

## **Engineering College Council Meeting**

**October 30, 2009**

**Yale/Princeton Room, Statler Hotel**

Members Present: Ken Arnold, Jim Becker, Bob Cowie, Sarah Fischell, Sam Fleming, Greg Galvin, Geoff Hedrick, Frank Huband, Shaygan Kheradpir, Gretchen Knoell, Brian Kushner, Chris Maziar, Lowell McAdam, Chris Ober, Evelyn Pearson, Bob Shaw, Bill Shreve, Jim Wrightson

Emeriti Members Present: Jay Carter, Bill Hudson

Bob Shaw welcomed the council and gave an overview of the meeting agenda.

The meeting presentations and materials can be found at:

<https://confluence.cornell.edu/display/ECC/Current+Meeting>

Username: eccfall09@gmail.com

Password: eccfall09#

Goal of the Meeting:

To discuss the impact of the economy on the educational mission, in particular on experiential learning and recruiting.

Desired Outcomes:

To provide counsel on job recruitment strategies.

To provide feedback on balance between experiential learning and budget constraints.

### **College Update - Chris Ober**

#### Overview of the Meeting - The College in a Period of Transition

Chris Ober gave an overview of the meeting and noted that the College is in a period of transition and is facing a new economic condition. He described the preparations that the College is making to confront this situation. However, despite the challenges we are facing, it has been an outstanding year.

#### Introduction of New Leaders

Chris introduced the following new leaders in the College: Shane Henderson, Interim Director of ORIE, replacing Jim Renegar; Phil Liu, director of CEE, replacing Jim Gossett; and Bill Olbricht, interim chair of BME, replacing Mike Shuler while he is on sabbatic. Paulette Clancy's term as Director of CBE is ending and a search for her replacement is underway. Chris also announced that Rajit Manohar will replace Marjolein van der Meulen in January 2010 as the new Interim Associate Dean for Research and Graduate Studies. He thanked Marjolein for her outstanding leadership as Interim Associate Dean.

## State of the College

The College of Engineering is ranked eleventh in the U.S. News graduate survey. As we go forward with our strategic planning efforts, we need to assess how our actions will affect our rankings, and continue to maintain excellent teaching and research in the College. Chris solicited the Council's input and guidance as we move forward with these efforts.

Applications in the College are up 18% from last year. Only the best engineering colleges have seen this kind of growth. The freshmen class is 37% women and 12 % URM's – a record year. Diversity of undergraduates is almost double the national average.

He highlighted some of the student successes, including: the Solar Decathlon House in which we placed 7<sup>th</sup> overall. The CU Autonomous Underwater vehicle team led by Erin Fischell, won first place in the 12th annual Association for Unmanned Vehicle Systems International/Office of Naval Research (AUVSI/ONR) competition in San Diego on August 2nd. The College is on the short list for the X-prize car. SWE earned the Gold Level award for Outstanding Collegiate Section. The College was ranked 4<sup>th</sup> for Hispanic graduate students by HispanTelligence.

## New Faculty Hires

We continued to conduct faculty searches, but at greatly reduced rates. New faculty hires in 2009 included: assistant professors Hadas Kress-Gazit (MAE), Salman Avestimehr (ECE), Brandon Hincey (MAE), Delphine Gourdon (MSE), Christopher Batten (ECE), Peter Frazier (ORIE), Chris Hernandez (MAE), Xiling Shen (ECE), and Jeff Tester ('66, MS '67), professor in CBE.

In 2009, faculty FTE has remained constant, while the diversity of our faculty (women and URM's) continues to climb overall. In terms of faculty diversity, the trend is encouraging.

## Faculty Prizes and Honors

Chris gave examples of some of the prizes our faculty have received: Joe Burns (MAE/TAM) was named an Honorary Fellow of the Royal Astronomical Society; John Hopcroft (CS) was elected to the prestigious National Academy of Sciences; Stephen Pope (MAE/TAM) is receiving the 2009 Fluid Dynamics Prize from the American Physical Society. Jiwoong Park (CCB) and Derek Warner (CEE) received PECASE awards (which are extraordinarily selective). Paul Kintner (ECE) was named a Jefferson fellow of the U.S. Department of State Jefferson Science Fellow.

