

Summary and Recommendations from 10/7/05 Meeting of the
Engineering Advisory Council
Robert H. Davis, Dean

College of Engineering & Applied Science
University of Colorado at Boulder

1. Introductions

EAC Chair Peter Mannetti introduced new EAC members Gary Anderson (retired from Storage Technology, Chair of the College's Resource Development Committee) and Roger Zimmerman (retired from Sandia National Labs, previously on faculty at New Mexico State University).

2. Update on EAC/RDC Changes

Dean Rob Davis noted that he is working to make the EAC even more effective by establishing three subcommittees:

- Education & Outreach (Jean Becker, Chair; Kristy Schloss, Vice Chair)
- Research & Corporate/Government Relations (Scott Donnelly, Chair; Pam Drew, Vice Chair)
- Resource Development (Gary Anderson, Chair)

He is also working to make the Resource Development Committee (RDC) more effective by expanding its charge beyond private fundraising to include broader resource issues, and fully integrating the RDC with the EAC. Rob will serve as the college liaison/facilitator for the RDC. He also noted that moving the College forward will be a team effort of these subcommittees, due to the linkages between education, research, and resources. In particular, he said

*"Fundraising is not the sole function of the RDC," and
"Fundraising is not solely the function of the RDC."*

3. Dean's Report

Dean Rob Davis gave an overview of progress on the College's Strategic Plan. A full report is available at http://engineering.colorado.edu/facultystaff/Strategic_Plan.htm.

Undergraduate applications to the College were down 10% this past year, but enrollments of new students increased by 5% due to a substantial increase in the acceptance rate of students offered admission. The numbers (and percentages) of women and underrepresented minorities in the freshmen class are also up. Graduate applications and enrollments are down, especially among foreign students (27% of the graduate students are foreign vs. 36% two years ago; nationally, 58% of PhDs and 44% of MS degrees in engineering in the U.S. are granted to foreign students). Participation by undergraduates in discovery, professional and service learning exceeded the goal of one-third of the students this past year.

Research proposals submitted and grants awarded are down a little this year, though industrial funding is up. Support from federal agencies is becoming increasingly competitive. At the campus level, there is a new initiative in renewable energy, to go along with initiatives in biotechnology and nanotechnology.

In the past two years, 19 new faculty have been hired, including nine women. There have been nine faculty retention cases during this time, with four staying, four leaving, and one undecided. Awarding of nine endowed chairs and professorships this year, including four for the first time, is helping to support and retain top faculty. The College has spent \$3 million on 40

renovation projects in the past two years, to improve the use of the current Engineering Center. Feasibility studies for wing expansions and a new biotechnology building are also underway. Financial resources remain a challenge, with state funding flat at only 6% of the overall college budget. New course-specific fees will help improve college lab courses, starting this fall.

Comments and recommendations from the EAC members include:

- *We should encourage our own top BS students to enroll as CU graduate students,*
- *We should start tracking undergraduate involvement in discovery/service/professional learning vis-à-vis retention, particularly for women and minority students, and*
- *Put the presentation on the web site, as it has considerable useful information.*

4. State Budget Referenda

Gary Jacobs gave a brief tutorial on referenda C and D. In brief, referendum C would set aside the tax payers' bill of rights (TABOR) limits on state spending for the next five years, allowing the State of Colorado to spend all tax revenues rather than providing tax rebates for the amount above the TABOR limit (though refunds of tax overpayments will continue). Referendum D would allow the State to borrow against future revenues, so that major projects can be started sooner. Without passage of referendum C, it is anticipated that state spending on higher education will decline to zero within a few years. (Added note: referendum C was passed and referendum D was rejected by the voters on 11/1/05.)

5. University Update

President Hank Brown talked about the importance of higher education and noted the quality of the CU Dental School. In response to a question by Hans Brunner, he said his two biggest challenges are a decline in academic rigor and connecting with people in the State. In response to a question from Gary Jacobs, he said that, if referenda C and D do not pass, there will be higher tuition, less access for low-income students, budget cuts, and possibly programmatic cuts. Anthea Johnson Roen (Co-Director of the Multicultural Engineering Program) asked what will be done to recruit students of color to CU, and President Brown said there would be a blue-ribbon panel to set goals and make recommendations on focusing resources on programs that work.

