Chairs’ & Center Directors’ Meeting Minutes

Date: September 22, 2014 (12:00 to 2:00 pm)
Location: WCH – Room 443
Attendees: Abbashian, Reza
           Aguilar, Guillermo
           Balandin, Alex
           Barth, Matt
           Boretz, Mitch
           D’Anieri, Paul
           Farrell, Jay
           Haddon, Robert
           Hartney, Pat
           Matsumoto, Mark
           Najjar, Walid
           Ravi
           Rodgers, Victor
           Schultz, Jerry
           Ula, Sadrul
           Vafai, Kambiz
           Wang, Albert

Absent: Bhanu, Bir
        Chrobak, Marek
        Garay, Javier
        Myung, Nosang
        Tan, Sheldon

The agenda for the meeting is shown in Appendix 1.

1. Welcome and call for agenda items - Reza
Mitch commented that there will be an ARPA-E workshop in February 2014. Mike Pazzani will pay for two attendees to this (three-day) workshop. Interested faculty should contact Reza.
Reza distributed copies of a message from Pramod Khargonekar, Assistant Director for the Engineering Directorate at NSF. This message announced NSF’s new initiative entitled “Professional Formation of Engineers.” The purpose of this initiative is to create and support an innovative and inclusive engineering profession for the 21st Century. Interested faculty can participate in an informational webinar on 9/23/14 at 2pm (EDT). Reza knows Pramod and encouraged faculty to meet with him during visits to Washington, D.C. Also, Reza met with the new dean of UCR’s School of Education who is interested in developing collaborations with BCOE.

2. Approval of Minutes - Pat
The revised minutes of the September 8th Chairs/Directors meeting were unanimously approved.
3. Introduction of Paul D’Anieri, Provost and Executive Vice Chancellor
Reza introduced Provost D’Anieri and stated that he came from the University of Florida where he was dean of the College of Liberal Arts & Sciences, the largest academic unit at UF with over 600 faculty. He received his B.S. degree from Michigan State and his M.S. and PhD degrees in Political Science from Cornell.

Provost D’Anieri relayed that he came to UCR based on its mission, the leadership team and the potential of the campus to define a new model of public higher education. He is pleased that UCR recently developed a strategic plan. His immediate goals are to increase undergraduate graduation rates and increase research performance. One of his approaches will be to differentiate UCR from other top research universities. An example is the new University Innovation Alliance of 11 universities. UCR is the only university from California in this Alliance. Also, he intends to encourage joint appointments between academic units. He noted that the Chancellor wants to hire 300 new faculty so UCR needs to develop a strategic hiring plan as soon as possible. His first year goals are:

1. Increase seats in classes so that students can get the classes they need to graduate.
2. Develop a new campus budget process that is transparent and aligns dollars with mission.
3. Develop a faculty hiring strategy. Efforts will be directed to this strategy at the Leadership Retreat in October.
4. Develop an appropriate research infrastructure.
5. Evaluate academic organizational issues.
6. Get to know the campus. He wants to visit every department within his first year.

4. Introduction of each BCOE Representatives & Brief Overviews
The BCOE participants presented overviews of their units according to the order in the agenda. One to two page summaries of these overviews were attached to the agenda along with a Quick Facts page about BCOE.

Provost D’Anieri thanked the group for these presentations and noted BCOE’s success in interdisciplinary research and its support of undergraduates. He concluded by stating that his job is to empower UCR’s faculty but he can’t print money so choices will need to be made.

No other matters were discussed.
September 22, 2014
Agenda
Winston Chung Hall – Room 443

1. Welcome - Request for Agenda Items from the Floor
   Reza

2. Approval of Minutes from September 8, 2014 Meeting
   Pat

3. Introduction of Paul D’Anieri, Provost and Executive Vice Chancellor
   ➢ Vision for UCR
   ➢ Goals for the coming year

4. Introduction of each BCOE Representative & brief overviews
   a. Undergraduate Education
      Ravi
   b. Graduate Education & Research
      Mark
   c. Administration & Facilities
      Pat
   d. Contracts & Grants
      Mitch
   e. Bioengineering
      Victor
   f. Chemical & Environmental Engineering
      Mark
   g. Computer Engineering
      Walid
   h. Computer Science & Engineering
      Marek
   i. Electrical & Computer Engineering
      Jay
   j. Materials Science & Engineering
      Javier
   k. Mechanical Engineering
      Guillermo
   l. Masters of Science in Engineering On-line
      Kambiz
   m. Center for Bioengineering Research
      Jerry
   n. Center for Environmental Research & Technology
      Matt
   o. Center for Nanoscale Science & Engineering
      Robert
   p. Center for Research in Intelligent Systems
      Bir
   q. Center for Ubiquitous Communication by Light
      Albert
   r. Winston Chung Global Energy Center
      Sadrul
   s. Phonon Optimized Engineered Materials
      Alex
BOURNS COLLEGE OF ENGINEERING

Chairs’ & Center Directors’ Meeting
Monday, September 22, 2014
Noon – 2 p.m.
Chairs’ & Center Directors’ Meeting

September 22, 2014

Agenda

Winston Chung Hall – Room 443

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   - Reza

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   - Vision for UCR
   - Goals for the coming year

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      - Sadrul
   s. Phonon Optimized Engineered Materials
      - Alex
Quick Facts About the College

Founded: 1989

U.S. News Ranking: 69, top one-third (39th among public universities)

National Research Council: Top quartile

Faculty Count: 96 (seven joined Fall 2014)

Undergraduate Enrollment: 2,364

Graduate Enrollment: 594

Research Expenditures: $37 million

IDC generated: $4.1 million (returned ~ $1.5M)

Endowment Support: $36 million

Endowed Professorships: 9

Philanthropic Gifts (‘12): $3.6 million received

NAE Member: 2

Fellows of Professional Societies: 81

NSF Career Awards: 46 (cumulative)

Diversity: 34 percent URM (2009 Claire Felbinger from ABET for outstanding service to URM)
**Departments and Programs**

- Bioengineering
- Chemical and Environmental Engineering
- Computer Science and Engineering
- Electrical and Computer Engineering
- Mechanical Engineering
- Computer Engineering (joint with CSE & EE)
- Materials Science and Engineering program (college-wide UG, Campus-wide graduate)