## Graduate Student Enrollments

MEng enrollments are increasing, especially in the fields of BME and CEE. However, MS/Ph.D. enrollments are flat. With the MEng, there is a good revenue sharing agreement with the University. The College is making efforts to increase these enrollments, and has also launched a professional M.S. program for those departments that struggle to attract MEng students.

### Research expenditures

Research expenditures are increasing. The National Cancer Institute has just awarded Harold Craighead funding for the new Center on the Microenvironment and Metastasis, which will be headquartered at Cornell, with a grant of \$13M over five years. The center will focus on using nanobiotechnology and other related engineering approaches to advance research on cancer. Harold Craighead is the principal investigator and director of the new center.

Cornell is competing aggressively for recovery act funds and has received over \$90M to date -- Engineering's share is over \$12M.

### Facilities

Construction of the new Physical Sciences Building is well underway. However, budget reductions are expected to impact many of the College's facilities projects. Renovations are continuing, but the Carpenter Hall replacement project is on hold. Working with FCIS and Dean Dan Huttenlocher, efforts are being made to move forward Gates Hall. Cornell has received a sizeable gift and has applied to NIST for a \$15,000,000 grant in support of the building. Engineering has made a financial commitment since we will benefit if this building moves forward.

### Budget Situation

Budget reductions are expected to have an impact on faculty hiring, facilities, and staff. In FY10, the College is reducing approximately \$7.2 million in ongoing expenditures. The College recently completed a comprehensive planning effort. Some actions were implemented immediately, such as faculty post-tenure reviews, and others are on hold while the college waits for the University to complete its review process.

### College of Engineering Academic Planning

Chris gave an overview of the College's academic planning efforts to date which have been in the areas of: curriculum, faculty hiring, faculty productivity and retention, revenue from industry and mega-departments/"clusters". Chris thanked the ECC for their participation in the task forces. The ECC's feedback was invaluable and he would like to keep the Council engaged in this process.

At the Spring 2009 ECC meeting, a major recommendation made was to implement a pilot program to test new ideas for University/industry interaction. The College is launching a task force group with the Office of the Vice Provost for Research to examine barriers to university/industry interactions and consider ways to reduce these barriers. Several ECC members offered to participate in the process. Reference was made to similar activities at the University of Texas that just launched a similar task force.

When Chris convened a group of directors and chairs to discuss the idea of mega-departments and clusters, the group could provide no academic rationale for merging additional departments. Therefore our efforts focus on administrative improvements to improve the cost efficiency and preserve undergraduate majors despite any cutbacks. Department chairs pledged to work with other departments to improve teaching around the College regardless of the administrative structure.

### Administrative Planning

The College has reviewed its organizational structure and processes, and has developed several recommendations for restructuring. However, given that this process needs to fit with the University approach to administration, we are awaiting Bain's report to determine next steps.

### **Update on Dean's Search – John Siliciano**

John Siliciano, Sr. Vice Provost, gave an update on the dean's search. During the winter and spring, the search committee solicited a pool of over 250 candidates. After a period of quiet, behind-the-scenes screening, it identified a small group of about 30 promising candidates. The search committee met confidentially with the most attractive candidates in New York City. Due to the wishes of the candidates, the process will be discreet. The committee will bring at least one candidate to campus in November to meet with carefully selected small groups of faculty and staff. Our goal is to have the new dean in place by June 2010. The search committee will be seeking the Council's help in finding representatives from the ECC to participate (via phone) in the interview process. John emphasized that this search is a major priority for the Provost's office.

### **Discussion on Experiential Learning in Engineering Education – Facilitated by Chris Ober**

The College of Engineering is supporting 13 project teams. Almost 20% of the student body participates in project teams. Funding comes from a variety of sources and sustaining that funding is one of the challenges we are facing. Funding for project teams puts funding other College objectives in question. Chris asked for the Council's feedback on what students gain from project teams and if there are mechanisms that we have not considered in which we can benefit from project teams.

