PROGRESS ON RECOMMENDATIONS OF 4/27/2012
CU-BOULDER ENGINEERING ADVISORY COUNCIL MEETING

The key recommendations of the CU-Engineering Advisory Council (EAC) at its 4/27/2012 meeting are provided below in italics, followed by summaries of the progress and plans made to-date on these recommendations. This summary report, prior reports, and other EAC information are posted at: http://www.colorado.edu/engineering/about/engineering-advisory-council.

Retention Taskforce Report: A task force on student retention led by Gary Anderson and Nan Joesten examined student data, surveys, articles, and related information. Conclusions and recommendations are available in the 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.

To pursue various improvements in our College, the Dean formed a series of blue ribbon committees that have met during the summer and fall. Two of these committees have considered the first-year projects course. The first committee, focused on updating the college rules, recommended that the first-year projects course be part of the “flexible first year” curriculum, which allows students to pursue any engineering major after completing this curriculum. The update to the college rules was approved by the faculty on 9/4/2012. However, the actual requirement of the first-year projects course (or any course) for a particular degree remains the responsibility of the faculty (per college and regent rules). The second committee, focused on improving retention, made two recommendations about the first-year projects course. One is to form a follow-on task force to do a deeper study of what we’ve learned about retention and how it is related to first-year courses, residential programs, scholarships, student experience in their major, etc., to help the departments and faculty make informed decisions about the first-year projects and other courses, culture, advising, etc. Another, provocative recommendation is to couple the requirement of a first-year projects course with the formation of new residential academic programs (RAPs), as was done this past year with the new Sustainable by Design RAP – this combination of living and learning may be a powerful retention tool. These recommendations will be considered by the Administrative Council over the coming months.

- Enhance rewards and recognition for teaching and advising excellence.

Rewards and recognition include both special awards and annual evaluations. For the former, we have added recognition of our college-wide faculty and staff awards to the banquet for distinguished engineering alumni and students, agreed to share best practices on departmental awards, and planned to bring a proposal this fall to the Administrative Council to increase the dollar amount of key awards. For the latter, changes in the faculty evaluation process, recommended by a blue ribbon committee and approved by the
Administrative Council, provide for explicit development of annual goals for each faculty member, alignment of these goals with the annual performance evaluations, and expanded performance and planning narratives in each of the major assessment categories: teaching, research and service. This process will help to provide richer performance conversations (recognition) in all three categories. Annual raises (rewards) are then linked to overall performance ratings.

- **Develop performance improvement plans for faculty who receive low teaching evaluations.**
  This recommendation has been adopted and was implemented starting with the most recent performance cycle. Faculty with performance evaluations below expectations in any category (teaching, research, service) must work with their Department Chair to develop and submit to the Dean an improvement plan that includes improvement goals and activities to meet these goals.

- **Require students seeking intra-university transfers to other CU-Boulder schools and colleges to first consult with an engineering advisor.**
  The blue ribbon committee on retention has recommended the requirement of an exit interview at the Dean’s Office level for any student intending to leave the College, before a transfer can be approved, both as a means to facilitate interaction with students who might not appreciate how well they are doing and the benefits of staying with engineering, and as a way for the College to better understand students’ reasons for departure. It will be considered later this fall by the Administrative Council and will require a change in campus-wide policy, which currently does not require a sign-off from the College that the student is departing. To help facilitate the expected implementation, interviews are underway to hire an Academic Programs Coordinator who will serve as an advisor for students in transition between departments and schools.

- **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.**
  In anticipation of the College having an opportunity to design new living/learning space over the next four years, the Associate Dean for Education has secured significant campus support to pilot at least one new interdisciplinary Residential Academic Program (RAP) along the Andrews model starting Fall 2013, with a view of having an additional 1-3 pilot RAPS ready for implementation with the full campus project. This initial RAP pilot would be focused on global engineering, given the importance of building an international mindset and experience with our students. The focus of the program would target foreign languages, culture and design for the developing world. Students currently in the College participating in the International Engineering Certificate, Engineers Without Borders (EWB), and international students in the College will be invited to join this community. As a side note, approximately 300 students attended the first meeting of our EWB-CU student chapter this semester.
• **Determine a means to evaluate departmental performance in student retention, including plans to improve retention of students in good standing.**

The College has added a new position, the Academic Programs Coordinator, to free up the Director of Academic Programs and Assessment to evaluate college data, part of which will provide departmental insights on unwanted attrition. A recommendation is under consideration to provide a retention scorecard to departments to inform them of their retention rates and to reward departments that improve or maintain high retention rates.

