State of the Department

EECS 2000 Conference

A. Richard Newton, Chair
Christos Papadimitriou, Associate Chair
Jan Rabaey, The Vice Chair

EECS Department
University of California at Berkeley

EECS 2000 Agenda: Thursday, February 10th

8:45-9:15 Welcome and Status of the Department, Richard Newton, EECS Chair
9:15-9:30 Presentation of Distinguished Alumnus Awards
9:30-12:00 Keynote Presentations
   - Professor Randy Katz, “The Endeavour Expedition: Taking Computing and Communications to the eXtremes”
   - Professor Eric Brewer, “The Post-IP Internet Infrastructure”
   - Professor Kristofer Pister, “Smart Dust, Synthetic Insects, and other MEMS Fantasies”
12-1pm Box Lunches
1:30-4pm Perspectives From New Faculty, Christos Papadimitriou, Associate Chair
   - Professor Kannan Ramchandran, “Multimedia Communications and Networking: a Unified Approach”
   - Professor Michael Jordan, “Graphical Models and Variational Approximation”
   - Professor George Necula, “Proof-Carrying Code”
   - Professor Laurent El Ghaoui, “Exhaustive Simulation and Reliable Design”
   - Professor Satish Rao, “Bulk Synchronous Computing”
   - Professor Michael Franklin, “Telegraph: An Adaptive, Internet-Savvy Database System”
   - Professor Bora Nikolic, “VLSI Implementation of Communications and Signal Processing Systems”
4-5:30pm Reception in the Wozniak Lounge, 4th floor Soda Hall
EECS 2000 Agenda: Friday, February 11th

9:00-12:00 Industrial Research in Berkeley, Professor Alberto Sangiovanni-Vincentelli
Representatives from a number of industrial research laboratories will each present a brief introduction to their laboratory and its research emphasis, followed by a round table discussion.

Participating Research Laboratories:

Surendar Magar: Berkeley Concepts Research Center (Kawasaki)
Patrick Scaglia: Cadence Berkeley Labs
Cynthia Baringer: HRL Laboratories (Hughes/Raytheon)
Nelson Morgan & Scott Shenker: International Computer Science Institute
Arding Hsu: Siemens Technology-To-Business Center
Bhusan Gupta: ST Microelectronics Research Center

Round Table Discussion - Industrial Research in Berkeley: Challenges and Opportunities

12-1pm  Box Lunches
1:30-3:30  Meet The Companies Fair

EECS Academic Reputation

◆ Among top combined EECS Departments
◆ NRC Rankings
  ● CS ranked #3, EE ranked #4 (2 hundredths below #3 Illinois)
  ● Berkeley Engineering ranked #2 overall
  ● Berkeley ranked #1 overall (34 of 35 departments in top 10)
  ● CS ranked #3 (just behind MIT, Stanford & with CMU)
  ● EE ranked #4 (behind MIT, Stanford, Illinois, ahead of Michigan)
  ● Berkeley Engineering ranked #5 (behind MIT, Stanford, GiT & Michigan)
  ● Second highest analytical GRE (after MIT), lowest acceptance rate, highest student/faculty ratio!
Business Week’s World Leading Computer Science Labs

1978
- AT&T Bell Labs
- MIT LCS
- Stanford
- Xerox PARC
- CMU
- IBM Research

#5 Berkeley
- Illinois
- Cornell
- SRI

1998
- Stanford
- MIT LCS
- #2 Berkeley
- CMU
- Lucent Bell Labs
- IBM Research
- AT&T Labs
- University of Washington
- MIT Media Lab
- Xerox PARC

Recent Berkeley EECS Recognition
- ACM Dissertation Award
  - Hari Balakrishnan (now at MIT), 5 of last 7 were Berkeley PhDs!
- IEEE Reynolds Johnson Award
  - Randy Katz, David Patterson
- IEEE John Von Neumann Medal
  - David Patterson (with John Hennessy)
- IEEE Mulligan Education Medal
  - David Patterson
- IEEE Piore Award
  - William Kahan
- IEEE Alexander Graham Bell Medal
  - Dave Messerschmitt
- ASEE Curtis McGraw Award
  - Connie Chang-Hasnain
- ASEE Lamme Medal
  - David Hodges
- ASEE Frederic E. Terman Award
  - Randy Katz
- ACM Nico Habermann Award
  - Shiela Humphreys
Recent Berkeley EECS Recognition

- NSF Career Awards
  - Marti Hearst, James Landay, Anthony Joseph, John Kubiakowicz, Jonathan Shewchuk, George Necula
- Chancellor’s Professor (3)
  - Stuart Russell
- Distinguished Professorships
  - Jim Demmel, Chenming Hu
- ACM Fellows (14)
  - Jim Demmel, Richard Fateman
- IEEE Fellows (58)
  - Jeff Bokor, Stephen Derenzo, Joe Kahn, Costas Spanos
- NAE Members (26)
  - Jim Demmel, Pravin Varaiya, Alberto Sangiovanni-Vincentelli
- NAS Members (5)
  - William Welch, Elwyn Berlekamp
- ACM Turing Award
  - Jim Gray
- Chinese Academy of Science
  - Ernest Kuh
- Eminent Member, Eta Kappa Nu
  - John Whinnery

What Makes Berkeley EECS Graduates Special?

