......
Multi City-University Collaboration

BOURNS COLLEGE OF ENGINEERING
Engineering college with world-renowned faculty, growing and making research contributions to make a difference in our world.

CITY OF SENDAI
- The major commercial center for the North of Japan
- Sister city of Riverside, California for more than 50 years

TOHOKU UNIVERSITY
- Ranked as the best Asian multi-disciplinary university in 1999 (Asiaweek)
- Leader in the material science field in Japan
- Well-known for its science and engineering programs contributing to development of high-tech industry

CITY OF RIVERSIDE
- One of the fastest growing metropolitan areas in the U.S.
- Top Seven Intelligent Communities of the Year 2012
- Smart21 Intelligent Community of the Year 2012
Southern California Research Initiative in Solar Energy (SC-RISE)

- Collaboration with City of Riverside, Riverside Public Utilities and Tohoku University
- Fundamental Research in solar devices and solar-thermal technology
- Applied research
- Training and outreach
Global Partnerships

Chinese battery inventor and entrepreneur Winston Chung’s $10 million gift to the college, the largest-ever individual donation to UCR.

- Endowment established:
- Winston Chung Global Energy Center
- Winston Chung Endowed Professorship in Sustainability
- Winston Chung Endowed Professorship in Energy Innovation (David Kasailus)
- New funding announced November 2011:
  - $2.5 million rare earth lithium-ion batteries to power Winston Chung Hall
  - $600,000 funding for energy storage research
  - Upcoming AQMD, ~ $2.5 million
$2-million AQMD Grant to Develop Renewable Transportation Solutions

- Project based at CE-CERT in collaboration with City of Riverside, Riverside Public Utilities, Riverside Transit Agency, and Bourns Inc.
- Will use Winston Batteries and technology developed by Balqon
- Solar energy will charge batteries, supplying power for facilities and charging stations for vehicles on campus and in the City of Riverside
UC Riverside’s Bourns College of Engineering to Showcase Research at 26th International Electric Vehicle Symposium
The Bourns College of Engineering
Strategic Plan
April 2011
We Engineer Excellence

» Undergraduate Education
» Undergraduate Research
» Graduate Education
» Faculty
» Research
» Community Engagement
» Advancement
Strategic Research Initiatives

BCOE has identified 11 additional areas of strength where investment of resources is likely to produce significant improvements in sponsored research activity, graduate enrollment, faculty recruitment, and overall campus prominence.

• Clean, Safe, and Sustainable Energy
• Computational Materials
• Cyber-Physical Systems
• Health Informatics
• High-Throughput Screening and Drug Design
• Centers for Environmental Research and Technology
• Next-Generation Electronics
• Safety and Security
• Sensing, Communications, and Imaging
• Medical Devices
• Sustainable Water Quality and Quantity
Thank You