Engineering College Council Meeting

October 22, 2010

423 ILR Conference Center

Members Present: Jim Becker, Ron Black, Lance Collins, Bob Cowie, Sarah Fischell, Sam Fleming, Greg Galvin, Mike Goguen, Geoff Hedrick, Andy Kessler, , Brian Kushner, Chris Maziar, Evelyn Pearson , Bob Shaw, Bill Shreve, Dan Simpkins, Duane Stiller, Dave Welch, Jim Wrightson

Emeriti Members Present: Jay Carter

The meeting presentations and materials can be found at:
https://confluence.cornell.edu/display/ECC/2010+Fall+ECC+Meeting

Username: eccmeeting@gmail.com
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PROPOSED THEME: The Future of Cornell Engineering

PROPOSED GOALS: To engage the ECC in the development of the College's new strategic plan.

The College of Engineering will embark upon an update of its strategic plan, which was last completed in 2004. Input from key external stakeholders such as members of the ECC in this process will be crucial to the development of a plan that will serve as a living document to guide the college for the foreseeable future.

DESIRED OUTCOMES:

1. To obtain relevant, actionable input from the ECC to aid in the development of the College's strategic plan.
2. To formally launch the ECC industry relations working group

Welcome, Introductions and Overview of the Meeting – Bob Shaw and Sarah Fischell

Bob Shaw and Sarah Fischell welcomed the Council to the Fall '10 ECC meeting and introduced Lance Collins, the new Dean of Engineering.

State of the College – Lance Collins

Lance Collins gave an update on the College. He indicated that we are sitting in a very good position and are coming out of a very difficult time. He added that this is an exciting time to be dean and a great time to be thinking about the future.

Leadership changes: Lance introduced Rajit Manohar, the new Associate Dean for Research. He mentioned that in addition to being an outstanding faculty member, Rajit has started a company, which is relevant experience for some of the bullet items to be covered later during

this meeting. Lance also introduced Kathi Warren, the new Assistant Dean for Alumni Affairs and Development, who started on June 1, 2010. Kathi previously served as a major gifts officer at the Johns Hopkins University Krieger School of Arts and Sciences and as Campaign Director at the Robert H. Smith School of Business at the University of Maryland. She has the interesting challenge of rebuilding her team. He also mentioned that Jennifer Micale is the newest addition to the Engineering AAD team, as the new Assistant Director for Development.
New Faculty: Lance highlighted two new outstanding faculty in the College: Christopher Hernandez, Assistant Professor, Mechanical and Aerospace Engineering, whose research is in the bone mechanics field, and Christopher Batten, Assistant Professor, Electrical and Computer Engineering, who works on computer architecture and strategies for high-performance computing. He indicated that although these are two outstanding individuals, we still need to do more hiring.

Rankings: The College has been ranked between 8-10 for the last several years in the *US News and World Report's* Engineering Undergraduate and Graduate rankings. He mentioned that the new National Research Council (NRC) rankings (which are graduate field rankings) have just been published. The NRC rankings have always been considered as the gold standard for rankings since they are far more data driven than the *US News and World Report* which is a reputation-based survey. The previous NRC rankings were done in the early 90's. This data was collected over the 2005-06 academic year, so the data is quite dated. There were two different approaches:

- S-rankings: faculty were provided surveys on what criteria they thought were important, and the weights were determined by this (weights vary by field).

- R-rankings: faculty were asked to rank fields, and weights were extracted based on this ranking (weights vary by field).

Lance noted that Cornell did not do as well in the NRC rankings as it has done in other rankings. Cornell has created a tool to evaluate this data and Lance has asked Rajit Manohar to work with the Directors of Graduate Studies to evaluate the data, correct and assess it, and determine if it is useful. These rankings should be used to improve, but not drive what we do.

Undergraduate women, minorities and international students: There have been positive trends in the College. The number of applications has doubled over the last five years. Our freshman class is made up of 37% women, 13% URMs. Thanks to the Diversity Programs in Engineering and Admissions offices, we have made good progress in the number of female and URM students. International student enrollments remain flat. Lance noted that the retention of URM males is 10 points lower than that of the rest of the population and, therefore, is an area that needs more attention.

