

PROGRESS ON RECOMMENDATIONS OF 4/24/09

CU Engineering Advisory Council Meeting

The summary of each recommendation is given below in *italics*, followed by a brief statement of progress and/or plans.

CU Engineering Venture Fund – *The proposed venture fund should be focused on CU but not exclusive. It should seek a 30% annual return on investment (normal) and not be philanthropic, but investors will be encouraged to donate part of their earnings. It should work closely with the CU Technology Transfer Office, the Eship program (development of business plans by student teams), and the Espace Center. A general partner is needed to run the programs and raise its first \$10-15 million. Largest return to the College may be long term, in the form of donations from students and faculty who become successful entrepreneurs.*

Vern Norviel is taking the lead on this item, in discussion with Peter Mannetti, Jessica Wright, and others. It was decided it would be a private fund, not directly involving the University of Colorado Foundation. A similar fund in California will be used as a model for guidance, and then the next steps would involve identifying a part-time managing partner and advisory board of venture capitalists to raise start-up funds of approximately \$5-10 million. This plan will be reviewed at the 10/30/09 meeting of the EAC Partnerships Subcommittee.

Graduate Student Recruiting – *Identify and network with key schools from which to recruit, including top students from foreign institutions, Puerto Rico, and 2nd-tier U.S. schools. Identify and publicize unique strengths of CU and noble causes (e.g., Engineers Without Borders). Provide opportunities for undergraduates to make short-term visits to CU for research experiences, national conferences, etc. Develop a purposeful campaign using their media (Facebook, web,...) and our looks (location, weather, key faculty, challenging projects,...). Keep the current graduate students happy (time with faculty, good pay, opportunities to present and publish) and use them in recruiting new students. Focus funding on PhD students.*

We have begun to establish international partnerships with several schools to develop dual graduate degrees (see *International Research and Graduate Partnerships* below). One of our new faculty, Fernando Rosario-Ortiz, is from Puerto Rico and has begun to undertake recruiting trips to schools there. An Information Fair held in September 2009 to provide CU undergraduates with information about our graduate programs was poorly attended (10 students left contact information). The Chemical and Biological Engineering Department hosts a Research Experiences for Undergraduates (REU) program each summer to bring undergraduates from around the country to CU, and all departments have set aside funds to bring top prospective graduate students to CU for two-day visits. A purposeful media campaign for prospective graduate students has not been started, other than via each department/program website. As to keeping current students happy, the Associate Dean for Education provided travel funds this past year to 17 graduate students to present papers at conferences, and a survey of currently enrolled graduate students was administered for the first time in Spring 2009 (results will be available soon). For funding of PhD students, the Dean's Graduate Assistantships and Graduate Fellowships were increased to support, respectively, 9 and 36 new PhD students this year. While further improvements in recruiting efforts are needed, we are beginning to see the fruits of our recent efforts: the number of new graduate students increased to 316 this fall from 241 last fall, and the total number of PhD students increased from 537 to 589 over the same period.

Undergraduate Student Recruiting and Access – Continue partnerships with key schools, Colorado MESA, and admissions office. Expand CU presence in rural areas. Work with financial aid office to make offers earlier. Provide sensitivity training to all faculty, not just new faculty, with a focus on providing an environment where underrepresented students feel nurtured and safe when asking questions in class and office hours. Provide more opportunities for teamwork and undergraduate research. Continue to raise scholarship funds to help support students with underrepresented backgrounds.

- Partnerships have been continued with the Denver School of Science and Technology and with Centaurus High School's Pre-Engineering Academy and feeder schools. After-school TEAMS programs at Lafayette schools are staffed by CU Engineering Honors students. A new partnership has been created to form a STEM Academy at Longmont's Skyline High School, and further work is being done with the feeder schools.
- The *Rural Engineering Education Program* in Mesa County was launched by our college in 2008 in partnership with the Western Colorado Math and Science Center (WCMSC) and fellows from Mesa State College (MSC). It is being expanded in 2009.
- The Financial Aid Office was contacted about the timing of offer letters. **Bottom line** – The Financial Aid Office does appear to have a sound procedure in place for notifying students as soon as possible within given constraints, typically in early March (at least six weeks before the confirmation deadline). Offer letters for last year's admissions cycle were delayed to an extent because of new federal regulations with the new administration.