**Degrees**

- BS: BIEN, CHE, CEN, CS, EE, ENVE, Bus Info, ME, MSE (all accredited except for Bus Info)
- MS and PhD: BIEN, CEE, CEN, CS, EE, ME, MSE
- On-line MS: Bioengineering specialization in 2013, Water and Nanomaterials in 2014
  (Negotiating with Pearson for marketing and recruitment)

*Planned Programs: Energy, Civil Engineering, Systems Engineering*

**Research Centers**

- 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)
- Center for Ubiquitous Communication by Light (UC-Light)
- Southern California Research Initiative for Solar Energy (SC-RISE)
- Winston Chung Global Energy Center (WCGEC)
- Phonon Optimized Engineered Materials (POEM)
Undergraduate Program

Chinya Ravishankar, Associate Dean, Undergraduate Education & Professor, Computer Science & Engineering

- **BCOE goal is to train professional leaders**
  - Academic training + professional development
  - Not just award degrees

<table>
<thead>
<tr>
<th>BCOE F’14 Freshman Cohort:</th>
<th>COLLEGE</th>
<th>Average Freshman AIS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BCOE</td>
<td>4535</td>
</tr>
<tr>
<td></td>
<td>CNAS</td>
<td>4308</td>
</tr>
<tr>
<td></td>
<td>CHASS</td>
<td>4110</td>
</tr>
<tr>
<td></td>
<td>UCR</td>
<td>4233</td>
</tr>
</tbody>
</table>

- **Compared to UCR freshmen:**
  - 85% are calculus-ready, or have finished calculus
  - Historically, that number is ~50%
  - 50% are in the top 15% of campus freshmen
  - 80% are in the top 33% of campus freshmen

- **BCOE Does its own recruitment and outreach**

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**Student Success: The A+ System**

- **Universities are trying predictive analytics, etc. (UIA, for example)**
  - BCOE has built predictive models for many years
  - Work poorly: Results are too noisy, especially at UCR
    - Big variance in student backgrounds, data is out of date, curricula change, etc.
  - These models really aren’t very useful for advising

- **Advising must be individualized**
  - Analytic models can bias advisers!
  - Changes in student behavior can make big difference

- **Students also change schedules for various reasons**
  - Impact of schedule changes hard to understand

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**Our Solution: The A+ System**

- **A+ is a scalpel, not a bulldozer**
  - Individualized per-student academic planning
  - A+ looks at courses required, courses completed, and projected pattern of course offerings
  - Produces an optimal course plan for each student
  - Students can change # units, move courses around, etc.

- **Initial reaction from students is very positive**
  - They know the obstacles in their individual case
    - Students never take advice based on statistics
    - Students feel more empowered with A+

- **A+ frees advisers from the tedium of course planning**
  - Can work with students at a higher level
Ensure: New Freshman Success Program
- Engineering Success and Retention
- High-intensity, in-your-face advising for freshmen
  - 225 freshmen, 30 peer mentors, supervised by 3 staff
- "Weight-Watchers" program for success
  - Mandated contact hours (via ENGR 10 enrollment)
- Academics, Professional Societies, Parent Awareness
- Fall theme: Connection to College
- Winter theme: Integration into College and Major
- Spring theme: Self-Direction

Undergraduate Research
- 100% of BCOE UGs do creative work (Senior Design project)
- 50% of BCOE graduates do laboratory research
- 486 UG researchers
  - 23.94% of BCoE Spring’13 enrollment
  - 86 funded by college-level HSI grant
  - 46 funded under other research-oriented programs
  - 354 using other funds, course credit, or volunteering
- 72 Faculty research mentors (80% of BCOE)

Student Professional Development
- A total of 23 Student Professional Organizations
  - Very active, with 984 members
    - 48.5% of BCoE students
- 246 Student Professional Development events in ‘12-’13
  - Attendance was 7839 (3 × enrollment)
- 6436 Outreach hours
  - High School, Community College, etc.

<table>
<thead>
<tr>
<th>CNAS</th>
<th>BCOE</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>F’13 Enrollment</td>
<td>4568</td>
<td>2364</td>
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</table>

<table>
<thead>
<tr>
<th>Current Campus-Funded FTE</th>
<th>CNAS</th>
<th>BCOE</th>
<th>Needed For Parity</th>
<th>BCOE Shortfall</th>
<th>Total Shortfall</th>
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<tbody>
<tr>
<td>Advising</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Advising FTE</td>
<td>17</td>
<td>3.5</td>
<td>8.8</td>
<td>5.3</td>
<td>5.8</td>
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<td>Transition adviser</td>
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<td>1.6</td>
<td>1.6</td>
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<td>Enrollment management</td>
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<td>Enrollment Management FTE</td>
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<td>2.1</td>
<td>2.1</td>
<td>2.1</td>
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Graduate Program Overview/History

<table>
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<tr>
<th>Program</th>
<th>Start Year</th>
<th>M.S.</th>
<th>Ph.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioengineering (BIEN)</td>
<td>2007-08</td>
<td>Yes*</td>
<td>Yes</td>
</tr>
<tr>
<td>Chemical &amp; Environmental Engineering (CEE)</td>
<td>1999-00</td>
<td>Yes*</td>
<td>Yes</td>
</tr>
<tr>
<td>Computer Engineering (CEN)</td>
<td>2013-14</td>
<td>Yes*</td>
<td>No</td>
</tr>
<tr>
<td>Computer Science (CPSC)</td>
<td>1994-95</td>
<td>Yes*</td>
<td>Yes</td>
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<tr>
<td>Electrical Engineering (ELEN)</td>
<td>1998-99</td>
<td>Yes*</td>
<td>Yes</td>
</tr>
<tr>
<td>Material Science &amp; Engineering (MSE)</td>
<td>2010-11</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Mechanical Engineering (MCEN)</td>
<td>2001-02</td>
<td>Yes*</td>
<td>Yes</td>
</tr>
<tr>
<td>Online – Engineering (OENR)</td>
<td>2013-14</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

*Five-year BS/MS programs available since Fall 2009
International Graduate Student Agreements

- Ambedkar Marathwada University (India)
- Chungnam National University (Korea)
- Gangnam-UCR International Education Center (Korea)
- Hanbat University (Korea)
- Hanyang University (Korea)
- Huazhong University of Science & Technology (China)
- Jiao Tong University (Japan)
- Josai University (Japan)
- Korea Institute of Materials Sciences
- Nanjing University (China)
- National Autonomous University of Mexico (UNAM)
- Overseas Koreans Foundation
- Rey Juan Carlos University (Spain)
- Shanghai Jiaotong University (China)
- Thailand Institute of Scientific & Technological Research
- Tohoku University (Japan)
- Tsinghua University (China)
- University of Bamberg (Germany)
- University of Wroclaw (Poland)
Research