Graduate student enrollment: The MEng program has grown dramatically and M.S./Ph.D. enrollments have also grown. This increased demand for M.Eng. might be due to the market, as well as to our budget model.

Career development: A significant number of our students go on to graduate school. He indicated that the employment numbers are very strong. 97% of our undergraduates and 92% of our graduate students found jobs within 6 months of graduation. Lance gave a breakdown of the employment sectors for undergraduates and graduates (technology, consulting/professional practice, financial services, business/industry, government, manufacturing, biotechnology/pharmaceuticals, education and other), which represent a very broad spectrum of areas.

Good news: The Cornell Autonomous Underwater Vehicle Team won 1st place for the second year in a row. In addition, the Baja team won their national competition. Andy Ruina's robot Ranger set a walking world record. Three young faculty won NSF Early Career Awards. Michal Lipson, Assoc. Professor of Electrical and Computer Engineering, won the prestigious MacArthur "Genius Award". President Skorton was elected to the National Academies Institute of Medicine.

Budget strategy: Lance gave an overview of the College's budget strategy for the last two years which has resulted in cuts of approximately $7 million (~ 9%). During the first year across the board reductions were made, whereas during the second year, the process has been more strategic in partnership with CIS involving the consolidation and centralization of services, (financial transactions shared services, HR shared services, facilities zone management, IT service groups) which will save money while delivering a higher level of services.

Engineering Library: The University is changing the way it delivers library services. The library is predominately used through electronic means. The Library plans to move some of its collections out of Carpenter Hall to a remote site. The digital library collection (journals, etc.) grow to provide remote access to much of the collection. The reference librarians will continue to be available to students, faculty and staff.

Facilities update: The Physical Sciences and Clark Hall project is nearly complete and will provide an important growth of space. The Olin Hall renovation is almost complete. The Snee Institute (Jeff Tester's Energy Institute) has been completed. The Facilities Master Plan is on hold, consequently, the focus has shifted to renovations and maintenance in the College. He mentioned that we are about to start the process of planning for space for the next 5-10 years and will hire an architect to perform the study so that we can maximize the space we have.

Student experience: The University has been exploring how we can reduce and respond to student stress. The notice and respond program has been implemented to capture these issues. A new "Friend-to-Friend" vignette has been created to look at stress from the student's perspective and has been well received.

Critical challenges: Lance mentioned that these challenges include: faculty age, attrition and that hiring has slowed significantly. In addition, he indicated that we also need to grow our graduate program further, as well as increase our research expenditures.

He outlined the plan of excellence which is the focal point of the meeting:

- The College of Engineering will update its strategic plan (from 2004)
- Hiring with a focus on achieving or sustaining preeminence in strategic areas
- Diversify sources of research funding
- Undergraduate Program: Second to None

College of Engineering Campaign Update – Kathi Warren

Kathi Warren, Associate Dean for AAD, gave an update on the College of Engineering's Campaign and Classroom Upgrade Project. She indicated that the University's capital campaign has raised $1.8B of its goal of $3.0B and the College has raised $205M of its $375M total goal. Kathi pointed out that the College's campaign priorities are: faculty renewal, faculty lines, graduate fellowships, scholarships and the Annual Fund. She indicated that new gifts and commitments to the College in FY10 have increased by 32% to $18.M from FY09 and that in FY10 the Annual Fund secured revenues of $1.47M for the College. She also pointed out that Cornell was 1st in total alumni fundraising at $318.9MM and 3rd in total support at $446MM behind Stanford and Harvard for FY10. The FY11 fundraising goal for College is $25MM in annual revenues with $1.5MM to the Engineering Annual Fund. Kathi thanked the Engineering College Council for its generous support to the College and also extended the challenge to increase that support to 100% participation of the Council.