Details--The Financial Aid Office issues "planning letters" to students on a weekly basis starting in February of the admissions cycle (for students admitted for the following Fall semester). As long as a student provides the Financial Aid Office with accurate information on the FAFSA (Free Application for Federal Student Aid), the estimate should be (and is) correct. However, if FAFSA is filed late by students, or if information provided is unverified and students are asked for verification information along the way and drag their heels, everything will of course be delayed for those students. In parallel, the Financial Aid Office must annually incorporate federal changes in its computerized processing system. These updates will typically happen starting in December, though these federal changes were delayed for the past cycle because of the new federal administration and regulations in place. As for the state, Colorado doesn't approve its fiscal-year budget until May. The Financial Aid Office has to estimate our state need-based allocation in hopes that we will get the money. For the past year's admissions cycle, the state ended up eliminating some of our programs. Also, the uncertainty of next year's tuition rates presents problems when the Financial Aid Office develops our estimated cost of attendance.

The Director of the Financial Aid Offices indicates that, given these factors, her office has developed a process that has worked well to provide families with information about financial-aid awards beginning in March (usually at least a month and a half before confirmation). According to the Director, many universities use this kind of process. "The constraints with which we're faced limit us as to the timing of when we can finalize our offers, however for the bulk of our students, their awards are unchanged from the planning letter and we believe it to be a reliable tool on which they can base an enrollment decision." In addition, separate and early notifications are sent to students regarding University merit scholarships (i.e. Chancellor's Achievement, Presidential, Regent). We have asked for copies of the planning and final letters, to help clarify the process.

- The BOLD Center hired two directors who started in August and October 2009 and will lead the expansion of diversity and sensitivity training to the faculty at large. In-depth training during faculty orientation in August 2009 was well received.
- The Discovery Learning Program to promote undergraduate research supported 36 discovery-learning apprentices in AY08-09. The program will be expanded this coming year with additional funds from differential tuition. A college-wide engineering education retreat was held in September 2009, at which strategies were discussed for expanding project-based learning and interdisciplinary capstone projects. The College will host a Capstone Design Conference in June 2010 to explore strategies for international teams and projects.
- We conducted this summer a detailed financial-need analysis of the last two cohorts of undergraduate students throughout the College. We found that first-generation, college-bound students are 2.5 times as likely to have high financial *unmet* need (Pell Grant eligible), and underrepresented students are twice as likely to have high financial unmet need. This finding has a direct link to diversifying our student body. The unmet need for these groups of students approaches an average of nearly \$7,000/year. Thus, our college must find a means to provide need-based funds, in addition to our historic merit scholarships, if we are to realistically be accessible to a broader range of students. To help in this regard, in September 2009 we submitted a proposal to NSF to support 197 need-based, \$3,000 scholarships over a three-year period. The NSF S-STEM program is highly competitive; we will learn about our proposal outcome in about March 2010.

Energy Systems & Environmental Sustainability – CU should have a focus on clean energy (e.g., wind, solar, biofuels) where it has unique strengths. Coordinate this focus with entrepreneurial efforts. Use the new Energy Institute to coordinate efforts across campus (technology, policy, economics, social factors). Capitalize on regional partnerships (NREL, CSM, CSU) but also add an international component (e.g., Spain = solar, Brazil = biofuels). Nuclear energy will become more important – what will be CU’s role? There is a huge mismatch between growth in energy demand and new laws to reduce carbon footprint – what role will CU play in improving energy efficiency and reducing carbon emissions?

