Cornell University
Engineering College Council
Meeting Notes

October 6-7, 2004

Note: The powerpoint presentations, advance material, and agenda for the fall 2004 ECC meeting are available on the web at:
www.engineering.cornell.edu/ecc/
login: fall2004
password: fall2004

The Engineering College Council (ECC) met in Ithaca on October 6 and 7, 2004. The following ECC members were present:

John L. Anderson
Kenneth E. Arnold
Richard A. Aubrecht
Charles S. Brown Jr.
Kenneth C. Brown
Jay W. Carter
Robert A. Cowie
Scott C. Donnelly
Samuel C. Fleming
W. Kent Fuchs
William J. Hudson Jr.
Randall D. Ledford
James M. McCormick
Venkatesh Narayanamurti
Justin Rattner
William R. Shreve
Roger Strauch
Sherri K. Stuewer
Evelyn Taylor

Bill Shreve opened the meeting by highlighting the Duffield Hall celebration.

Kent Fuchs introduced three previous Deans of Engineering, Dale Corson (also Cornell President Emeritus), William Streett, and John Hopcroft. He thanked them and the ECC members for joining the Duffield Hall grand opening.

Address by President Jeff Lehman -- Call to Engagement

President Lehman thanked John Hopcroft for having the vision to build Duffield Hall.

Jeffrey Lehman stated that in his first 15 months he has found the College of Engineering to be:

(1) An extraordinary intellectual enterprise – he particularly noted the number of graduates in the world who are industry and intellectual leaders.
(2) The College of Engineering is a model for the university in collaboration. The new Department of Biomedical Engineering and its relationship with the Weil Medical Center is one example of the leadership demonstrated by the College.

President Lehman initiated the Call to Engagement as a process to help the campus think about the direction of the university.

Highlights of the Call to Engagement responses will be published later in October. Each area will be presented in a section (8 sections) including a summary analysis. At the end of the month, during the Trustee Council weekend, President Lehman will give the State of the University Address. He will outline where we will go to realize our potential and what activities Cornell is uniquely situated to pursue.

Lehman described Cornell as a university founded in 1865 by creative fusion– for any person. Over the years Cornell has lowered the boundaries of classical versus practical study (theory and application), religion, socio-economic differences, and gender. The university also has a strong commitment to service.

Lehman asked:
What other boundaries are in need of lowering?

How can we renew our educational methods? How can we integrate technology and strengthen relationships in and out of the classroom?

Questions from the ECC to the President:

- The cost of tuition keeps increasing. What is being done to get a better balance?
- What is happening with visa issues?
- What would you like to see more of from the college?
- I am proud that the Strategic Planning process set a goal to improve the College of Engineering's external reputation. What else can we do besides try to improve our ranking? Rankings are biased by size and scale factors.
- We are experiencing a life sciences revolution. How do intellectual property issues play against academic freedom and our ability to be leaders?

Update on College of Engineering – W. Kent Fuchs, Dean (see powerpoint presentation on the web)

Announcements

- We will have a College Faculty Meeting in two weeks at which we will discuss:
  (1) International Programs
  (2) Asynchronous Learning – How much time does a student need to spend at Cornell to earn a Master of Engineering degree?

- At the next ECC meeting the agenda will focus on the Master of Engineering Program. We will conduct an MEng program review during the winter.

- The fall 2005 ECC meeting will focus on the undergraduate program.

International Programs

The college is developing international programs in Europe, China and India. Initiatives are moving forward with Ecole Centrale de Paris and Tsinghua University with plans to develop a program in India next year.

Capital Campaign Status

The Capital Campaign is in the quiet status and will remain so until an unspecified funding target is met. In 2-3 years the campaign's public phase will begin.

Facilities

Life Sciences Technology Building– This building has an expected finish date in late 2007. The Department of Biomedical Engineering will be housed in this building with space for 12-15 faculty.

Physical Sciences Building – The physical sciences Building is in the planning stage. The site is tentatively planned for the space in front of Clark Hall. Chemistry, Physics and Applied and Engineering Physics will be housed in the facility.

Computing, Information Science and Engineering Building –This facility is in the concept stage and is not yet approved. Computer Science, Operations Research and Industrial Engineering, possibly the Theory Center, and other special programs will hopefully be housed in the building. This would free up extensive space in Rhodes and Upson Hall for Electrical and Computer Engineering, Mechanical and Aerospace Engineering, Materials Science and Engineering, and Theoretical and Applied Engineering.