### **Experiential Learning: Student Project Teams**

#### Cornell University Autonomous Underwater Vehicle (CUAUV) – Erin Fischell

Erin Fischell, team leader of the CUAUV, gave a presentation on this project team. The CUAUV was founded in 1999 and has participated in 10 AUV competitions, winning 2 of them (in 2003 and 2009). The competition involves autonomous tasks including: docking, following pipelines, launching torpedoes, avoiding obstacles and using markers. The team is composed of 43 students from 3 colleges, and 16 different majors (including 10 engineering majors), equally

distributed by year, and has 3 advisors (Bruce Land, Graeme Bailey and Alan Zehnder). The team recruits almost exclusively freshmen, and most team members stay for 4 years. Everyone participates in the design process and gets experience in having ownership in the project. The design cycle for each project is less than one year, from August-May, with an operating budget of ~\$30,000/year. The team receives a large number of gifts in kind and all of the circuit boards they use are donated.

Erin indicated that there are real-world applications for AUVs, such as oceanographic research, the military, homeland security and offshore industry. The CUAUV has conducted open water research in Cayuga Lake by running search patterns and transfers to determine what is growing at the bottom of the lake at different times of the year. This was a big step because the team realized that AUVs can be used as a platform for research. According to Erin, this project is the most important learning experience she has had at Cornell.

#### 100+ MPG "Revolution through Competition" – Matt Robison

Matt Robison, team leader of the 100+ MPG team, gave a presentation on the Automotive X-Prize competition. The team was founded in Spring 2007 by two Johnson School students. Currently, the team consists of over 90 members, 54 of whom are engineering students. The team's goal is to compete and win the Automotive X-Prize and to design the first commercially viable 100+ MPG vehicle. In the design process, aerodynamics came first and aesthetics came second. Their vision is to help develop an ultra-efficient automobile for the mainstream market, using technology available today, to increase public awareness of fuel-efficient technology and develop an open source technology resource to educate students, the next generation of workers, to be energy conscious.

Matt decided to join the team to improve his leadership skills, to have the opportunity to work outside of his major, ORIE, and to get his hands very dirty. Participating in this project team helps its members to acquire excellent leadership experience, learn the real world problems of group dynamics, deal with red tape and legal procedures, and to cope with unforeseen challenges. The final cost of the car will be over \$110M, and the team spends an average of \$1,500 a week. The batteries, motor and generator are the 3 major components of the car, each at a cost of ~ \$20,000 to \$30,000. Two of the 3 components were donated. The team also receives funding from Cornell and industry partners. He considers being a part of this project team as more valuable than any class he could have taken.

#### Project Team Activities in the Sibley School: Benefits and Costs – Lance Collins

Lance Collins, S.C. Thomas Sze Director, Sibley School of Mechanical and Aerospace Engineering, gave a presentation on experiential learning in the Sibley School through project teams, co-op and research projects. He described the benefits of experiential learning to students as: the ability to apply classroom knowledge put it into practice to design, build, and test a system, which often results in a team entering a national or international competition. It

creates an atmosphere similar to a startup company where students run all aspects of the project, including: management, design, fabrication, budget, fundraising and developing promotional materials. Project teams are often interdisciplinary.

In addition to the benefits for the students, he also described the benefits for the school, college and university, including: prestige (we have been remarkably successful in several team competitions, i.e., CUAUV 2009 champions), good press (Solar Decathlon House), becoming a research platform for some faculty, great recruiting tool for undergraduates and MEng students, and prompting alumni to become engaged. Corporate donations, alumni gifts, endowments, department funds and College contributions fund team projects. He asked for the Council's guidance on funding due to the uncertainty of corporate donations which are down. He also indicated that there is a large infrastructure involved in these projects, i.e., the Experiential Learning Lab (ELL) in the basement of Upson and equipment, the High Volt Lab (HVL), computing facilities, Taylor Design Studio; Swanson Lab; and the Emerson Manufacturing Teaching Lab.