Comparison of USNWR Criteria - UCR/Public 1-25

Research Activity, 3-Yr Running Average
Research Collaborations (partial)

- City of Sendai (Japan)
- Haider Spine Institute (Riverside)
- Honda (Japan)
- Hyundai NGV (Korea)
- Infinite Universe Limited (China)
- Intel Corporation
- LG Innotek (Korea)
- Naval Surface Warfare Center (Corona)
- Oak Ridge National Laboratory
- Nissan Motor (Japan)
- Raytheon
- Riverside CEO Forum
- Samsung Electro-Mechanics Co., Ltd (Korea)
- Tata Sons Limited (India)
- Winston Chung (China)

Research Space

- Buildings
  - Material Science and Engineering (2011) – shared with CNAS; clean room area incomplete
- Wet Labs
  - 28,000 ft² (Bourns & MSE) + 7,000 ft² (damp, non-chemical)
  - Recent (2/25/13) analysis by CRM concluded additional 10,000-12,000 ft³ needed for current BCOE faculty

Engineering Building Unit III

- Detailed Project Plan (August 2006)
  - 91,500 gsf, 54,000 asf, 30,000 asf wet lab
  - Target completion date – Fall 2011
  - Projected BCOE faculty size – 105 to 110

- EBU III is a priority for continued BCOE growth and excellence toward Top 25 objective.
### BCOE Administration and Facilities

**D. Patrick Hartney, Assistant Dean**  
Finance & Administration

#### BCOE Personnel Levels and Transactions for Fiscal Year 2013/2014

<table>
<thead>
<tr>
<th>College Personnel Information</th>
<th>FTE</th>
<th>Head Count</th>
<th>Transaction Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filled Faculty (PERM)</td>
<td>88.6</td>
<td>90</td>
<td>No. of Accounts Payable Transactions</td>
</tr>
<tr>
<td>Unfilled Faculty (PERM)</td>
<td>16.75</td>
<td>0</td>
<td>No. of Payroll Transactions</td>
</tr>
<tr>
<td>Other Academics (TEMP)</td>
<td>168</td>
<td>775</td>
<td>No. of Travel Requests Transactions</td>
</tr>
<tr>
<td></td>
<td><strong>273.35</strong></td>
<td><strong>865</strong></td>
<td>No. of Campus Work Order Transactions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No. of Transfers</td>
</tr>
<tr>
<td>Career Staff (PERM)</td>
<td>57.07</td>
<td>68</td>
<td>No. of BEAs</td>
</tr>
<tr>
<td>Career Staff (TEMP)</td>
<td>30.88</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>87.95</strong></td>
<td><strong>109</strong></td>
<td></td>
</tr>
<tr>
<td>Non-Career Staff</td>
<td>39.97</td>
<td>316</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>127.92</strong></td>
<td><strong>425</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>401.27</strong></td>
<td><strong>1,290</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### BCOE Expenditures for Fiscal Year 2013/2014

- Annual C&G Expenses: $20,777,157 (37.83%)
- Annual General/State Research Exps: $1,720,691 (3.13%)
- Annual Initial Comp Expenses: $2,566,965 (4.67%)
- Annual Gift Fund Expenses: $1,472,324 (2.68%)
- Annual S&S, Fees, & UNEX Expenses: $3,855,451 (7.02%)
- Annual General/State I&R Expenses: $24,532,669 (44.67%)

**Total Expenditures:** $54,925,257 (100.00%)

#### BCOE Space Use Summary (as of Sept 19 2014)

<table>
<thead>
<tr>
<th>USE</th>
<th>TOTAL ON CAMPUS</th>
<th>CECERT</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instr Svc</td>
<td>1,996</td>
<td></td>
<td>1,996</td>
</tr>
<tr>
<td>Instruction</td>
<td>6,187</td>
<td>529</td>
<td>6,716</td>
</tr>
<tr>
<td>Office Svc</td>
<td>19,844</td>
<td>1,360</td>
<td>21,204</td>
</tr>
<tr>
<td>Office</td>
<td>106,639</td>
<td>47,044</td>
<td>153,683</td>
</tr>
<tr>
<td>Other</td>
<td>1,107</td>
<td></td>
<td>1,107</td>
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<tr>
<td>Research LAB Svc</td>
<td>26,827</td>
<td>1,888</td>
<td>28,715</td>
</tr>
<tr>
<td>Research OFF Svc</td>
<td>0</td>
<td>130</td>
<td>130</td>
</tr>
<tr>
<td>Research</td>
<td>13,088</td>
<td>8,363</td>
<td>21,451</td>
</tr>
<tr>
<td>Research - DRY</td>
<td>12,866</td>
<td>6,127</td>
<td>18,992</td>
</tr>
<tr>
<td>Research - WET</td>
<td>11,939</td>
<td>2,938</td>
<td>14,877</td>
</tr>
<tr>
<td>Research Svc</td>
<td>2,103</td>
<td>399</td>
<td>2,502</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>202,596</strong></td>
<td><strong>68,778</strong></td>
<td><strong>271,374</strong></td>
</tr>
</tbody>
</table>
Contracts and Grants

Central contracts and grants office for BCOE
- Tracks and disseminates funding opportunities, and helps PIs and students find opportunities.
- Prepares budgets and all internal and external compliance documentation for all non-philanthropic proposals from BCOE (now more than 300 per year).
- Works with the faculty and the research office on uploads/production and timely submission.
- Helps to organize and manage large proposal teams.
- Maintains a library of proposal text (diversity, management plans, data management) and past successful proposals.
- Assists with writing, editing, graphics, and formatting.

In collaboration with RED, Graduate Division, and other schools/colleges:
- Leads an annual workshop (April) for assistant professors planning NSF CAREER proposals.
- Conducts training for graduate students for the NSF Graduate Research Fellowship Program.

So, what's up?
- Faculty size has doubled since we went to this structure. Staffing has remained static.
- Faculty mix is more senior than it was 12 years ago, so we are applying for larger and more sophisticated opportunities, which require more resources.
- Campus investments in what is broadly termed “research development” are uneven and, so far, uncoordinated.