Classroom Upgrade Project Goals. Kathi outlined the following classroom upgrade project goals:

- Enhance AV functionality
- Enable faculty to use new teaching strategies

She discussed some of the classroom improvements made and in progress, including: the purchase of a widescreen projector with split image capability, dual wireless microphones, smart tablets/WACOMS, and the installation of clicker receivers). Despite these improvements, Kathi indicated additional funding is still needed in order to complete the necessary classroom upgrades (18 more rooms also need upgrades such as Smart Tablets/WACOM, clicker receivers, more black/whiteboards, etc.).

Swanson Challenge: Kathi outlined the Swanson classroom matching challenge. John Swanson contributed $150,000 which will match any gifts to this project. Donors receive a 1:1 match and gift credit, and all contributions count towards the College and University's campaign totals. The goal is to complete the funding by the Spring '11 ECC Meeting.

Charge for the Industry Relations Committee – Bill Shreve

Bill Shreve gave an overview of the Industrial Relations Committee and its charge. This subject will be the primary topic of the spring 2011 meeting. He indicated that "Industrial Relations at Cornell, the way that Cornell interacts with large and small companies to transfer technology from Cornell Research to companies who can incorporate that technology in commercial products, has been a subject of discussion on the Council since our spring 2009 meeting. At that meeting, we saw in the budget presentation that Cornell receives much less financial return from industrial relationships than most of our peers. Given the recognized quality of Cornell Research, this situation gives Cornell Engineering a great opportunity to improve industrial relationships for the benefit of our community, industry partners and the college". He also mentioned that when Lance Collins became Dean of Engineering, he threw his support behind the ECC's efforts to improve industrial relations and he named Rajit Manohar, Associate Dean for Research and Graduate Studies, as co-chair of the subcommittee. Bill highlighted the two goals for the college in this area:

- to minimize the barriers for faculty-industry interactions
- to clarify and simplify the process to produce an agreement for collaboration

Bill pointed out that Lance recognizes that the ECC has a unique role since its members come from various backgrounds (including executives from large corporations, venture capitalists, and entrepreneurs with experience in start-ups) and he would like to gather the talents of the council in this effort. Below is the charge for the Industrial Relations Committee:

1. Collect and summarize relevant documents from prior working groups
2. Document our experience of best practices with other universities. He would like us to go beyond the policies of other universities to relate experiences with applications of these policies
3. Document alumni experiences with Cornell
    a. What has made some interactions successful? Are these areas for improvement even within these successes?
    b. What has made other interactions fail?
    c. Summarize these results with statistics if possible.
    d. Document potential benefits to Cornell from improved industrial relations beyond the financial benefits from increased licensing revenue.

From this report and inputs from the other stakeholders at Cornell, Lance would like to see two outcomes for the college.

1. Create a clear policy with rules and boundaries for industry relationships.

2. Create templates for interactions that can lead to mutual benefit in a variety of situations. These templates will fall into two separate classifications.
    a. Relationships for commercialization through start-ups and venture financing and
    b. Relationships for commercialization through established companies.

Strategic Planning – Review of Existing Strategic Plan/Future Directions – Lance Collins

Lance Collins gave an overview of the strategic planning process. He indicated that a comprehensive strategic plan was written in 2004; now the College would like to update this plan and make it consistent with the University's plan that was completed in May 2010.

Drivers of the strategic plan: There are several factors driving the need to update our strategic plan, including:

- Anticipated turnover of 1/3 of faculty over the next 5-10 years
- Update and sharpen vision
- Exploit opportunities for stronger messaging
- Prioritize investments and garner university support
- Growth of faculty in engineering
- Facilities needs (short and long term)

Process: Lance noted that we need to evaluate where we are compared to the 2004 strategic plan. We also need to identify our successes and remaining challenges and develop an initial vision. The Directors and Chairs have been asked to start a process in their units. He mentioned that we will create college-wide committees to work on interdisciplinary topics that cross departmental lines. In the next few months, there will be a retreat with the Directors and Chairs and Advisory Committee members to begin this process.

