SUMMARY AND RECOMMENDATIONS FROM THE 04/22/2016 MEETING OF THE CU-BOULDER ENGINEERING ADVISORY COUNCIL

This report provides a summary of the 04/22/2016 meeting of the University of Colorado Boulder Engineering Advisory Council (EAC). The key recommendations from the meeting are listed in *italics*. This summary, presentations, prior reports and other EAC information are posted on the EAC website at http://www.colorado.edu/engineering/about/engineering-advisory-council.

1. **College Update** – Dean Davis provided an update on several college activities:
   a. **EAC Member Recognition and Organizational Updates** – Dean Davis recognized new EAC members, and existing members for awards and service. Dean Davis also introduced changes to the bylaws that created new categories of membership for recent alumni and emeritus members. These bylaw changes were approved by the EAC.
   b. **Undergraduate Enrollment Update** – Dean Davis presented data on undergraduate enrollment projected for fall 2016 based on current confirmed students. The incoming freshmen class is expected to exceed 1000 students and the total undergraduate enrollment will exceed 4500 students, a 50% increase since 2007; female enrollment is up 100% in that same period, and women are 32% of the incoming class; underrepresented minority (URM) student enrollment is up 150% in the same period and is 20% of the incoming class. The quality of incoming students has continued to improve, with ACT scores above our peer schools and nearly on par with our aspirational schools.
   c. **Program and Place Updates** – Dean Davis provided updates on graduate enrollment, faculty hiring and new building programs. The Aerospace Building is going ahead on East Campus with design starting in July 2016, and the building is expected to be complete in 2019. The 5th wing of the Biotech Building is under construction, and is expected to be complete (but partially shelled) in 2017, and the renovation of the ECES wing of the main Engineering Center is underway and expected to be complete in fall 2017.

2. **Campus Update** – Chancellor Phil DiStefano – Chancellor DiStefano joined the EAC for a discussion of campus goals and progress. He emphasized progress on student retention, inclusive excellence and affordable education with new revenue sources, noting the lead role of the College of Engineering and Applied Science in all of these areas.

3. **Student Persistence – Meeting the Challenge of Retaining Students in Engineering** – Dean Davis and Ken Anderson, Associate Dean for Education, 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—the highest on campus and approaching the Chancellor’s goal of 80%. The College is engaged in an extensive review of calculus classes, including addressing cultural and pedagogical issues and encouraging Applied Math to engage in bottom-up reform. Ken Anderson presented on the College’s Thinking of Leaving survey. The top reasons that students gave for leaving the College are unsatisfactory performance in initial classes and lack of fit with student interests, although the need to improve curricular flexibility and college/classroom culture was also cited. The EAC then divided into small groups to discuss this subject, and made the following recommendations:
   - Ask Applied Math to provide timely communication of current letter grades throughout the semester, and set expectations with students for these courses
Review how calculus is taught at other institutions and institute reforms including more examples of how engineers make use of math in practice

Respond to Thinking of Learning survey by providing prospective students with better information on engineering study and careers so that they make informed choices, offer flexible degree programs, develop a comprehensive peer-mentoring program, and engage students in improving culture

4. **Lunch with our Student Athletes** – At lunch, we were joined by 8 student athletes who are in the College of Engineering and Applied Science. The students shared how they balance their intense training regimen with our rigorous curriculum. These outstanding students include Clare Wise, who was recognized as one of the outstanding graduates from our Chemical and Biological Engineering Department and also a two-time All-American skier for the Buffs, and Michaela Wenning, who is another top student in ChBE and runs for the track team.

5. **Departmental Updates and Challenges** – Three department chairs presented updates for their departments, and described progress and challenges that they face in realizing the strategic plan objectives for the college. The EAC broke into groups to discuss the challenges. The findings of the break-out groups are summarized by department.

a. **Computer Science** – The department is suffering with over 1200 BA & BS in CS students being taught by the department. Moreover, computer science needs are becoming ubiquitous across the campus. Key recommendations are:
   - More sections are needed for CS courses, and a strategic discussion is needed as to whether CS will teach these sections or whether they should be distributed among other departments and maybe even other schools and colleges; CEAS/CS should maintain thought leadership and potentially appoint a “CS Czar” to lead the campus discussion
   - The focus should be on high-quality CS instruction and research that are proactive vs. reactive and with the necessary classroom and research space

b. **Mechanical Engineering** – The growth of the department is in alignment with the College, but the ranking seems to have lagged from other departments. Growth of the graduate program has also lagged the huge growth of the undergraduate program. Key recommendations include:
   - The senior projects course is key but hard to scale. Consider a “superstructure” with a few large projects that are each divided into smaller projects, with professional master’s students helping to guide undergraduate teams, and also seek endorsement support to ease the annual fundraising burden for projects
   - Provide additional space for projects courses and research as the numbers of faculty and graduate students are increased

c. **Chemical Engineering** – The department has had tremendous undergraduate student growth, but graduate students have not grown at the same pace. The department is highly ranked in part due to its outstanding and highly productive faculty.
   - Early faculty engagement and a marketing strategy are needed to improve recruitment of PhD students, including international students
   - Faculty hiring should include 1-2 more instructors to help with undergraduate student growth, and 1-2 more endowed chairs and professorships to help attract senior faculty

6. **GOLD Survey** – Amy Kramer, ChE ’06 and Co-Chair of the GOLD (Graduates of the Last Decade) board, presented the results of a GOLD alumni survey completed earlier in April 2016. The results raised several good ideas to follow up, and identified over 200 recent alumni interested in the GOLD board
and related activities. Among the findings are that 95% of the respondents are employed, and 60% reside in Colorado; those that graduated with a BS/MS received higher starting salaries than their peers; 55% of the respondents had internships or other field experience while at CU; and they felt that communication skills outweighed the importance of technical skills in the workplace. A key recommendation was made:

- **Mine the verbatim comments from the survey**

7. **Recognition of Outgoing EAC members** – Dean Davis recognized the seven outgoing EAC members who have completed their terms. Each was given a gift to remember his or her time on the EAC.

8. **Upcoming Meetings** – The next EAC meetings will be 10/14/2016 and 4/28/2017 in Boulder.

9. **EAC Members in Attendance** – Dana Andersen, Vanessa Aponte, Rick Baily, Brad Brooks, Marco Campos, Frank Doerner, Pam Drew, Jim Gallogly, Lisa Glatch, Jon Goldsmith, Amy Kramer, Mark Matossian, Mike McAtee, JoAnne Miller, John Mollenkopf, Jeff Osterkamp, Cliff Pearson, Maja Rosenquist, Nathan Seidle, Ali Siahpush, Doug Smith, Kathy Tobey, Herb Vogel, Jim Wade and Mike Wirth. Emeritus Chair Kristy Schloss was also in attendance.