According to RED annual reports:

BCOE proposals and awards by year

Dollars

<table>
<thead>
<tr>
<th>Year</th>
<th>Proposals</th>
<th>Awards</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>300</td>
<td>15,000,000</td>
</tr>
<tr>
<td>2010</td>
<td>250</td>
<td>20,000,000</td>
</tr>
<tr>
<td>2011</td>
<td>320</td>
<td>30,000,000</td>
</tr>
<tr>
<td>2012</td>
<td>350</td>
<td>35,000,000</td>
</tr>
<tr>
<td>2013</td>
<td>280</td>
<td>25,000,000</td>
</tr>
</tbody>
</table>
Bioengineering

Bir Bhanu
Distinguished Professor and Interim Chair

At a glance

- **Beginning**
  - Department Began: 5/2006
  - Graduate Program Began (BIG): 12/2006

- **Enrollment**
  - Undergraduate 2006: 14
  - Undergraduate 2014: 350
  - ABET Accredited 2012
  - Graduate 2006: 5
  - Graduate 2014: 96 (75 PhD, 21 MS); 10 NSF GRFP; 2/3 domestic and 1/4 minority

- **Faculty**
  - 2006: 5
  - Since 2012: 12

- **Extramural Support**
  - NIH
  - NSF
  - Beckman Initiative for Macular Disease
  - American Soc. of Laser Medicine & Surgery
  - Tobacco Related Disease Program
  - Whitaker Foundation
  - Haider Biologics

- **Core Faculty**
  - AAAS Fellows: 4
  - ACS Fellow: 1
  - AIChe Fellow: 1
  - AIMBE Fellows: 4
  - BMES Fellows: 1
  - SPIE: 1
  - National Academy of Engineering: 1
  - NSF Career: 1

- **BIG Faculty**
  - 12 Departments
  - 44 Faculty Members
Research Focus Area

Research is conducted in the following major areas:
- Biomaterials and Regenerative Medicine
- Biomedical Imaging
- Molecular and Cellular Engineering
- Medical Devices
- Computational Bioengineering

BIG Graduate Students

Ten BIG Students are NSF Graduate Research Fellows
Chemical & Environmental Engineering

- Department was formed in 1998
- Graduate program started in 1999
- Currently 17.5 ladder-rank faculty (one split appointment, one center director, and two associate deans)
  - Lost five faculty (Marc Deshusses (former chair), Wilfred Chen, Yushan Yan (former chair) and David Cwiertny, Joseph Norbeck (founding director for CECERT) during FY 09 and 10
  - Hired eight new assistant professors during AY 12-15 (Ian Wheeldon (AY 12), Xin Ge (FY 12), Philip Christopher (FY 12), Juchen Guo (FY 13), Haizhou Liu (FY 13), David Jassby (FY 13), Ruoxue Yan (FY 14), Bryan Wong (FY 15)
- Two Undergraduate programs:
  - Chemical Engineering: Chemical, Biochemical, Bioengineering options
  - Environmental Engineering: Water and Air Quality options
- Enrollment (Fall 2013):
  - Undergraduate students: CHE: 273 and ENVE: 173
  - Graduate student: 85 CEE (+8 students from other programs)

Undergraduate Enrollment

Graduate Enrollment

Faculty Size
Research is conducted in six major areas:
- Biotechnology and Bioremediation
- Advanced Materials and Nanotechnology
- Energy Conversion and Storage
- Computation and Molecular Modeling
- Air Quality Systems Engineering
- Water Quality Systems Engineering

Publication Statistics/CHE 2000-09

- # of citation/paper
  - 6th highest (24.15)
  - Caltech (38.36), MIT (28.52), U of W (25.82), Michigan (25.66), UIUC (24.31)

- # of papers/faculty/yr
  - 11th among top 25
  - 2nd among 16th - 25th

- h-index
  - 12th among top 25
  - 2nd among 16th - 25th
Computer Engineering

Walid Najjar
Director, Computer Engineering Program
Professor, Department of Computer Science & Engineering

Computer engineering is a discipline that embodies the science and technology of design, construction, implementation, and maintenance of software and hardware components of modern computing systems and computer-controlled equipment. Computer engineering has traditionally been viewed as a combination of both computer science (CS) and electrical engineering (EE).

- IEEE/ACM Curriculum Guidelines for Undergraduate Degree Programs in Computer Engineering, 2004

Jobs in Computer Engineering
- Shift to software aspects of computer engineering
  - Where software and hardware interact
- 6th highest paid major (median mid-career)

<table>
<thead>
<tr>
<th>Quick Facts</th>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010 Median Pay</td>
<td>$98,810</td>
<td>$90,530</td>
</tr>
<tr>
<td>Jobs in 2010</td>
<td>70,000</td>
<td>913,100</td>
</tr>
<tr>
<td>Growth Outlook</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010-20 (avg. 14%)</td>
<td>9%</td>
<td>30%</td>
</tr>
<tr>
<td>Change 2010-20</td>
<td>6,300</td>
<td>270,900</td>
</tr>
</tbody>
</table>


Time Line of CEN@ UCR
- **2000**: a major jointly managed by EE and CSE
  - An orphaned major:
    - CEN undergraduate advisor alternates yearly between CSE or EE
  - Curriculum changes require votes from both departments
- **2008**: proposed as a program, joint CSE-EE
  - Based on recommendation by CSE external undergraduate review committee
  - UCSB CEN program used as a model
  - Better preparation for ABET
- **MS degree in CEN**
  - 2009: proposal for MS degree in CEN
  - 2010: CEN Program committee @ BCOE formed
  - 2012: MS CEN approved by UC President
    - UC Santa Cruz, only other UC with MS in CEN
    - 2012: 5 years BS+MS in CEN approved
# CEN Faculty

**Nael AbuGhazaleh**
Professor, CSE, ECE

**Laxmi Bhuyan**
Professor, CSE

**Philip Brisk**
Assistant Professor, CSE

**Rajiv Gupta**
Professor, CSE

**Roger Lake**
Professor, ECE

**Walid Najjar**
Professor, CSE

**Sheldon Tan**
Professor, ECE

**Frank Vahid**
Professor, CSE

**Albert Wang**
Professor, ECE

**Qi Zhu**
Assistant Professor, ECE

10 Faculty members:
9 Fellows (IEEE, ACM, AAAS)

~280 undergraduates

~29 graduate (MS)

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**UCSB CEN Program**

19 Faculty

~180 undergraduates
Computer Science and Engineering

- Relatively new: established in 1989, first PhD graduated in 1999
- 24 faculty: 3 ACM Fellows, 4 IEEE Fellows, 5 AAAS Fellows, and 10 NSF CAREER awardees
- Funding: in 2012-14, 10M in external grants
- 3 undergraduate majors: Computer Science, Business Informatics, Computer Engineering (joint with ECE). Total ~650 undergrads.
- UCR’s largest graduate program: 165 grad students: 115 Ph.Ds, 50 MS students. We graduate ~25 Ph.D.s per year, some now employed at UCI, Arizona, Florida, Umass, etc.
- Steady rise in rankings:
  - NRC rankings: 5-34 in S ranking, 5-31 in research, 24-59 in R ranking, out of 126 Ph.D. programs (in 2010)

Research Strengths

- Networking and Mobile Computing
- Architecture and Embedded Systems
- Software Engineering and Programming Languages
- Data Mining and Databases
- Graphics
- Scientific and High Performance Computing
- Bioinformatics
- Algorithmics
- Artificial Intelligence

Research Highlights
Detect the insects with wireless sensors in real time....