CU-Boulder has formally established the Renewable and Sustainable Energy Institute (RASEI), for which the College of Engineering and Applied Science is playing a major role. Research centers affiliated with RASEI include the Colorado Center for Biorefining and Biofuels (C2B2, led by Prof. Al Weimer in Chemical & Biological Engineering), the Center for Research and Education in Wind (CREW, led by Prof. Lucy Pao in Electrical, Computer, & Energy Engineering), and the Center for Revolutionary Solar Photoconversion (CRSP, involving several engineering faculty). These centers are part of the Colorado Renewable Energy Collaboratory and involve regional partnerships with CSM, CSU, and NREL. New centers are planned in Energy Efficiency and Management and in Carbon Management. The latter, along with the formation of Ion Engineering (a spinoff company from our Department of Chemical & Biological Engineering), is among the many efforts at CU to address carbon emissions and capture. In addition, the new name of the Department of Electrical, Computer, and Energy Engineering reflects its historic and strategic future focus on energy. At this point, CU has not defined its role in the nuclear arena, but it will be considered by RASEI as the institute defines its unique foci.

International Research and Graduate Partnerships – Global experience will help our students get jobs. CU does not have as strong of international reputation as some other U.S. universities (primarily on the east and west coasts) – thus, to build international research and graduate partnerships, we should develop exchange and collaborate programs with selected schools in foreign countries. A recommended long-term strategy is to train PhD students to return to be faculty members in their home countries.

Benchmark successful international programs, including CMU and MIT. Exchange programs should be at the research level, to build long-term relationships.

In addition to the numerous individual international interactions among faculty, many important international partnerships have been forged:

- i) PhD partnership programs.* These partnerships are in various stages and include the Catholic University in Chile, the University of Trento in Italy, the Polytechnic University of Catalonia in Barcelona, the University of Tokushima in Japan, and Tianjin University in China. All have, or have planned, faculty visits to develop research relationships as well as activities to generate resources to support the programs.
- ii) Research and educational project partnerships.* MOUs on research-exchange programs have been developed with institutions in France, Germany, India, Japan, Korea, Spain, and Switzerland. An example is the partnership between students in ECEE and the University of Tokushima in Japan. They entered the IEEE International Future Energy Competition and received an award for team work and the student educational experience. Activities like these provide valuable experiences working across both cultures and time zones.
- iii) Targeted trips to foreign countries to recruit graduate students.* Led by faculty in our ITP program, we have participated in recruiting tours in India and China and plan to do so again in the future. Costs to participate in these tours are about \$20K-\$30K and allow exposure to many hundreds of prospective students. Dean Davis has also undertaken a visit to several universities in Spain, to recruit prospective graduate students for the Balsells Graduate Fellowship Program funded by an alumnus of our college.

Engineering Leadership Program – *One group recommended against a separate engineering leadership program and that we instead develop a mechanism to provide an “Engineering 2.0” skill set to all students, including broad perspectives, customer orientation, business knowledge, teamwork, communication abilities, creativity, ethics, service orientation, volunteerism, persistence, etc. The other group did not have a firm answer on whether or not to form an engineering leadership program but noted gaps in young engineers entering the work force, including communications and team work. It was suggested that these skills could be provided to students via senior programs, a leadership seminar, Eship, case studies, etc. Guest speakers from the community should be used. Leaders need followers, but all should understand leadership principles and problem solving.*

Further consideration of an Engineering Leadership Program will be led by Assistant Dean JoAnn Zelasko during the 2009-10 academic year, and it will be discussed by the “Partnerships” subcommittee at the upcoming EAC meeting. The Engineering Entrepreneurship (Eship) Program is also considering a leadership and professional-skills component. The Mechanical Engineering Department has launched a professionalism initiative, focused on preparing students to work as professionals through a series of seminars from industry leaders, as well as training on academic climate, leadership, communication skills, etc.

EAC members in attendance:

D. Agonafer, G. Anderson, S.J. Archuleta, B. Bauer, J. Becker, K. Coyne, P. Drew, , F. Figueroa, J. Gallogly, L. Glatch, P. Hamilton, D. Hernandez, M. Herriage, N. Joesten, J. Kennedy, R. Kolibaba, R. Krebs, J. Liebman, P. Mannetti, J. Negler, V. Norviel, L. Pinchuk, F. Prager, A. Sanders, L. Sanders, K. Schloss, D. Smith, J. Tietjen, J. Voss, M. Wirth

R. H. Davis 10/20/09