The 4/27/2012 CU-Boulder Engineering Advisory Council (EAC) meeting included presentations and discussion on student retention analyses, updates on the Department of Mechanical Engineering and the Department of Chemical and Biological Engineering, and presentations on high-school STEM education. There were also small-group discussions of initiatives in Engineering Management & Entrepreneurship, Engineering for Society, and International Engineering. A highlight of the meeting was lunch with students at the Andrews Hall Residential College and at the Mechanical Engineering Design Exposition. Traditional subcommittee meetings were not held this time, due to the full agenda. Meeting slides and other materials are posted at http://www.colorado.edu/engineering/about/engineering-advisory-council. The next meetings of the EAC are scheduled for 10/12/2012 and 4/26/2013.

Retention Taskforce Report: A task force on student retention led by Gary Anderson and Nan Joesten examined student data, surveys, articles, and related information. About 55% of students who enter our college as freshmen graduate with a CU-Boulder engineering degree within six years. About half who leave the college without a degree do so with a grade-point average of 2.5 or above. Positive correlations are observed between retention in the college and living in an engineering dorm (Andrews Hall, Engineering Quad) and also between retention and taking engineering projects and other first-year engineering courses. Surveyed students cite a variety of reasons for leaving, including unsatisfactory progress, fear of failing, loss of interest in engineering, heavy workload, and lack of interest shown by faculty/staff. The top improvements cited by freshmen to make their experience with the College of Engineering and Applied Science more satisfying are smaller classes and more help sessions. Conclusions and recommendations are available in the PowerPoint presentations archived on the web site noted above. Among the recommendations from the presentation and ensuing discussion are:

- Require all departments to participate in the first-year projects course (or suitable alternatives that engage students), staffed with top instructors.
- Enhance rewards and recognition for teaching and advising excellence.
- Develop performance improvement plans for faculty who receive low teaching evaluations.
- Require students seeking intra-university transfers to other CU-Boulder schools and colleges to first consult with an engineering advisor.
- Explore how to increase the numbers of engineering students in “living-and-learning” dormitories, and to better engage students who are not in engineering dorms.
- Determine a means to evaluate departmental performance in student retention, including plans to improve retention of students in good standing.
- Identify “at-risk” populations and developed targeted retention plans for these populations.

Departmental Updates: Victor Bright provided an update on the Department of Mechanical Engineering (ME). ME is the most popular major in our college, with nearly 600 undergraduates. There are now 9 assistant professors, who between them have received 11 early-career awards.
from federal agencies. The department has doubled its research funding over the past five years, and achieved dramatic improvement in the ranking of its doctoral program by the National Research Council. It has a strong focus on student design projects. And, it will add considerable research space in summer 2012 by occupying a portion of the vacated chemical engineering wing.

Chris Bowman provided an update on the Department of Chemical and Biological Engineering (ChBE). ChBE has doubled its enrollments and research funding in the past five years, and moved this spring to its new location in the Jennie Smoly Caruthers Biotechnology Building. Its faculty members have won numerous awards in both teaching and research, and over 100 undergraduates participated in research this past year. Its efforts are interdisciplinary, with themes in biology, energy, and materials. The department is now ranked among the top 10 of public programs. When asked about why ChBE does not require the first-year projects course, Chris cited the large number of first-year courses already required in ChBE (biology, chemistry, computing, physics) and the relatively high cost of the projects course.

**High-school STEM Education:** Patty Quiñones, Principal of Skyline High School and member of our EAC, describes the STEM (Science, Technology, Engineering & Math) Academy at Skyline High School and its partnership with our college. She noted a need to change the message from engineering is hard and for nerds, to engineers make a difference in the world. Mark Heffron, Director of Stapleton High School, noted the national need for qualified STEM teachers. He said that students love demos and hands-on learning, and recommended that service opportunities like Engineers Without Borders be extended to the high-school level. He noted that 15-25% of graduates from DSST (Denver Schools of Science and Technology) major in engineering in college but may not choose CU-Boulder because of relatively high costs and low diversity.

**Engineering Management and Entrepreneurship:** Jean Becker reported that EME is of broad interest to undergraduate engineering students and that the program is growing with a secure funding base, but it needs additional support. Recommendations include:

- Most but not all EAC members recommend that a business course be required for engineers, and others noted that business principles could be covered as part of a design or other course.
- Distance learning presents a good opportunity for teaching business principles to engineering students.

**Engineering for Society:** Patty Quiñones reported that the group is excited about CU-Boulder being the first to prepare engineers as STEM teachers. The proposed Engineering for Society degree will have multiple pathways (teaching, pre-med, pre-law, etc.). It was recommended that:

- The job market for STEM teachers be quantified.
**International Programs:** Pam Drew reported that our college has made great progress with international program (e.g., Engineers Without Borders), but that a more focused and strategic effort is needed. Recommendations include:

- **Develop specific targets and strategies for international students coming to CU-Boulder and for our students going abroad.**
- **Seek alliances with specific countries.**
- **Consider the role of international students in diversity and retention.**

**General Business:** Mike McAtee and John Mollenkopf were welcomed as new members, and Arch Archuleta, Jean Becker, Frank Figueroa, and Mike Herriage were thanked for their services as they are ending their final terms. Doug Smith reported that overall membership and support raised for the Dean’s Club are up, but EAC participation is lagging this fiscal year (July 2011 – June 2012). Arch Archuleta reported that the first nine students are set to graduate in May 2012 from our Mechanical Engineering partnership with Colorado Mesa University. Dean Rob Davis reported that the upper administration has approved and funded a proposal to grow the College of Engineering and Applied Science by one third by 2020, and he asked for interest in a task force to plan for this growth. There is a home football game on 10/11/2012, the evening before the next EAC meeting, so hotel space will fill up early.