A half second of audio from the laser sensor.

...then classify the insects using novel machine learning algorithms invented at UCR ...

Gates Foundation: Precise Handling of Insects in Agriculture

Bioinformatics and Computational Biology

Computer Graphics: Human motion editing and analysis
Electrical and Computer Engineering (ECE)

Jay Farrell
Professor and Chair

ECE Degree Programs:
- BS, MS, Ph. D. Computer Engineering
- BS, MS, Ph. D. Electrical Engineering

ECE History
- 1989 First students enrolled
- 1992 Five EE Faculty
- 1993 First UG Faculty
- 1994 First ABET Accreditation
- 1997 Graduate Program starts
- 2000 Ten EE Faculty
- 2000 CEN B.S Starts
- 2001 First Ph.D. Granted
- 2006 Twenty EE Faculty
- 2012 CEN Grad. Prgm. Starts

UCR ECE USNWR Ranking (2014)
- #39 of 101 Public Universities
- Top Quartile NRC S-Ranking

The UCR ECE is well ranked relative to its size.

Faculty – 23.5 FTE
- Assistant Professors: 6
- Associate Professors: 2
- Full Professors: 15.5

Research Areas (24 People)
- Computer Engineering & VLSI (2.5): Low power, thermal management, reliability, embedded applications
- Nano Materials, Devices, and Circuits (8): graphene, electron & thermal transport, solar cells, L-ION batteries, optoelectronics, phonon engineering

Honors, Awards, Professional Leadership:
- Fellows: 9 IEEE, 7 AAAS, 2 APS, 2 SPIE, 1 IFAC, 1 IOP, 1 IAPR
- Research Initiation: 8 NSF Careers, 2 ARO YIA, 1 ONR YIP, 1 NSF BRIGE
ECE Research Center Leadership:
- CRIS – Center for Research in Intelligent Systems
  - Bhanu (Director), Roy-Chowdhury, et al.
- CE-CERT – Center for Environmental Res. & Tech.
  - Barth (Director), Farrell, Kassas, Yu.
- UC-Light – Ubiquitous Communication by Light
  - Wang (Director), Farrell, Liang, et al.
- POEM – Phonon Optimized Engineering Materials
  - Balandin (Director), Lake, et al.

EE Enrollment

EE Graduate Recruitment

12/13 Awards = $362k/EE faculty

International Grad apps
  - Strong history of growth
Domestic Grad apps
  - Goal: Continued growth

Target admits for Fall 2014
  - 25 PhD
  - 25 MS admits
Actual admits
  - 25 PhD for F'14
  - 28 MS for F'14
Materials Science and Engineering

Javier Garay
Professor and Chair

- Materials Science and Engineering (MSE) is concerned with the study of the structure, properties and applications of materials.
- The MSE Program at UCR aims to provide fundamental knowledge of materials with the objective of predicting, modifying and tailoring the properties of materials to achieve enhanced material/device performance.
- Materials Research is one of the strength areas of research at UCR;
- MSE provides the ‘glue’ for research in BCOE, CNAS and UCR
  \( \rightarrow \) MSE at UCR is an interdisciplinary program with participating faculty from Engineering (BCOE) and physical sciences (CNAS)

Core Faculty: 15
Participating faculty members:
28 from BCOE
13 from CNAS

Award B.S., M.S. and PhD degrees

The MSE undergraduate program is not a free-standing department. Rather, it relies on the participation of every department in the Bourns College of Engineering for providing curriculum, facilities, and assessment (Joint faculty hires).
Growing Graduate Program

\[ y = 1.0357x^2 - 4152.9x + 4E+06 \]
\[ R^2 = 0.9916 \]

Tremendous graduate student growth
Have \~70\ grad students
62 PhD, MS 8
Mechanical Engineering

Guillermo Aguilar
Professor and Chair

Total: 17 faculty

2013 ME Faculty @ Dana Point

METRICS AND COMPARISONS

Peer-reviewed journal papers published with ME students

number of citations
UCR USNWR Rankings

<table>
<thead>
<tr>
<th>Undergraduate</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>rank</td>
<td>total</td>
</tr>
<tr>
<td>National Univ</td>
<td>97</td>
<td>156</td>
</tr>
<tr>
<td>UG Engineering</td>
<td>82</td>
<td>156</td>
</tr>
<tr>
<td>Top Public Schools</td>
<td>44</td>
<td>156</td>
</tr>
</tbody>
</table>

Graduate

| BCOE       | 64   | 144   | 44   | 67   | 143   | 47   |
| BIEN       | 51   | 66    | 77   | 67   | 75    | 89   |
| ChE        | 61   | 91    | 67   | 60   | 88    | 68   |
| CompE      | 52   | 91    | 57   | 46   | 85    | 54   |
| EE         | 62   | 112   | 55   | 67   | 122   | 55   |
| EnE        | 41   | 68    | 60   | 48   | 81    | 59   |
| MSE        | 58   | 74    | 78   | 59   | 75    | 79   |
| ME         | 72   | 109   | 66   | 61   | 132   | 46   |

Career goals of currently enrolled ME graduate students.
Total responses: 39

- Definitely stay in academia, either by continuing with a Ph.D. or with a Postdoc
- Possibly stay in academia, it depends on how things go
- Pursue a career in industry
- Do research in a national lab
- Pursue a teaching-oriented career
- I really have no idea right now

Vision/Growth Plans/Needs

- **Vision**
  The Vision of the Department is to be nationally recognized as an innovator in both research and education in mechanical engineering.
- **Growth Plans**
- Increase # faculty
- Grow graduate program by traditional and non-traditional means (e.g., bolster MS admissions with the goal of converting them to PhD students)
- Work closely with industry on joint projects. More than 50% of our students seek industry jobs
- NEED: space, particularly wet labs
Masters of Science in Engineering On-line

Kambiz Vafai, Distinguished Professor of Mech Eng and Director of MSOL

November 1998
- The Regents delegated authority to the UC President to set fees for self-supporting degree programs

2008
- MSOL Concept Started

September 9, 2009
- Proposal was communicated to the EVC

2011
- Reviews and Response to Reviewers conducted by CCGA

February 9, 2012
- Coordinating Committee on Graduate Affairs (CCGA) Approval

February 13, 2012
- Office of the Provost and Executive President, Academic Affairs, UCOP Approval

December 17, 2012
- Change to MSOL Program Graduate Council approval at Partnership with Pearson on Fall of 2014.