- Very high quality, smart students
  - "They come into your program with a great deal of talent and no matter what you do to them, they will leave talented! At a bare minimum, you are a good filter!"
  - “Particularly well-grounded in the basics”
  - “Excellent integration of theory and real practice.”

- Ability to Work Independently and in Teams
  - "Berkeley grads stand out" as "self-starters" "graduate with street smarts."
  - "More of a go-get-it attitude" or more of a "can-do attitude" than graduates from some other top schools.
  - "If you can survive four years at Cal EECS, you can do just about anything!"
  - Also reflected in our faculty: “hard working and dedicated professionals, taking on the “tough” research problems, extending their reach, and managing the attendant risks."

- Important Role of Diversity
  - Diverse socially, ethnically, economically
  - "Very diverse mix of students, from a wide range of backgrounds."
  - "A diverse group of faculty, with many backgrounds, many different approaches to research--and to life... all very successful in some dimension of their careers."

- Importance of an Integrated EE and CS Program
Undergraduate EECS Enrollment

Major Challenges and Initiatives

- **Life-Long Learning**
  - Young people should not have to make a binary decision: school or job?
  - Professionals require (re)training: “myEECS.com”
  - Start in 10th grade, or earlier!

- **Relationship to Industry**
  - We already do a good job here... but the world is changing rapidly
  - How can we better serve the needs of industry and couple our research more effectively?
Faculty Growth

1997-99 Recruitments (8.5 FTE)

- Laurent El Ghaoui, Optimization
- Michael Franklin, Databases
- Michael Jordan, Machine Learning (joint w/Statistics)
- Richard Karp, Bio-informatics/Theoretical CS
- George Necula, Compilers/Verification
- Bora Nikolic, High-Speed IC’s/Communications
- Kannan Ramchandran, Communications & Digital Signal Processing
- Satish Rao, Theoretical CS/Parallel Processing
- Jonathan Shewchuk, Scientific Computing
- Doug Tygar, Security/E-Commerce (joint w/SIMS)

...and we are recruiting for five more positions this year!

Berkeley EECS has the youngest faculty (average age) of any major US public or private research university by over 2 years!

(1999 MIT Faculty Survey)
Major Research Initiatives

- Berkeley Wireless Research Center
  - Professors Robert Brodersen and Jan Rabaey, Gary Kelson
  - Focus on single chip radios
- SIA/DARPA MARCO Design Center
  - Professors Richard Newton and Kurt Keutzer, Gary Baldwin
  - Design for deep submicron technologies
- Millennium/SimMillennium
  - Professor David Culler and others
  - Harness NOW technology for computational science and engineering across the Berkeley campus
- Endeavour
  - Professors Randy Katz and David Culler
  - Advanced exploration in invisible and ubiquitous computing
  - Includes Ninja, Iceberg, and others
- And many others…

Overall Faculty Hiring Emphasis

- Electronics, Displays, Sensors, Actuators,
- Communications, Wireless
- Distributed Systems, Networks, Security, Foundations
- Human-Centered Systems, Digital Libraries, …
Overall Faculty Hiring Emphasis

Bioinformatics

Electronics, Displays, Sensors, Actuators, Nanoengineering

Distributed Systems, Networks, Security, Foundations

Communications, Wireless

Software Engineering, Embedded Systems

Human-Centered Systems, Digital Libraries, …

Major Challenges and Initiatives

- Life-Long Learning
  - Students should not have to make a binary decision: school or job
  - Professionals require training: “myEECS.com”
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- Relationship to Industry
  - We already do a good job here... but the world is changing rapidly
  - How can we better serve the needs of industry and couple our research more effectively?
- Major Interdisciplinary Focus is Required
  - Starts with EE and CS
  - Within the College (CE #2, ME #3)
  - On Campus: 35 of 36 Departments are ranked in the top 10 in the nation
  - Eventually, we must entirely “retool” engineering as a profession!
### Undergraduate Admission Statistics

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<th>Targets</th>
<th>Requests</th>
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<tbody>
<tr>
<td>EECS</td>
<td>334</td>
<td>699</td>
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<tr>
<td>GES/Undeclared</td>
<td>280</td>
<td>222</td>
</tr>
<tr>
<td>Bioengineering</td>
<td>150</td>
<td>128</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>604</strong></td>
<td><strong>827</strong></td>
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<tr>
<td>EECS Targets</td>
<td>~800</td>
<td>~50%</td>
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<thead>
<tr>
<th></th>
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<th>Requests</th>
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<tbody>
<tr>
<td>Civil &amp; Environmental</td>
<td>130</td>
<td>36</td>
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<tr>
<td>Engineering Physics</td>
<td>30</td>
<td>32</td>
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<tr>
<td>Materials Science</td>
<td>14</td>
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<td>Eng. Math/Stat</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>196</strong></td>
<td><strong>187</strong></td>
</tr>
</tbody>
</table>

**TOTAL**            | **1,200**| **1,200**|

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Electrical Engineering Outstanding Alumnus Award

Professor Robert W. Dutton, Stanford
BS ‘66, MS ‘67, Ph.D. ‘70

Dr. Mihir Parikh, Chairman and CEO, Asyst
BS ‘69, Ph.D. ‘74

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