Discussion:
(1) Do the facilities match the quality and needs of the Biomedical Engineering Department and program?
(2) Not having the university hospital in Cornell's backyard is an enormous disadvantage. Have you figured out how to market it?

Planning the Future, Benchmarking the Present
Dean Fuchs presented an extensive series of charts representing benchmark data (see slides on web).

Overview of the College of Engineering Research Plans – Michael Spencer
(see slides on web)

Six Research Areas
Michael Spencer, Associate Dean for Research reviewed the strategic planning research goals and focused on the following two:
- Increase the average research funding per faculty member by at least 10% per year, with a goal of doubling the funding within 10 years.
- Significantly grow the Ph.D. Program, particularly in the six area of strategic focus: advanced materials, information science, nanoscience, bioengineering, complex systems, and energy and the environment.

He summarized the six research areas and reported on progress toward the goals.

Federal Funding Trends

President Bush's tentative budget for the period 2004-2009 shows reductions in basic research funding to all federal agencies except NASA and Homeland Security (DHS).

Looking at the average faculty research expenditures by decile, we can see that 20% of our faculty bring in almost 3/4 of our research funding. This offers us the potential of increasing our research funding if we can improve the funding success of a larger number of faculty.

Graduate Student Trends
Since 1991 the percentage of Doctorate degrees awarded to Asian students has grown from approximately 28% to 42% while the percentages of European and US students completing the Doctorate degree have declined. This is of concern because international graduate applications at 60% of top tier Research/Doctoral institutions decreased in Fall 2003 and 2004 and that trend also holds true at Cornell.

Guided Questions
Mike Spencer distributed a set of guided research questions (see questions on web) to be considered by the ECC in the afternoon discussion session.

Overview of Complex Systems and Networks Research

Professor Stephen Wicker, School of Electrical and Computer Engineering, presented an overview of the collaborative sponsored research being done in the areas of complex systems and sensor networking. (See powerpoint slides on the web.)

Discussion

- This could assist the FAA work. We need a new way of looking at air traffic. The current decision making process is flawed and would benefit from systems knowledge.
- I am struck by the lack of mention of artificial intelligence. Unmanned vehicles, for example, are cheaper and do not rely on emotional decisions. Homeland Security could benefit by building patterns out of apparently unrelated events.
- I like the presentation and encourage you to look at agriculture – to work with other colleges to find applications that would distinguish you from other institutions and potentially result in funding from sources outside of NSF.

Kent Fuchs pointed out that complex systems was one of the six research areas that emerged in the strategic planning process that we didn't expect. He asked the ECC, "What is your reaction to complex systems as a theme in the College of Engineering for the next 10 years?"

- It is a new frontier that needs to be explored.
- Who is the target audience?
- Will it help you identify resources?
- How do you convey the underlying education and skills?
- The math foundation of complex systems resonated with me. It could compliment other areas like life sciences. Mathematics could predict and simulate scenarios, replacing data.

Cornell IGERT Program on Nonlinear Systems

Steven Strogatz, Professor in Theoretical and Applied Mechanics, described the Integrated Graduate Education in Research and Training Program (IGERT). Through the merger of math and biology faculty and graduate students are exploring non-linear systems.
(See powerpoint presentation on the web.)

Energy and the Environment

Sidney Leibovich, Director of Mechanical and Aerospace Engineering and Committee Chair of the College of Engineering Committee on Global Sustainable Development (CGSD), provided an overview of energy and environmental initiatives in the college. (See powerpoint presentation on the web.)

Discussion

- This is a large topic with broad objectives. How will you approach it?
- Another idea that you may want to add is the issue of grid and local distribution issues of distributed power.
- Sensing power failure to prevent the whole grid from going down could be achieved by:
  - Controlling the grid
  - Taking out the human actions
  - Increasing security
  - Keeping Cornell ahead of public policy – Public policy takes a long time.
- Environmental work is boosted with public policy orientation. Is there a Cornell group doing that?
- You have to work on the right problems. Policy informs your work – it provides a match up.
- Have you spoken with NSF about funding or an ERC?

- Financing the vision will be the biggest challenge. Chevron Texaco appears to be the only oil company left that has not aligned with a university.
- Shell seemed interested. Cornell needs to position itself as an important player and provide options to Princeton, Stanford and MIT.
  Cornell is strong in the materials sciences and this will support energy work in some of the key areas.

Biomedical Engineering

Michael L. Shuler, Chair of the Department of Biomedical Engineering, gave an update on the new Department of Biomedical Engineering. (See powerpoint presentation on the web.)

The ECC ended the meeting in a closed Executive Session.