Course Conversion (V)

Courses need to be converted and approved for online presentation

Lectures and Syllabus need to be adjusted

Exams, Quizzes, Homework, and Projects need to be revised

Graduate Council Approval

Committee on Courses Approval
UNIQUENESS

- We have started the program with a specialization drawn from Bioengineering.

- Our MSOL program is unique amongst the competing online programs since it offers an effective and well-balanced blend of professional core engineering management and specialization courses.

- Program incorporates a significant design experience that draws from the knowledge gained from courses taken (ENGR 296). We believe this experience will attract students who complete the online M.S. program to our Ph.D. programs

PROGRAM PLANS

- At the beginning of the second year and every thereafter, we intend to offer two new areas of study. The topics for the 2014 academic year are: Environmental Engineering Systems (Water) and Materials at the Nanoscale. The topics for the 2015 academic year are: Mechanical Engineering and Electrical Engineering Specializations.

- In this program you can earn a Master of Science in Engineering degree with the same program of study as in our departmental programs, with the same courses, same instructors, and TA as on campus

Most faculty regarded the new streamlined review process for the Online Program as 'quite an improvement'
Center for Bioengineering Research

Goals:
> Provide Seed Funding for Multidisciplinary Projects
> Stimulate University/Industry Projects

Example Projects and Outcomes

Bahman Anvari, Professor, Bioengineering
Optical Imagine and Phototherapy
NSF-Grant: Intraoperative imaging of ovarian cancer
Collaboration: MD Anderson Cancer Center, Houston

Dimitri Morikis, Professor, Bioengineering
Immune System Diseases-Macular Degeneration
Grants and 9 provisional patents
Collaborations: Princeton, UC-Santa Barbara, Stanford, U Queensland, U Sheffield, U Cypress

Jiayu Liao, Associate Professor, Bioengineering
High-throughput Screening for Drugs Based on Selective Molecular Pathways
7 Patent Applications, found potential virus inhibitor
Collaboration: Mount Sinai Medical Center, NY

220,000 Compounds Tested

Virus Inhibitor

Hyle Park, Assistant Professor, Bioengineering
Optical Coherence Tomography Method Needle Guidance for Arterial Catheterization
Research sponsored by Dr. Thomas Haider

Fiber Optics Inside Needle

Visualization of Blood Flow in Artery
Center for Environmental Research Technology (CE-CERT)

Matthew Barth
Yeager Families Professor, Department of Electrical and Computer Engineering
Director, Center for Environmental Research and Technology

CE-CERT’s mission is to contribute to improved environmental quality and energy efficiency by conducting a broad program of interdisciplinary basic and applied research and by providing educational opportunities for the next generation of engineers, scientists and policy-makers.

Established in 1992 as an off-campus research facility

CE-CERT Snapshot

- 25 Academic and Research Faculty, 22 staff, 55 graduate students and 60 undergraduates
- Multiple engineering disciplines: Chemical, Environmental, Mechanical, Electrical, Computer Science, Materials Science
- $12 million per year in active projects (industry, state, & federal agencies)
- ~100 industry partners
- ~40 academic partners

CE-CERT Research Areas

- Emissions from Advanced Technologies and Fuels
  - Emissions measurement/analysis, fuel effects, new instrumentation/methods, after-treatment

- Transportation Systems Research
  - Intelligent Transportation Systems, vehicle activity, energy/emissions modeling

- Atmospheric Processes Research
  - Secondary pollutant formation, mitigation methods, environmental modeling

- Sustainable Energy Research
  - Cellulosic ethanol, synthetic diesel fuel, energy distribution

- Southern California Research Initiative for Solar Energy, Energy Storage and Grid Integration Research
  - Solar devices, solar thermal, smartgrid, energy storage

www.cert.ucr.edu
The College of Engineering-Center for Environmental Research and Technology (CE-CERT) is a collaborative research center involving government, industry, and academia to develop and assess environmental technologies to improve air quality, transportation, and energy efficiency. CE-CERT’s mission is to be a recognized leader in education, an honest broker in research, a creative source of new technology, and a strong contributor to solving societal environmental issues. CE-CERT consists of faculty, research staff, and students to conduct projects organized along six research programs:

**Emissions and Fuels Research** — The EFR group encompasses capabilities in measurement of mobile source emissions (such as heavy and light duty vehicles, locomotives, and ships) in the laboratory and in the field, under controlled and “real world” operating conditions. Studies of the energy and environmental impacts of reformulated or alternative fuels and advanced emission control technologies are a major priority. Research also includes characterization of emissions from current and future sources to understand their environmental effects.

**Atmospheric Processes Research** — This research group studies the fate of pollutants in the atmosphere by conducting atmospheric measurements, chamber simulations, and computer modeling. The primary research focus is the photochemical reaction of primary emissions to secondary pollutants such as ozone and fine particulate matter. Measurements of trace species are also used in support of special air quality studies.

**Sustainable Energy Systems Research** — Researchers in this area carry out projects to develop and study technologies for producing electricity and fuel from various resources. Research priorities include development of processes for thermochemical conversion of coal, renewable material, or waste into synthetic fuels. Production of ethanol from cellulosic biomass using biological processes is also being developed.

**Transportation Systems Research** — The TSR group focuses on a variety of system-level issues related to multi-modal transportation. Our primary goals are to predict the air quality and energy impacts related to transportation, to develop new intelligent transportation system technology, and to pursue advanced vehicle engineering projects.

**Southern California Research Initiative for Solar Energy (SC-RISE)** — This research initiative focuses on advancing the current state of solar energy by carrying out cutting-edge research in solar-thermal technologies as well as materials synthesis, device integration, and theoretical modeling of novel photovoltaic devices. Research also includes the areas of energy storage, energy efficiency and wind energy.

