

**Summary and Recommendations from the 10/19/07
Meeting of the Engineering Advisory Council
Robert H. Davis, Dean**

**College of Engineering and Applied Science
University of Colorado at Boulder**

This report summarizes the key findings and recommendations of the Engineering Advisory Council (EAC) meeting on 19 October 2007. Presentation slides are archived at:
http://engineering.colorado.edu/overview/advisory_boards.htm.

1. Introductions & Announcements

EAC Chair Vern Norviel introduced new members: Joanne Maguire (Lockheed Martin) and Mike Wirth (Chevron). Dean Rob Davis introduced Marcia Simmons (Development Associate), Jessica Wright-Bowen (Senior Director of Development), Brian Argrow (Associate Dean for Education), and Chris Bowman (Associate Dean for Research), who recently joined the College's fundraising and leadership teams.

2. College Updates

Dean Rob Davis made a presentation on college highlights, and Associate Deans Brian Argrow and Chris Bowman gave updates on education and research, respectively. The College is doing well. Freshman applications and enrollments increased dramatically this year. Quality and diversity measures are up, as well. Over one-third of undergraduates participated this past year in semester-long discovery learning, service learning, and/or professional learning experiences, and the Earn-Learn Program has continued to expand. The new Engineering Honors Program and BS degree in Chemical and Biological Engineering have been highly successful. Enrollments of new graduate students are also up for the past two years, with improved quality measures. Research grants awarded increased over 15%, from \$35 million in FY05-06 to over \$40 million in FY06-07, and grants from industry have more than doubled in three years to \$9.5 million in FY06-07. The College has hired many new faculty, including 14 tenure-track faculty starting this year. Four junior faculty received NSF CAREER awards this year, and awards to senior faculty include Bernard Amadei's selections for the Hoover Medal and Heinz Award for his founding of Engineers Without Borders, USA and related efforts. The funding picture for the College is also continuing to improve. After several years of cuts, state funding has been increased by 30% over the past two years. Resident tuition, including an engineering differential, has nearly doubled over the past five years, while nonresident tuition has increased less than a quarter. Private fundraising has been steady at approximately \$5 million per year, but it is expected to increase substantially with the upcoming campaign. Rob also thanked EAC members for contributing almost \$300 thousand to I-CUE (Investment in CU Engineering) over the past year, noting that over \$1.1 million has been raised for I-CUE toward a \$1.5 million goal.

The ensuing discussion included both educational initiatives (e.g., Engineering Honors Program, student preparation, partnership with Mesa State College) and research initiatives (e.g., technology transfer, role of industry partners on grants from the National Science Foundation (NSF), relation of our research to Governor's initiatives in biotechnology, energy and space). Specific requests and recommendations include:

- *Check if there is a correlation between ACT/SAT math scores and the diagnostic test of preparation for calculus*
- *College K-12 outreach should include an emphasis on improving quality of math education*
- *The proposed partnership with Mesa State College raised concerns: It should be pursued only if it is of equivalent quality to the CU-Boulder program, includes research opportunities, and has a sufficient pipeline of qualified students – research best practices on making an extension program successful*
- *Spinout startup companies from college research*
- *Investigate how many of our NSF grants include corporate partners*

- *Tie college research to the Colorado initiatives of Governor Ritter*

3. Biotechnology Initiative & Building

Rob Davis described the distinguishing features of the Colorado Initiative in Molecular Biotechnology (CIMB), which include both a unique suite of expertise (nucleic-acid technologies for drug and sensor development, bio-active polymer scaffolds for tissue engineering, freeze-dried inhaleable vaccines for stable storage and delivery, Colorado Center for Biorefining and Biofuels, and more) and a close partnership of scientists, engineers and practitioners in a systems approach. Art Dawson shared the good news of a \$20 million lead gift for the Systems Biotechnology Building. The building did not receive state funding this year but is on the list for state approval to start design in Spring 2008 and for construction funding in 2009 and 2010. Amy Palmer, Assistant Professor of Chemistry and Biochemistry and one of the first interdisciplinary hires by CIMB, gave an overview of her research and how she was attracted to CU because of the interdisciplinary culture. Recommendations from the EAC members are:

- *Vern Norviel asked each member to give Art Dawson the name of at least one potential donor for the biotechnology building*
- *Amy Palmer is an outstanding ambassador and should meet with selected donor prospects*
- *Interdisciplinary mentors and input on tenure and promotion reviews should be provided for junior faculty in the biotechnology program*

4. Honors Program

Scot Douglass, Faculty Director of the Engineering Honors Program, noted a strong interest among students in the Honors Program, with 45 new students this year. Two of the honors students, Mitchell Kosht and Brittany Oetter, shared their experiences. Two recommendations were made:

- *Offers of admission to Honors Program should be made well before students' decisions are due*
- *Invite prospective honors students to campus*

5. College Updates

Rob Davis asked that the subcommittees help the College inaugurate its strategic planning, by making a list of five important initiatives for the next ten years. Subsequent reports from the subcommittees are provided below.

5.1 Education and Outreach Committee (EOC)

The subcommittee on education and outreach started with a review of recent progress and activities:

- The TEAMS program in Lafayette, CO reaches 1600 kids weekly in 58 classes, and the number of freshmen in the Pre-Engineering Academy at Centaurus HS has increased from 34 to 78 students in the past four years. This fall, 17 students from Centaurus HS enrolled in engineering colleges, with 16 of these students choosing CU!
- The Denver School of Science and Technology will have its first HS graduates in 2008. It has a very diverse student body (45% low income, 45% female, 65% students of color), and its average ACT score is tied with Cherry Creek for top in the Denver Public School District and fifth in Colorado. Our college has been teaching engineering electives at DSST.
- Math assessment test scores correlate closely with Calculus 1 grades and facilitates student placement in the correct math sequence.
- The CU-Engineering precollegiate program in cooperation with the Western Colorado Math and Science Center in Grand Junction is poised to start in Spring 2008.
- A "redshirt" proposal is being considered for first-year students who demonstrate potential to be successful engineering students but have inadequate preparation for regular admission to the College.

The subcommittee then considered an educational vision for *Engineering 2020*, the college strategic plan to be formulated this academic year. Key comments of this vision should include:

- Response to globalization, need for diversity.
- Technical literacy across campuses, such as sustainability in basic science courses.

- Interdisciplinary/interdepartmental opportunities.
- K-16 expanded and sustained outreach and harvest.
- How to select, evaluate, and translate information into knowledge.
- Engineering as a discipline and not just a career.
- Rebalancing to address grand challenges, including review of *The Engineer of 2020*, break down silos, educate for technical agility, build on strengths, and determine what terminal degree needed to provide desired knowledge and skills.

Recommendations and action items from the subcommittee include:

- *MEP Leadership Class meets Tuesday afternoons and invites EAC members to speak*
- *Online math assessment while prospective students are still in high school is needed*
- *CU-Engineering should continue to teach engineering electives at DSST (consider using graduate students, or professionals who live/work closer to the school)*
- *Leave decision on making biology a core class up to the departments*
- *Brian Argrow will plan the MEP/WIEP student event with EAC members for next spring, and Jean Becker and Dan Hernandez will help*
- *Pilot the "red shirt" program with the ME department, if necessary approvals and resources obtained*

5.2 Resource Development Committee (RDC)

Rob Davis gave a further update on I-CUE, noting that a mailing to almost 500 alumni at the end of September resulted in a \$45,000 pledge and five smaller gifts in the first couple weeks. Development officers will work with RDC members on follow-up. Rob then noted that the public announcement of the next CU capital campaign is expected in summer 2009, and that the silent phase began in July 2006. Preliminary campaign goals were submitted by the Dean in September 2007, and distributed to the RDC for discussion. General goals include maintenance (continuing research leadership, support of students and faculty, promotion of interdisciplinary programs, and more), growth through listed initiatives (interactive education, bioengineering, energy, materials, space, and computational technology) and radical transformation (discussion around feasibility study for new engineering building to the east of the main campus). The financial goals for the College total \$100M (not including a new engineering complex), compared to \$56M raised in the prior campaign.