6. ECE Department Overview

Bob Erickson, Chair of Electrical and Computer Engineering (ECE), gave an overview of the ECE Department and its plans. Research funding has seen large swings, from a high of \$13M in 1993 to \$3M in 2003, with the difference primarily due to the normal end of funding of the Optoelectronics Computing Systems Center by the National Science Foundation and the loss of several top faculty to administrative positions elsewhere. Current research areas of strength include communications, microwaves, optoelectronics and power electronics. Strategic thrusts for the future include mixed-signal electronics, nano-optoelectronics, and wireless communications. The undergraduate program in ECE has 10 required labs, the most in the country. However, there has been a 50% decline in entering freshmen in the past four years. Some comments and recommendations from committee members include

- *Pam Drew recommended that the curriculum be focused on something like embedded systems, which is where there are jobs in the U.S.*
- *Scott Donnelly noted that some other schools are focused on the fundamental core for the B.S. degree, then students get practical or research hands-on experience in an M.E. or M.S. degree, whereas a B.S. curriculum with lots of labs may be viewed like vocational training (Bob responded that the CU curriculum has both more core and more labs than other schools, but fewer electives).*
- *Mike Herriage noted that EE departments in California are overflowing.*

After the presentation by the ECE Department Chair, Professor Dragan Maksimovic described the Colorado Power Electronics Center. Although it includes only three faculty, this center is very active, with 29 graduate students and six industry sponsors.

7. Student Presentations

During lunch, there were two student presentations. First, Erin Reed described her cooperative education experiences at NASA Johnson Space Center in Houston. Erin is majoring in Aerospace Engineering Sciences. Second, Joe Brannan presented his undergraduate research work on tetherless bio-data recording and how it may be used in the future for wireless automatic monitoring of human health. Joe is majoring in Electrical and Computer Engineering and working with Professor Zoya Popovic.

8. Subcommittee meetings

After lunch, there were breakout meetings of the three subcommittees. After facility tours of the remodeled Engineering Lobby and Aerospace Graduate Student Area, reports from the breakout groups were provided to the entire EAC, and they are summarized below.

8.1 Education and Outreach Committee (EOC)

EAC participants: Jean Becker, Mike Herriage, Betty Irvine, Jon Liebman, Peter Mannetti, Chuck Robertson, Kristy Schloss, Jim Voss, Roger Zimmerman

CU participants: John Bennett, Dave Clough, Anne Dougherty, Scot Douglas, Kristin Germain, Jean Hertzberg, Kristine Larson, Clayton Lewis, Zoya Popovic, Diane Sieber, Ashley Moore, John O'Brien

- 1) The committee convened reviewed progress on actions recommended at the Spring 2005 EAC meeting.
- 2) The committee reviewed the Educational Objectives/Resources in the Strategic Plan and voiced continued support for these objectives.
- 3) During the recruiting season, the EAC members will again be asked to make phone calls on behalf of the university to prospective students.
- 4) The committee focused most of its discussion on the Honors Program. The following outline summarizes that discussion.

Honors Program:

- Roll it out in the Fall of 2006 and ramp up for full roll out in the fall of 2007
- Two kinds of honors courses: deeper and broader version of existing course, or a one-hour supplement (small group seminars, extra papers, etc.) to an existing course
- Automatic admission to the BS/MS program and incentive to PhD program
- Honors courses will be open to all students (with permission of instructor)
- Open question: Can a student take one-hour add on without taking the primary course?
- Faculty will be asked to help recruit current and prospective students to the program
- Both cross-department and focused departmental courses will be offered – we want to foster an interdisciplinary program
- The program should have an international component – build on the Spanish and German engineering certificate programs
- How to create a sense of community for the students in the program? Ideas:
 - Residential academic program in engineering quad
 - Honors lounge, reciprocal with other honors programs, interdisciplinary housing on honors (Kittredge)
 - Use the Herbst building for dinners for honors students.
 - Offsite “grazing” lounge – grazing zones
 - Graduate “with honors”
- We want to be sure to recruit from pre-engineering high school classes (e.g., DSST and Centaurus)
- Students not directly admitted into the honors program can earn admittance by doing well in an honors course (and their other academic work)

- Faculty and peer mentor for every student (as described in proposal)
- Conduct exit interviews for those who drop out of the program to determine why
- Two-tier entrance criteria – include student interviews
- We should seek to endow the honors program

Internships:

- An internship is a key component of the leadership development aspect of the program
- Match students with industry people for outside experience
- Honors students attend an evening hosted by local industry
- VCs, industry groups (Colorado Bioscience Association, CXO, etc.)
- Pay-to-play for the industry people

Job Fair:

- We should establish a “job fair” for students in the honors program (for both summer internship and full-time opportunities)
- Student participation will be voluntary
- Industry representation will typically be more senior than the HR people or entry-level engineers who usually come to campus to recruit
- To help students and industry representatives prepare, create a spiral bound book prepared ahead of time with
 - resumes of students
 - Industry/Company backgrounds
- Get a sponsor for this event
- Train students for the event – what to wear, what to say, resume writing
- Invite guest lecturers to students, perhaps on a panel, to help them prepare

Pilot Honors Industry Night (same as Job Fair):

- Pilot the honors student–industry engagement in February 2006
- A collaboration web site will be created for the planning so we can involve the subcommittee easily
- 15 engineering fellows plus outstanding graduate in each department
- John Bennett will discuss with the students the week of 10-10-05 (done – JKB)
- Real event next fall – February 2006 is the trial run
- Invite national labs for research opportunity
- John Bennett offered to hold the event at his house
- Sponsors – We talked about having the defense/aerospace industry sponsor this first event. John Bennett spoke to Ray and Scott and they both said they would sponsor the event (couple hundred dollars each is what he mentioned). Here are some potential sponsors in this industry sector:
 - Ray Kolibaba - Raytheon - yes
 - Scott Donnelly - GE Aircraft - yes
 - Pam Drew - Boeing
 - Mike Herriage – Northrop Grumman
 - Tom Marsh (Jim McAnally) – Lockheed Martin
- The fellows.colorado.edu website lists the current fellows
- State legislature internships – Hank Brown might be interested in helping

Summary of Recommendations and Followup:

- *Pilot honors program in Fall 2006*
- *Pilot honors industry night in February 2006*
- *Seek to endow the honors program*
- *Ask EAC members to call prospective students in Spring 2006*

8.2 Research and Corporate/Government Relations Committee (RCRC)

EAC participants: Kevin Coyne, Scott Donnelly (Chair), Pam Drew (Vice Chair), Ray Kolibaba, Merc Mercure

CU participants: Victor Bright, Tanya Kelly Bowry, Martin Dunn, Liza Eschbach, Lee Peterson, Ken Porter, Ted Randolph, Dan Schwartz, Stein Sture (CU facilitator), Pat Sullivan

Stein Sture presented a review of recent progress made on prior recommendations. The presentation followed the report previously distributed by Rob Davis. He also briefly described campus and University-wide initiatives, including the proposal to operate LANL (Los Alamos National Labs), and the newly created renewable energy initiative. He then made a presentation of statistics related to the number and dollar-value of research awards and expenditures in the College and the various departments over the past year as well as previous year.

Research awards and expenditures from public and private industry sources were discussed in detail. Overall funding statistics were discussed and related to campus statistics, which included data for the various schools and colleges, as well as institutes. The data show an overall tendency to level off, and in some cases decline. However, the number and dollar-value of research awards received from corporate sponsors increased this past year.

A review was given of current strategies to increase the College's research programs, which include multi-disciplinary research center initiatives. Dan Schwartz from Chemical and Biological Engineering gave a summary of the efforts related to NSF NSEC (Nanotechnology Science and Engineering Centers) and MRSEC (Materials Research Science and Engineering Centers) proposals, specifically details related to development of external collaborations and reverse site visit preparation related to the NSEC proposal, which was short-listed and was close to being funded. The importance of addressing broader impacts, societal and educational implications related to this center proposal effort were also addressed.

Ken Porter, Director of Licensing of the CU System and until recently Director of CU-Boulder's Tech Transfer Office, presented current trends and statistics related to start-ups, innovation disclosures, background for university-industry research collaboration, confidentiality agreements, proof-of-concept funding for faculty, and issues and concerns related to developing intellectual property agreements. The discussion that followed centered mainly on intellectual property agreements. Scott Donnelly, Pam Drew and others commented that CU's policies seem very restrictive and quite different from intellectual property policies developed by other research universities, both public and private. It was bluntly stated that they saw difficulty with CU's stance on many of the issues. Where industry and most other universities would see appropriate exclusive rights for corporations, CU appears to claim rights in instances when such rights do not seem appropriate. It was agreed that this is a very important issue, which the group will pursue, since it is a potential show-stopper and substantial barrier for increasing industry research collaboration. The only dissenting view was presented by Merc Mercure, who wanted to be certain that the intellectual work brought to the table by faculty and students also be considered on par with material contributions, such as cash-funding, gifts in-kind, equipment, etc. contributed by the corporate partners, when IP rights were to be discussed. Ken also noted that the CU Tech Transfer Office may take a more flexible stance, now that revenue streams are coming in. Scott and Pam will carry on the discussion with the group via e-mail and phone, and prepare a recommendation and brief white paper to the College and Tech Transfer prior to the next meeting. It was agreed that this issue must be resolved as early as possible to develop successful industry-university collaborations.