**Winston Chung Global Energy Center** — This center takes a holistic approach to addressing energy storage needs and issues, broadly ranging from technical issues, economic development, and ecological wellness. The goal of this center is to advance solutions for today’s energy storage demands, while developing far-sighted energy storage research and energy-use strategies for tomorrow’s applications.

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College of Engineering  
Center for Environmental Research and Technology  
University of California, Riverside  
1084 Columbia Avenue  
Riverside, CA 92507  
(951) 781-5791  
www.cert.ucr.edu
Center for Nanoscale Science and Engineering (CNSE)

CNSE Cleanroom and Nanofabrication Facility
Construction: $3M
Equipment and Tools: $7M
Full Operation: 2007

Research thrusts – next generation electronics spintronics, 3D-electronics, carbon nanotubes, graphene

CNSE Hiring
Initially CNSE was given 10 academic positions (5 each in Engineering and Science), and we have hired in the areas that strengthen the ability of UCR to perform in spintronics, 3-D electronics and advanced materials

- July 2002, we hired Dr. Roland Kawakami as an Assistant Professor in Physics. Spintronics, Graphene
- December 2003, we hired Dr Jianlin Liu as an Assistant Professor in Electrical Engineering. Semiconductors, Spintronics, Memory storage
- July 2004, we hired Dr. Jeanie Lau as an Assistant Professor in Physics. Nanowires, Graphene
- July 2004, we recruited Professor Jing Shi from the Physics Department at the University of Utah. Nanomagnetism, Superconductivity, Spintronics, Oxides, Graphene
- July 2005, we recruited Professor Sakhrat Khizroev from the Electrical and Computer Engineering Department at Florida International University. Nanomagnetism, 3-D Information storage
- July 2009, we hired Assistant Professor Marc Bockrath from the Applied Physics Department of Caltech. Nanoscale electronics and mechanics; Carbon Nanotubes, Graphene
CNSE Future Facilities – MS&E Cleanroom

First Two Clean Bays in MS&E Ready for Tool Installation

First ICP Etch Tools Ready for Install

MSE Cleanroom Etch/Sputtering Bay Layout
Center for Research in Intelligent Systems (CRIS)

Bir Bhanu
Distinguished Professor of Electrical & Computer Engineering &
Director, Center for Research in Intelligent Systems

Goal: Research & Development of autonomous systems with sensing
capabilities which are able to perform intelligent tasks and interact with
other biological and artificial systems.

Applications
- Biological/Medical Imaging and Bioinformatics
- Security and Surveillance
- Image/Video Databases
- Object/Target Recognition
- Biometrics (gait, face, ear, body)
- Human-Computer Interaction
- Autonomous Navigation
- Robotics (Perception/Learning)
- Bio-inspired Computational Models
- TV Commercials, Human Emotions
- Vehicle Modeling/Recognition

Interdisciplinary Research Projects with CNAS (Life Sciences, Statistics), CHASS (Psych), SOM

- Bio-imaging and Informatics (NSF IGERT Video Bioinformatics)
  - Pavement Cells
  - hESCs
  - Lesion Detection
  - Pollen Tube
  - C. elegans

- Security and Surveillance (NSF/ONR/ARO) - Tracking, Recognition, Learning, Monitoring and Security
  - Video Networks
  - Tracking-Social groups
  - Reidentification

Figure from Bhanu/Das book, Springer 2014
• **Object Recognition (NSF/ONR/DARPA/AFOSR/NASA)** – People, Vehicles, Targets

  - Gait
  - Ear
  - Faces
  - Targets
  - Vehicles

• **Image and Video Databases (NSF/DARPA/AFOSR)**

  - Semantic Concepts
  - GIS Database
  - Action/Activities
  - Species – Butterfly and Wasp

• **Bio-inspired computational models (NSF)** – Emotion Understanding, Evolving Computational eye/brain

  - Facial Expression/Emotions
  - Evolutionary Computation

• **Mobile vision/learning (NSF/DARPA/ONR)** – Perception/Learning

• **Fundamental Performance of recognition (NSF/AFOSR)**
  - Qualifying limits of algorithms
Center for Ubiquitous Communication by Light (UC-Light)

Albert Wang, Director, UC Light & Professor of Electrical & Computer Engineering

- **Mission**
  - Enable visible light wireless communication by embedding signals into the light emitted by LEDs

- **Vision**
  - Ubiquitous: Communicate as you see

- **UC-Light Center Milestones**
  - Funded by University of California Multi-Campus Research Programs and Initiatives (MRPI) Program
  - A 5-year Award 1/2010-12/2014
  - Kickoff on 1/26/2010 at UC Riverside
  - Industrial Advisory Board (IAB) formed in 2010
  - 1st IAB meeting on 4/1/2011
  - 1st industrial grant – INTEL/2010
  - 2nd IAB meeting on 5/11/2012
  - 3rd IAB meeting on 3/28/2013
  - 4th IAB meeting on 4/18/2014

- **Core technologies:**
  - VLC: Visible-light communications
  - VLP: Visible-light positioning

- **Killer Applications:**
  - Smart lighting
  - Wireless communications
  - Medical applications
  - Indoor/outdoor navigation
  - Smart Traffics
UC-Light Principal Investigators

Director
Albert Wang
Founding Director
Daniel Xu
Jay Farrell
Gang Chen
Srikanth Krishnamurthy
Ping Liang

UC Riverside

IAB - Industrial Advisory Board
Boeing, CISCO, Gallium Lighting, Intel, InteLED, Los Alamos National Lab, TASC, RHD, Lumewave, Microsemi, Northrop Grumman, Raytheon, Sutter Health, Xeralux, Celerity Technologies, Broadcom, Qualcomm, Huawei USA, TransRF, Hangsheng Electronics, Navy NAVSEA, etc.