Timeline: The strategic plan will be completed this academic year. An update will be provided at the Spring '11 Meeting.

Assessments: Lance outlined the areas to be assessed during the strategic planning process:

- Research
- Faculty
- Facilities
- Undergraduate Studies
- Graduate Studies
- Staff
- Alumni

College of Engineering Aspiration: The College of Engineering at Cornell University aspires to be widely recognized as a top-five engineering college in undergraduate and graduate studies.

Enabling Goals:

- To recruit, retain and enable a diverse community of exceptional faculty, students and staff
- To educate undergraduate and graduate students to become global leaders
- To be world leaders in important areas of research
- To increase our interactions with industry; and create a fertile environment for entrepreneurial activities for faculty and students

Presentation by Kessler Fellows Students

Tracey Brant, Director of Kessler Fellows, gave an overview of the Kessler Fellows Program and introduced two Kessler Fellows: Harsh Chamria, ECE '11 and Sarah Sprague, ISST '11. The Kessler Fellows Program is focused on entrepreneurship in general and start ups in particular. Established in 2008, with the generous support of Andy Kessler, this unique opportunity is designed for junior Engineering students interested in an entrepreneurial experience in a start-up environment. Fellows learn first-hand what it takes to make technological innovations marketable and scalable through a spring course, summer placement and fall symposium series. Each fellow receives a $2,000 cash prize and $1,000/week during their internship, as well as help with the federally funded portion of their student loans. This year there is funding for 10-12 students.

Harsh Chamria: gave a presentation on his six-week experience last summer as a Kessler Fellow at Bling Nation, an innovative mobile payment company. He indicated that the Kessler Fellows program gave him the chance to have experience with a real company. He chose Bling Nation because he wanted to be part of a growing, cutting-edge, small start-up company in Silicon Valley. Harsh described the innovation of Bling transactions and said it would revolutionize payments as we know them today. You don't need your wallet, just your phone.
He said that this was the best experience of his life. The work was diverse and every day was different. Among the many things he learned was that changing consumer behavior is difficult because people are adverse to change. He also learned about sales and event planning and, most importantly, that if he is passionate about an idea, he can be successful. He concluded by thanking Andy Kessler for funding the program and Tracey Brant for her guidance and support.

Sarah Sprague: gave a presentation on her 10-week experience at Nimbit as a Kessler Fellow. She indicated that it was an "amazing" learning opportunity. Nimbit is a direct-to-fan online music platform that provides musicians with tools to manage their own career. During her fellowship, she worked on two projects from start to finish:

1. Affiliate Marketing Programs: was asked to create one, had to research competitors. Created, implemented and tracked program.

2. Instant Band Site: easy way to build a website for bands to use. She was charged with finding a way to create this on her own.

She indicated that among what she learned was: to be passionate about whatever you decide to do and to engineer a better world. She emphasized that it's important for her to use her technological skills to make this world a better place.

Breakout Sessions Reports

Three breakout sessions were held to discuss "Research Themes on the Horizon" and "Education Priorities for the Ivy Engineer" – Groups A & B. The notes from the individual sessions will be appended to the minutes shortly.

Aspects of an engineering undergraduate education most critical to a successful career

