Summaries of progress and plans for the key recommendations of the CU-Boulder Engineering Advisory Council (EAC) made at its 10/16/2015 meeting are provided below. Recommendations are given in *italics*, followed by responses. This summary, prior reports and other EAC information are posted on the EAC website at [http://www.colorado.edu/engineering/about/engineering-advisory-council](http://www.colorado.edu/engineering/about/engineering-advisory-council).

1. **Student Persistence – Meeting the Challenge of Retaining Students in Engineering** – Dean Davis presented some additional facts on student persistence and highlighted findings that 59% of students who received a D, F, or W in Calculus 1 left the college within 2 years and that 77% of students who enroll in the college graduate from CU-Boulder (any school or college) within 6 years—approaching the Chancellor’s goal of 80%. Assistant Dean Mary Steiner reported on progress toward recommendations made in 2012 by a Blue Ribbon Panel of the EAC to improve student persistence, with almost all aspects of the EAC recommendations implemented. The EAC then broke into five discussion groups, which reported out to the entire group with the following recommendations:

   (i) *Gather comparable data from peer and aspirational colleges on student persistence and examine best practices.* Data are now available from the American Society for Engineering Education (ASEE) but not for individual schools. These data show that CU is slightly ahead of national averages (e.g., 85% vs. 80% second-year persistence rate and 60% vs. 58% six-year graduation rate). As part of the work on the Math Roundtable that was led by Sarah Miller and Diane Sieber last Fall, a document was generated on best practices with respect to math education at peer institutions. Carrie Ngai also reviewed best practices for student engagement at peer institutions and generated a report.

   (ii) *Let students know where they stand in the gateway classes and make clear paths to help.* Applied Math now publishes its midterm averages, though they are still relatively low (about 60 out of 100) and without clear correspondence provided between scores and grades. The Undergraduate Education Council (UEC) of our college will address this subject for all common first-year courses in Fall 2016. Students who perform below standard in midterms for any key first-year course are proactively contacted by Assistant Dean Mary Steiner and pointed to help such as the Student Success Center.

   (iii) *RAPs and peer mentoring have proved successful—do more of them.* Increase engineering density in dorms that are not RAPs, to provide engineering communities. Despite a campus moratorium on the creation of new RAPs, we are actively engaged in responding to this recommendation. BOLD has all GoldShirt students live in Aden Hall, and all BOLD scholarship students are encouraged to live there as well. Over the past four years, the number of first-year engineering students living in an engineering community has increased from 396 to 490, and the number of first-year pre-engineering students in these communities has increased from 0 to 133. BOLD has started offering professional and community programming in Aden this year, in addition to college-wide tutoring through the Student Success Center. The Quad
is now fully booked with Engineering and Pre-Engineering students, and Student Services is engaged with developing peer mentoring and other programming for these students.

(iv) **Mandate math course assignments based on math proficiency tests.** This recommendation was implemented last year with the nationwide, online ALEKS test. However, students could retake the text and move up without necessarily learning the material. We now have campus buy-in that a student is placed into Pre-Calc or Calc 1 by the first score they receive on the ALEKS placement exam. For students who are unhappy with their scores, we are working with campus to provide a proctored exam before the first week of the Fall semester that will allow them to improve their scores and be placed into the appropriate classes.

(v) **Make Orientation Week a big deal for the College, and use it to prepare students for time management and freshman perception of workload.** We have secured a full day of programming for engineering students during Welcome Week for Fall 2016. We are actively working with Mary Kraus, the incoming Associate Vice Chancellor for Undergraduate Education, to expand Welcome Week in Fall 2017 to consist of a full week of orientation.

2. **Recruiting Outstanding and Diverse Students** – Assistant Dean Sarah Miller described the success of the current recruitment program in light of the extraordinary improvement in gender and URM diversity over the past few years, and Amanda Parker presented the key elements in the high-touch recruitment strategy. Chris Anderson presented a new strategy for recruiting from community colleges in Colorado. Recommendations from the EAC breakout groups are:

(i) **Create a Mocktail-type event for diverse prospective students to feel ‘like they could see themselves here.’** BOLD created a Tail Gateway to Engineering event, which was sponsored by Arrow Electronics in February 2016 and attended by 25 accepted underrepresented minority (URM) students and their families. This event provided prospective URM students the chance to meet current students and faculty and to learn about CU Engineering and BOLD. After conversation and lunch, prospective students and their families attended a CU Buffs basketball game together with our CU engineering students and staff.