Research Achievements

REU - Undergraduate Research Experiences
BCOE Partners with Winston Chung to Develop Renewable Energy Future

- $10 million gift established in 2011:
  - Winston Chung Global Energy Center
  - Winston Chung Endowed Professorship in Energy Innovation
  - Winston Chung Endowed Professorship in Sustainability

- 3.3 million gift funded:
  - Six faculty research projects in energy storage
  - 1.1-megawatt battery storage project for Winston Chung Hall
    - 330,000-amp-hour rare-earth yttrium-iron-sulfate batteries
    - Can be charged during less costly off-peak hours
    - Delivers power to building during peak hours
UCR Sustainable Integrated Grid Initiative (SIGI)

- Integration of Renewable Energy Generation, Energy Storage, Electric-Drive Transportation
- Smart Grid $10 million Testbed

**UC Riverside SIGI: Solar, Battery Energy Storage and EV Charging System**

- **Solar PV**
  - 3.5 MW UCR West Campus
  - 0.5 MW CE-CERT
- **Battery Storage**
  - 1.08 MWh BCOE WCH
  - 1.08 MWh CE-CERT/Bourns, Inc.
- **EV Chargers** (green)

**SIGI: Stationary Battery System 500 kWh**
Phonon Optimized Engineered Materials (POEM)

Alexander Balandin
University of California Presidential Chair
Professor, Department of Electrical and Computer Engineering
Director, Phonon Optimized Engineered Materials (POEM)
Fellow of MRS, APS, IEEE, SPIE, OSA, IOP, AAAS

Established: July 1, 2013 on the basis of Nano-Device Laboratory with UCR space and equipment contribution

Participating Faculty:
Alexander A. Balandin (EE, MSE); Roger Lake (EE); Alexander Khitun (EE), Javier Garay (MSE, ME), Ashok Mulchandani (CEE), David Kisailus (CEE, MSE), Lorenzo Mangolini (MSE, ME), Elaine Haberer (MSE, EE), Prof. Shi (Physics), Prof. Abbaschian (ME) and Ming Liu (EE).

Participating PhD Graduate Student Researchers:
Jackie Renteria (EE), Richard Gulotty (MSE), Zhong Yan (EE), Chenglong Jiang (EE), Rameez Samnakay (MSE), Pradyumna Goli (MSE), Sylvester Ramirez (MSE), Mohammed Saadah (EE), Maxim Stolyarov (EE), Hoda Malekpour (EE)

Terminology and Rational:
- Phonons are quanta of crystal lattice vibrations that reveal themselves in all electrical, thermal and optical phenomena in materials.
- Phonons carry heat in semiconductors and scatter electrons.
- Nanotechnology creates opportunities for engineering phonons in much the same development of heterostructures three decades ago allowed for engineering electrons and enabled modern electronics and information and communication technologies.
- Phonon optimized engineered materials will allow for more efficient renewable energy generation and storage, faster and lower power electronic and optoelectronic devices, better thermal management in a range of technologies, novel biomedical methods of diagnostic

Goal: Make UCR the number one research establishment in the world in phononics research and applications

Currently Funded Research Projects in POEM’s Director Laboratory

- NSF 2-DARE $1,750,000 (PI) Two-Dimensional Materials Beyond Graphene
- DOE EFRC SHINES Center $12,000,000 – Associate Director $800,000 for POEM
- NSF – SRC NRI $1,681,577 (PI) Nanoelectronics 2020 and Beyond
  - $200,000.00 industry cash gift contribution
  - Charge-density waves for ultra-low power electronics beyond Si CMOS
- NSF $360,000 (PI) Engineering Thermal Properties of Graphene
- NSF $379,637 (co-PI) Spin Transport in Topological Insulators
- NSF $350,000 (PI) Coop-grant on Graphene ICs
  - Develop graphene technology for wireless communications
- NSF $575,218 (co-PI) NSF GOALI Next Generation Memory for Electronics
- DARPA – SRC FAME $1,000,000 (PI) Van der Waals Materials for Energy Applications
  - Develop technology for increased thermoelectric energy conversion and ultra-low power dissipation electronics
- Winston Global Energy $200,000 (PI) Thermal Management of Batteries
  - Develop graphene-based technology for improved thermal management of batteries
- UC Proof of Concept $145,000 (PI) Commercialization of Graphene Thermal Materials
  - On average: $1.5M per year of competitive funding to UCR for the last 10 years
POEM Center
created on the basis of Nano-Device Laboratory (NDL)
Profile: experimental and theoretical research in advanced materials and nano-devices
Nanoscale Characterization

Phononics Research & Applications

Electronic Devices and Circuits

Theory and Modeling

Direct Energy Conversion

Raman, Fluorescence and PL Spectroscopy

Optoelectronics

Bio-Medical Nanotech

PI: Alexander A. Balandin
Thermal and Electrical Characterization

Device Design and Characterization

Campus-Wide and Inter-University Collaboration

UCR DOE EFRC: Spins and Heat in Nanoscale Electronic Systems (SHINES) - $12M new center at UC Riverside

Director: Professor Jing Shi, Department of Physics and Astronomy

Associate Director: Professor Alexander Balandin, Department of Electrical and Computer Engineering

Program Committee is chaired by the Director.

The External Advisory Committee will comprise leading scientists from academic institutions, national labs and industry. The committee is chaired by the Associate Director.
Dear Engineering Deans:

I would like to bring your attention a significant opportunity to help address major challenges in engineering education.

The NSF Engineering (ENG) Directorate has launched a multi-year initiative, the Professional Formation of Engineers, to create and support an innovative and inclusive engineering profession for the 21st Century. Professional Formation of Engineers (PFE) includes all processes and value systems that shape how people become engineers. In FY 2015 the first phase of the PFE initiative is launched through a pilot program, Revolutionizing Engineering Departments (RED), in partnership with the Directorates for Computer and Information Science and Engineering (CISE) and Education and Human Resources (EHR). This funding opportunity enables engineering departments to lead the nation by successfully achieving significant sustainable changes in their undergraduate programs and to educate inclusive communities of engineering students prepared to solve 21st century challenges. As you will see in the program description, the principal focus is on departments. Thus, I would like to encourage you to make your department chairs/heads aware of this opportunity.

An informational webinar will be held September 23, 2014 at 2pm EDT (http://www.nsf.gov/events/event_summ.jsp?cntn_id=132690&org=ENG).

We hope that you and your colleagues will submit creative ideas and ambitious proposals in response to this tremendous challenge and exciting opportunity.

Best wishes,

Pramod P. Khargonekar
Assistant Director for Engineering Directorate
National Science Foundation
4201 Wilson Blvd., Suite 505N
Arlington, VA 22230
Tel: (703) 292-8300

New Dean of GSOE

Thomas M. Smith
Dean and Professor
900 University Avenue
1207 Sproul Hall
Riverside, CA 92521
Tel 951.827.5802
Fax 951.827.3942
thomas.smith@ucr.edu
www.education.ucr.edu