• **Identify “at-risk” populations and develop targeted retention plans for these populations.**

The recent EAC retention taskforce and associated studies helped identify at-risk populations: students with poor course performance, who do not live in an engineering dormitory, who do not take the projects and other recommended first-year courses, who are from out of state, and/or who come with deficiencies in preparation. We have developed programs to help students (free tutoring, math workgroups, math placement exam, living and learning communities, BOLD, GoldShirt Program, etc.). To address this recommendation, we will step up our intervention efforts to reach out to students with the at-risk characteristics noted above and provide individual counseling to help them take advantage of the appropriate support programs. The effort will be overseen by the Assistant Dean for Students along with our First-year Experience Coordinator and new Academic Programs Coordinator.

**Departmental Updates:** Victor Bright provided an update on the Department of Mechanical Engineering (ME). At that time, ME was the most popular major in our College, with nearly 600 undergraduates. There were then 9 assistant professors, who between them had received 11 early-career awards from federal agencies. The department had 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.

Chris Bowman provided an update on the Department of Chemical and Biological Engineering (ChBE). ChBE had doubled its enrollments and research funding in the past five years, and moved in spring 2012 to its new location in the Jennie Smoly Caruthers Biotechnology Building.

**Update:** The preliminary Fall 2012 numbers reveal that Mechanical Engineering remains the most popular major in the College, with over 700 undergraduates enrolled in the degree program followed by Chemical and Biological Engineering with over 500 undergraduates.

The latest edition of *The U.S. News & World Report’s Best Colleges* revealed that our undergraduate program maintained a high ranking among national and regional institutions, coming in at 19th among public institutions whose highest degree is a doctorate, 34th overall. Within engineering, kudos went to aerospace/aeronautical/astronautical programs. Our Department of Aerospace Engineering Sciences was ranked 12th among all.
**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.**
  The Leeds business school has secured financial and faculty support for the development and initial delivery of a 12-hour business minor. Our College is collaborating with Leeds to design an engineering track (potentially 15 hours) that will be available and provide relevant curriculum for our engineering students.

- **Distance learning presents a good opportunity for teaching business principles to engineering students.**
  The Center for Advanced Engineering and Technology (CAETE) is the distance-learning and professional studies arm of the College of Engineering and Applied Science. Academic course sequences are available that can lead to graduate certificates or master’s degrees in Engineering Management, Engineering Entrepreneurship, and Leadership & Ethical Decision Making, among others. An on-line undergraduate course, Business Methods and Economics for Engineers, was piloted this summer by Engineering Management. The course had a section of 36 students, with 27 enrolled via distance learning. The on-line offering made the course possible for students working or traveling, but, interestingly, between 10-30% of the distance-learning students attended the lectures each week.

**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* (EfS) degree will have multiple pathways (teaching, pre-med, pre-law, etc.).

Update: The Engineering for Society (EfS) Blue Ribbon Committee has completed extensive benchmarking and will be recommending to the Administrative Council that our College proceed with creation of this new general engineering degree. Core EfS curriculum has been defined for engineering, science, math and education courses; departments are in the early stages of expanding the core engineering curriculum to prepare EfS students for a curricular focus in their discipline. The goal is to submit this new degree proposal to the campus leadership by early 2013.

- **The job market for STEM teachers should be quantified.**
  This component of the EfS feasibility study will be quantified during Fall 2012.

**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.**

The Associate Dean of Education and Assistant Dean of Programs and Talent are refining the College’s international strategy to enhance international programs and activities. A target growth of 150% has been set for campus-wide International undergraduate and graduate students per the Flagship 2030 strategic plan (1,200 students in Fall 2009 to 3,000 students in Fall 2016, an increase from about 4% to 10% of the student body). In the Fall 2011 census, our College had a total of 589 international undergraduate and graduate students (12.4%). Our current plan is to increase the percentage of international students to 19% (15% undergraduate and 30% graduate) by 2020. We are participating in the campus-level Academic and Advising Subcommittee on International Students, which makes strategic recommendations for campus and college level actions to help international students transition into and participate fully in our campus community. This group specifically recommends that, starting in Fall 2013, all new undergraduate international students be required to arrive one to two weeks early for language assessment and additional targeted orientation (shared by campus and the individual colleges).

• **Seek alliances with specific countries.**

Further alliances are now established with Spain (Universidad Carlos III offering technical and engineering courses in English as well as Spanish), Japan (Kyoto University, beginning summer 2013) and China (North East University). We are also working closely with Brazil’s Science Without Borders program to enroll nearly 50 Brazilian students in our College. The College has begun to develop a set of strategic goals for international partnerships.

• **Consider the role of international students in diversity and retention.**

The proposed Global Engineering RAP would create a hub for international activities within the College and serve as a focal point for broader student interactions with foreign students who have remained somewhat isolated within the university community.

Benchmarking of the impact of international students on engineering enrollments is becoming a topic of interest in the field, as most international engineering students are men — many from countries where women are not empowered. Purdue University, whose undergraduate international population recently approached 25%, has stopped recruiting in the Middle East, China and India because of detrimental impacts on the diversity of their student population at large. They have moved to recruiting only from those countries (primarily South American) where the role of women in engineering and technology is progressive.