A discussion of strategic planning by the RDC expanded beyond resource development and led to six strategic initiatives of primary importance for the College (not in priority order):

- Entrepreneurial activities and technology transfer, not just as a source of revenue but also to improve research and education.
- Interdisciplinary and collaborative activities.
- Interactive and service-based learning.
- Globalization and diversity, including a focus on excellence in K-12 efforts to attract students from underserved populations.
- Growth, including 25-30% enrollment growth and additional faculty, staff and space for a healthy learning environment.
- Resource sustainability, including both education and research in areas such as energy, water, environment and food; nuclear power, clean coal, shale oil, and power transmission were noted as particular needs.

Gary Anderson then made a PowerPoint presentation showing that private support (gifts and investment income) is twice the level of state funding for CU, and that the investment performance of the CU Foundation is near the top of its class for the past three years (it won the top award this past year). Gary also appealed to RDC members to help raise funds and discussed different ways to be involved.

Recommendations and action items from the RDC meeting include

- *Development liaisons to work with RDC members to secure additional commitments for I-CUE, either from donors who were sent the mailing or additional prospects*

- *The number and amount required for endowed chairs should be benchmarked for peer schools*
- *A more coordinated focus is needed on underrepresented minority students, as progress has been lacking*
- *Focus on a few initiatives where we can be the best – the interdisciplinary biotechnology initiative is emerging as a good model*
- *Do more connecting of students and alumni to the College through enhanced alumni relations and events*

5.3 Research and Corporate/Government Relations Committee (RCRC)

Campus has granted approval for a college representative in Washington, DC, and Associate Dean Chris Bowman and RCRC Chair Pam Drew met in Washington, DC on 10/11/07 to discuss it. While focused on agencies instead of Capitol Hill, the individual will also help build relations with industry.

Chris Bowman also presented data on college research, including a breakdown of grant dollars. The diversity of sources (with no one source above about 25%) is a positive. Art Dawson then described his initial efforts and plans to build industry interactions with the College. In addition to his primary position with the CU Foundation, Art started in February 2007 as Director of Industry Interactions for the College part time (12.5%).

The rest of the meeting focused on a research vision for the College's strategic plan. The resulting most important initiatives for the next ten years are:

- Bioengineering and health care.
- Energy, sustainability and climate change.
- Communications and technologies related to global social networking.
- Sensing technologies.
- Advanced materials.

Recommendations and action plans from the RCRC meeting include

- *A set of guidelines for corporate relations with CU should be written*
- *College faculty should be engaged in study boards, program leadership, and proposal review panels*
- *An action plan will be needed to implement the strategic plan*
- *In each of the key areas noted above, an assessment of our and competitors' strengths is needed, to identify opportunities for us to build excellence*

6. Concluding Business

The EAC held a closed session and then reported back to the Dean. The consensus of the group is that the College is doing well. Upcoming EAC meeting dates are 4/25/08, 9/26/08, and 4/24/09. Final recommendations and agenda items for the next meeting are:

- *Focus on strategic planning and response of the College to the campus Flagship 2030 plan*
- *RDC should include biotechnology, I-CUE, and the capital campaign*
- *RCRC should include Washington, DC efforts, research initiatives, and update on the proposed Engineering Research Centers*
- *EOC should include DSST progress and the program with Mesa State College*
- *An event with MEP/WIEP students should be held late Thursday afternoon on 4/24/08 (most likely at 5:15 pm)*

EAC members in attendance

G. Anderson, B. Bauer, J. Becker, S. Donnelly, P. Drew, S. Dunn, P. Hamilton, D. Hernandez, M. Herriage, G. Jacobs, N. Joesten, F. Kitson, R. Kolibaba, R. Krebs, J. Liebman, J. Maguire, P. Mannetti, M. Mercure, J. Negler, V. Norviel, L. Pinchuk, F. Prager, A. Sanders, G. Sissel, J. Tietjen, J. Voss, M. Wirth