Leadership training is provided which covers Cornell business practices, safety, travel, and risk management, as well as student training on equipment. He also indicated that personnel are needed to monitor and train students to use equipment. There is a great deal of faculty time and energy involved in project teams, who align their research interest with the teams, such as: Al George, one of the pioneers of the Systems Engineering Program, is very involved in projects such as the 100+ MPG; Mason Peck, a satellite researcher, is involved in the CUSat Satellite Project; Ashutosh Saxena, CS, is involved in the Cornell University Autonomous Air Flight (CU Air) team; deep personal conviction about the environment and energy drive Matt Ulinksi and Zellman Warhaft's involvement in the Solar Decathlon.

Due to the current financial situation, there are several revenue streams that we counted on in the past to support project teams that may not be available in the future. To meet this challenge, we will need to retain the top performing teams, and focus on those with active advisors. We will also need to manage our portfolio, making it broader, with more diverse teams.

A suggestion was made to involve the law school and Johnson School to help the teams with possible IP issues and VC funding. Other ideas included approaching alumni who were active with project teams as students to contribute. The ECC asked that we look at whether project team members receive more/better job offers than those who do not participate.

To conclude, Lance asked for the Council's advice on the following questions:

1. How important is the type of learning that takes place on Project Teams to our curriculum and to work in the corporate world?
  - a. Is project team experience considered a plus in hiring?
  - b. What aspects of the experience do you consider important?
  - c. How could we teach those aspects in our normal curriculum?

2. How do we sustain funding for these teams?
3. What criteria would you use to be more selective about the number of teams?

These questions were later discussed during the breakout group sessions.

### **Campaign Update – James Mazza and Jessica Traynor**

James Mazza, Interim Assistant Dean for Alumni Affairs and Development and Jessica Traynor, Associate Director for Alumni Affairs and Development gave an update on the capital campaign, highlighting the progress we have made since last year and the objectives for this year.

FY09 has been one of the most challenging fundraising years in Cornell's history. There have been more solicitations in FY09 than ever, but with a higher deferral rate (52%). New gifts and commitments have dropped significantly, approaching 60% for the University and 70% for the College overall this year as a result of the economy; however, we have had our best cash year ever, which means gifts that were made outright and for existing commitments. In addition, this year alumni attendance at our events skyrocketed.

College goals for FY10:

- Reach an annual fund of \$1.85M
- Make at least 100 \$100K+ solicitations
- Identify at least 100 new prospective donors w/\$100K+ capacity
- Steward all donors who have made major gifts strategically
- Hold two "mini-conferences" in Philadelphia (Biomedical Engineering theme) and in Boston (Energy theme), instead of the annual CEAA Conference.
- Continue to strengthen the working partnership between AA&D and Schools and Departments.

Of the \$3 million goal in gifts, we are tracking about the same as last year. Engineering is leading the other units in gifts. 30% of the total amount raised is planned for unrestricted funding.

71% of the ECC group made a gift last year to the University. 47% made an unrestricted annual fund gift to the University. Only 26% of ECC members gave unrestricted gifts to the College's annual fund. Designating a percentage of the annual fund gift to the College of Engineering is critically important since it serves as the dean's discretionary fund.

Giving numbers also affect rankings. The percentage of participation among leadership and participation of overall alumni is factored in various ways into some rankings.

### Staffing update

Based on a strategic plan that was developed by Alumni Affairs and Development (AAD) staff over the last 18 months, a significant realignment of the organization was implemented. The

impact on Engineering was that several staff have moved to Carpenter Hall to help the college more directly. Currently we have 3 vacant positions; we are searching for a new Assistant Dean for AAD and a Major Gifts Officer.

Bob Shaw thanked those ECC members who have helped with the annual fund. He also indicated that at the executive session, he would like to discuss the creation of a special ECC fund to support student project teams and working harder with the venture capital community. CEAA has designated a portion of its legacy fund, \$7,000 for student project teams.

