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 CU-Boulder Engineering Advisory Council (EAC), with key recommendations collected in italics at various locations in the report. 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. (see presentation). Dean Davis also introduced two new 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 21% of the incoming class. The quality of incoming students has continued to improve, with ACT scores above our peer schools and 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 mid-2019. The 5th wing of JSCBB is under construction, and is expected to be complete in 2017, and the renovation of the ECES wing of the EC 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.

3. **Student Persistence – Meeting the Challenge of Retaining Students in Engineering** – Dean Davis and Ken Anderson, Associate Dean of 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—approaching the Chancellor’s goal of 80%. The College is engaged in an extensive review of its 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 for leaving the College were unsatisfactory performance in initial classes and lack of fit with student interests, although issues related to the culture of the college were also strongly cited. The College is looking at ways to address these findings via flexible degree programs, developing comprehensive peer mentoring programs, and engaging with students to better understand cultural issues. The EAC recommended reviewing how calculus is taught at other institutions, pursuing comprehensive STEM reform with Applied Math, setting expectations with new students with respect to Applied Math classes, and presenting to them the importance of these classes by showing them how engineers make use of math in practice.
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. Each of the student athletes shared how they balance their intense training regimen with the college’s rigorous curriculum. Each of the students remarked how disciplined they had to be to balance both of their interests, but that they loved each part of the challenge. These are all outstanding students including Clare Wise who was recognized as one of the outstanding graduates from our Chemical and Biological Engineering Department who was also a two-time All-American skier for the Buffs, and Michaela Wenning who has a 4.0 gpa in ChBE and runs for the track team.

5. **Departmental Updates and Challenges** – Three department chairs presented updates for their departments, and identified challenges that they face in realizing the strategic plan objectives for the college. Each chair presented their respective information and challenge, and 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 from too much success with over 1200 students being taught by the department. Computer science needs are becoming ubiquitous on campus with five schools teaching some aspect of CS.
   1. CEAS/CS needs to maintain thought leadership of computing education on campus, and lead a strategic discussion of computing education on campus;
   2. CEAS/CS may need a CS Czar to interact with the 5 Deans/Colleges;
   3. Computing will become as universal as reading, so we need to plan ahead for that eventuality;
   4. Need to do a better job of filtering out the students who only want a ‘taste’ of computing, and not let them overload our teaching resources.

b. **Mechanical Engineering** - The growth of the department is in alignment with the College, but the ranking seems to have lagged from other departments, and needs a concerted campaign to improve it.
   1. Senior projects course is key to the success of the department, but the current model is being challenged to scale;
   2. The current projects model includes fund-raising for each project. An endowment that produced $500K annually would have a huge impact on the department and ease the time required to maintain the quality of the senior capstone course;
   3. Faculty appointments and space have lagged the u/g growth of the department, and the department struggles with both issues;
   4. The department needs to do a better job of filling the pipeline from BS to MS to PhD candidates. Graduate student recruitment is a challenge.

c. **Chemical Engineering** – The department has had tremendous u/g 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.
   1. Growing graduate student (PhD) enrollment is a challenge that needs a new strategy and marketing campaign;
   2. Early faculty engagement will be required to effectively identify and recruit faculty and graduate students;
   3. Endowed chairs would be an important asset to recruit senior faculty;
4. Special efforts are required to change the cycle of successful faculty recruitment to diminish teaching loads, and allow more time for faculty engagement in the PhD and faculty recruitment process.

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 a number of recent alumni interested in the GOLD board and related activities. Among the findings were 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; over ½ of the respondents had internships, or other field experience; and they felt that communication skills outweighed the importance of technical skills in the workplace.

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 their 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 member Kristy Schloss was also in attendance.