Statistic	Mean	Min Value	Max Value	Variance	Standard Deviation
Demonstrates an understanding of engineering, science and mathematics fundamentals	2.83	1	9	6.07	2.46
Possesses the ability to think both critically and creatively	3.57	1	15	13.15	3.63
Communicates effectively in a variety of different ways, methods, and media (written, verbal/oral, graphic, listening, electronically, etc.)	5.77	2	13	8.25	2.87
Possesses the ability to think both individually and cooperatively	6.00	1	14	14.41	3.80
Demonstrates an understanding of information technology, digital competency, and information literacy	6.87	2	15	19.64	4.43
Functions effectively on a team (understands team goals, contributes effectively to team work, supports team decisions, respects team members, etc.)	7.07	1	15	10.89	3.30
Communicates effectively to both technical and non-technical audiences	8.00	2	14	12.41	3.52
Demonstrates an understanding of project planning, management, and the impacts of projects on various stakeholder groups (project team members, project sponsor, project client, end-users, etc.)	8.70	2	15	14.01	3.74
Functions effectively in a diverse environment (including gender, ethnic and national origin) and appreciates the importance of having different perspectives brought to bear on complex problems	8.77	1	16	15.77	3.97
Understands a systems approach to problem solving	9.00	2	16	18.00	4.24
Demonstrates an understanding of the ethical and business norms and applies norms effectively in a given context (organization, industry, country, etc.)	10.20	4	15	9.61	3.10
Demonstrates an understanding of stages/phases of product life-cycle (design, prototyping, testing, production, distribution, supply chain and management, disposal or recycle, etc.)	10.23	3	15	15.22	3.90
Possesses an entrepreneurial drive	10.40	3	16	13.83	3.72
Possesses an international/global perspective and demonstrates the cultural sensitivity and understanding to be effective in multi-cultural environment	11.33	5	16	9.47	3.08
Demonstrates an understanding of political, social and economic perspectives	11.77	3	16	11.50	3.39
Possesses fluency in at least two languages	15.50	11	16	1.50	1.22

Undergraduate Education
Additional attributes

Leadership/style

- Leadership (3)

- Emotional intelligence
- Resourcefulness - ability to find solutions to problem
- Optimism
- Problem solving skills derived from an Engineering Education
- Hands on implmentation skills
- Organizational skills/time management/ managing their own work
- Demonstrates good moral and ethical values

- Work ethic
- Willingness to work hard and long hours
- Desire to succeed
- Motivation
- Persistence/Tenacity
- Energy/energize
- Tenacity; accept setbacks

- Ability to communicate both up and down in an organization - comfort and skills appropriate for speaking with adults in a professional environment
- Demonstrates varied influence approaches
- Empathy and ease with people

- Ability to continually acquire new skills, knowledge and capabilities
- Ability to learn
- Curiosity

Business skills

- Investment and Return analysis
- Demonstrates an understanding of financial metrics and reports
- Understanding of financial impacts of various decisions and the ability to effectively communicate with financial personnel
- Ability to make good engineering decisions - cost/performance/features tradeoffs
- Basic understanding of finance -- income statement, balance sheet, cash flow.
- Understands how to incorporate safety and risk management into solutions
- Understanding of cash flow and discounting
- Basic understanding of marketing and sales
- Finance and Accounting
- Tradeoff analysis
- Knows patent law
- Basic business concepts/analysis
- Demonstrates business savvy

Other

- Being effective in Asia
- Chinese
- At least one excellent technical competence
- Basic understanding of human biology
- Has a basic understanding of indisciplinary fields such as agriculture, medicine, social science and law.
- Ability to integrate knowledge from more than one discipline

Emerging Research Areas
ECC Survey Responses

Bioengineering

- Interface of technologies and biology and Information systems in the era of personalized medicine
- Biologically inspired engineering
- Enhanced Bio materials
- cellular bioengineering
- Bioengineering
- Biotechnology
- Collaberation with stem cell research
- bioenegineer
- replacement organs like failed ears
- Genetic Engineering

Info technology

- Link with CIS on network activities
- information technology
- Information technology for Society
- information management

Energy

- Energy, solar, bio...
- ENERGY POLICY,
- battery technologies
- Energy
- Distributive energy generation and control
- energy storage: electricity and hydrogen
- even more focus on sustainability
- Sustainable energy solutions
- safe nuclear engineering
- Sustainibility
- Nuclear Power - next gen
- clean energy
- Independence from Fossil Fuels
- Recycling, Re-use tech
- clean energy
- Water
- dealination and water conservation
- water desalination/purification
- sustainability engineering
- Environmental Engineering
- Low-carbon transportation
- New Energy
- sustainability

Other

- Design/Management of Complex Systems
- water management
- "Enhanced Humans"---Human/Machine Amalgams
- Efficency in the Built Environment
- Nanotechnology