### **Recruiting Realities and Job Opportunities for Engineering Students – Betsy East and Mark Savage**

Mark Savage, Director, Co-op and Career Services, and Betsy East, Assistant Dean, Student Services, highlighted career development and co-op programs in the College, and described the recruiting environment for students.

Some of the challenges include the state of the economy, our location, fewer employers participating in co-op and recruiting, reduced staffing, an increase in the number of MEng students and the increased demands of Ph.D. students. Recent efforts to meet these challenges have been to hire a temporary staff member to coach MEng students, to develop workshops specifically for the MEng and Ph.D. students, and to participate in consortia career fairs in NYC. Mark Savage was instrumental in coordinating a virtual Bio-Technology Career Fair with Hopkins, Penn, Princeton and RPI in an effort to attract biomedical employers. Alumni have also been contacted to assist with hiring.

Co-op is a 28-week experience. Students come back in the summer to complete their semester at Cornell. Summer tuition is a source of revenue for the college and the Co-op Program is a good way for students to find jobs - a large percentage of our co-op participants come back from their internships with job offers. In the past several years, the number of co-op participants and employers has dropped.

### **Breakout Sessions for Recruiting**

Four breakout group sessions were held to get the Council's input on the following:

- In this new economy, are there particular skills students need to succeed in the job market and on the job?
- What can we do to differentiate our students?
- How do we market our MEng students, particularly Financial Engineering students who spend their final semester in NYC?
- How can we connect more effectively with recruiters?
- How can alumni help us?



Also discussed during the breakout groups were:

How important is the type of learning that takes place on Project Teams to our curriculum and to work in the corporate world?

- Is project team experience considered a plus in hiring?
- What aspects of the experience do you consider important?
- How could we teach those aspects in our normal curriculum?

How do we sustain funding for these teams?

What criteria would you use to be more selective about the number of teams?

## Notes from Breakout Group 1

Project teams are a plus for hiring, especially for systems engineering!

Aspects of experience that are important:

- Systems understanding
- Team dynamics
- Leadership opportunities
- Solving real problems creatively
- Presentation skills

Teaching project team aspects in “normal” curriculum

- Creativity and problem-solving
- Working with teams with leadership opportunities
- Interdisciplinary
- Technical writing, public speaking

How to sustain funding

- CEAA and/or ECC endowment/trust fund
- Venture capital support
- IP rights, licensing
- In-kind donations

Criteria for selecting project teams (portfolio management)

- Aligned with Engineering College direction
- Cost
- Impact for Cornell, notoriety
- Broad appeal
- Diversity of team members

## Notes from Breakout Group 2

Worry that capstone experience doesn't capture depth of project team experience.

Progressive development of experience in P.T.s is a big plus.

Challenge in resourcing project

- \$
- Faculty/staff time
- Student time

Project management course in sophomore year (+) (Restructure—distribute capstone experience)

Students learn to work beyond disciplinary identities (+)

Leadership (+) reflective of understanding of experience (+)

Call for proposals for funding (club model)

### Notes from Breakout Group 3

Encourage students to add to their engineering classes:

- Communications
- Management
- Leadership skills
- Business skills

(M.Eng. different from B.S. here)

More global perspective in undergraduate education . . . but how?

(evaluate what we are doing; do some more brainstorming; look at what other colleges are doing; . . . )

Best set of internet tools?

Support connections to smaller companies?

- Video conferencing
- Facebook
- Skype

Are we matching needs of companies to skills of students? (or . . . do we know what they want?) (alumni review curriculum)

Are we matching method companies want to use to recruit with our methods? (. . . or do we know what they want to use?)

Vision of the future for how to network graduates into smaller companies.

Dept – specific alumni activities

- Social
- Job opportunities

Placement could reach out to international companies.

ECC could help create summer jobs at their companies.

## Notes from Breakout Group 4

Proactive outreach

- Cornell
- Students

Use of internet – Wiki

Industrial sponsor of student projects

Boot camp on networking, etc.

Technical fairs

- On campus when alumni in town
- In key recruiting areas