(ii) **Map out a clear route for students to go from high school to community college (CC) to CU Engineering. Should we look at CCs outside of the metro area?** We created the Pathways Programs and materials for Colorado community colleges, and we continue to make sure our partnerships are active and reaching students. We hosted our 2nd annual Transfer Students Explore Day in November 2015, which was attended by over 50 students. We also hosted our 2nd annual Community College Advisor Day in March 2016, which was well attended with 20 advisors.

(iii) **Create an emotional connection and differentiators for students to come to Boulder, like Space Grant and the Be Boulder campaign, especially for out-of-state students.** For the next recruiting season, we will work with the campus admissions and communications offices to create such a campaign, with slogans such as “Be a global engineer. Be Boulder.”

(iv) **Houston Jr. Achievement used a pre-job fair to create interest in engineering careers by having engineering employers present examples of what engineers do—create something similar at CU-Boulder and use GOLD alumni.** In conjunction with National Engineers Week, we hosted
the Lockheed Martin Mentoring Lunch in February 2016. This on-campus event joined professional engineers (CU alumni working at Lockheed Martin), our current engineering students, and prospective and admitted CU engineering students to mingle, network, and learn about careers in engineering. This event was well covered by the press.

(v) **Provide more scholarships.** We continue to increase both the number and amount of scholarships, using donor and college funds. This year, we awarded 2015 scholarships totaling $3.8 million, up from 1900 scholarships totaling $3.4 million last year and 894 scholarships totaling $1.5 million five years prior.

3. **Preparing Students to be Global Leaders** – Marie Pecoraro presented an update on the Business Minor, which currently has 750 students total and 130 engineering students. The program is highly valued by the industry partners who are sponsoring it (Arrow, P66, SpectraLogic, Zayo and Ball), and by the students who have completed the program. The biggest barrier is arranging the students’ schedules to make it work. Christy Bozic presented an update on the undergraduate Engineering Management program, which currently has almost 670 course enrollments per year. Both programs are focused on creating ‘T-shaped’ professionals who are capable of technical excellence and collaborative cross-discipline behavior. Students from both programs testified to the enrichment provided by the programs. Key findings from the breakout groups include:

(i) **Engineering economics should be required of all engineering students.** Three of our six departments (ChBE, CEAE, MechE) require engineering economics, either as a separate course or within a capstone design course, and expect graduating students to take the Fundamentals of Engineering (FE) exam (which includes questions on engineering economics). Ken Anderson will lead a discussion of the role of engineering economics in all of our majors during the Fall 2016 meetings of the Undergraduate Engineering Council (UEC).

(ii) **Combine business and legal training as an elective.** An elective on Intellectual Property Law and Engineering is offered by the Department of Chemical and Biological Engineering, and our Interdisciplinary Telecommunications Programs offers business and policy courses. However, there are no current plans for a combined legal/business, college-wide course.

(iii) **Allow students to use business and management courses for social science electives.** Most engineering management courses are approved as technical electives. The UEC will consider again in Fall 2016 a recommendation to count business minor courses as technical or social science electives.

(iv) **Provide business minor courses in summer session or virtually.** Business minor courses will be offered in summer 2016. Selected engineering management courses are offered in summer, including online.

(v) **Provide early advising so that students have maximum flexibility to accommodate class schedules and see the value in their offerings.** Our advisors begin engaging with new students before they even arrive on campus and then continue to do so each semester. The *Introduction to Engineering* course and a new *Industry 101* course provide early information on various opportunities for our students. In addition, our engineering advisors have regular visits/communication with campus leaders (like Marie Pecoraro, who runs the Business
Minor), so they keep abreast of opportunities for our students to broaden and enhance their engineering education.

4. Executive Session and Wrap-up – Feedback provided to the dean is that the college is doing well and the day’s meeting was engaging and effective. Recommendations include:

(i) Send a little homework or reading materials in advance of the EAC meetings. Reading materials sent in advance of the Spring 2016 meeting include this report, a persistence report, and introductions to new EAC members.

(ii) The breakout concept was good, but pick fewer topics (2 vs. 3), with longer breakout sessions. There will be two breakout sessions at the April 2016 meeting.

(iii) At the spring 2016 meeting, do a deeper dive on student persistence, including causes of loss and results of exit interviews. A presentation on persistence and causes of loss will be presented at the spring 2016 EAC meeting, followed by small-group breakout discussions.

(iv) Find ways to keep EAC and GOLD members engaged when their terms end. EAC has created two new categories of membership, recent alumni for GOLD members to serve on the EAC, and emeritus membership that enables EAC members to stay engaged on special projects and assignments, and to attend EAC meetings when able.