Tanya Kelly-Bowry, who is Associate Vice President for Government Relations in the CU-System, presented an overview of current CU practice and policies related to earmarking of projects, contacts with the Colorado congressional delegation, and related topics. The possibility of having a dedicated college coordinator or "lobbyist" in Washington, DC, who would look after college

interests, especially related to visits to funding agencies, mission agencies, etc. was discussed. It was argued that this person would have to work closely with the University's overall effort to avoid conflicts with university interests or accidental cross-purpose activities. The group did not see any difficulties with this and argued that industry and other universities, to their knowledge, have effective Washington, DC representation which looks after broad interests through repeated visits to mission and funding agencies, as well as congressional delegations. The group argued that the University, campus and College should consider hiring a consultant with extensive experience in this field to enhance chances to obtain research funding. It was also mentioned that in those instances when industry and college faculty were to collaborate on projects, that industry might be most effective in related lobbying efforts and visits to the mission and funding agencies.

In summary, action items and recommendations from the subcommittee include:

- *Prepare a white paper on recommendations for technology transfer efforts and intellectual property rights*
- *Explore with campus leadership the possibility of a full-time advocate acting on the College's behalf with federal agencies*
- *Industry members should plug the value of higher education and of the College of Engineering and Applied Science*

8.3 Resource Development Committee (RDC)

EAC/RDC participants: Enid Ablowitz, Gary Anderson, Hans Brunner, Art Dawson, Gary Jacobs, Nan Joesten, Vern Norviel, David Richmond, Al Sanders, Greg Smith

CU/CUF Participants: Rick Buckman, David Clough, Rob Davis, Emily Muller, John Mabley, John Quigley, Pat Sullivan, JoAnn Zelasko

- I. Resource & Fundraising Update
 - a. Review of resource progress and needs relative to the Strategic Plan (Rob Davis)
 - i. Faculty
 1. 19 faculty have been hired over the last 2 years (9 of these are women)
 2. 3 Senior faculty searches were conducted last year, of which only one was successful
 3. We are promoting faculty excellence; there is tremendous support for new faculty (i.e. mentoring program)
 - ii. Facilities
 1. There has been no state funding for building capital since the DLC was completed
 2. \$3M spent in past 2 years to improve current Engineering Center
 3. A biotechnology building is in the planning stages
 - iii. Financial Resources
 1. State resources have remained flat for 3 years (no change for inflation or enrollment growth) – it is our hope that, if Referenda C & D pass, more money will become available
 2. Campus budgets have still gone up to maintain quality faculty and education, despite lack of state funding, due to tuition increases
 3. Students within CEAS remain positive in regards to the almost 50% tuition increase over the last 2 years; they feel confident that their future salaries will be benefited by their CU Engineering degree
 - b. Update on Engineering Development Efforts (John Mabley)
 - i. Handout: Roles Volunteers and Board Members Can Serve in the Fundraising Process with CEAS
 - ii. Shared excerpts of letters from CEAS scholarship recipients to their donors
 - iii. Mentioned Hurricane Katrina Tax Package – will update the committee with specifics
 - iv. Elise Patkay is leaving the Foundation; we are in the process of collecting resumes and hope to fill the position quickly with a qualified applicant

- v. EDC and Earn-Learn brunch tomorrow (Oct. 8th)
- vi. Turned floor over to Pat Sullivan to discuss Corporate & Foundation Giving – passed out handout of Corporate Giving Summary

Broke out into working groups:

Biotechnology Building (led by Rob Davis in Clark)

Attendance: Enid Ablowitz, Hans Brunner, Rick Buckman, David Clough, Rob Davis, Ryan Gill, Gary Jacobs, Nan Joesten, John Mabley, Vern Norviel, Ric Porreca, Greg Smith, Pat Sullivan, JoAnn Zelasko

Engineering for Developing Communities (led by Gary Anderson in DLC)

Attendance: Gary Anderson, Art Dawson, John Quigley, Emily Muller, David Richmond, Al Sanders

II. Reports by Working Groups and Discussion

- c. Engineering for Developing Communities (Gary Anderson)
 - i. This program is a valuable PR and recruitment tool for CEAS
 - ii. Goal is to create a \$1M+ endowment – the program could efficiently spend this amount with their current human resources
 - iii. Find out names of alumni that work for corporations/foundations with potential for giving to EDC and use those alumni for leverage
 - iv. Focus on non-traditional corporation/foundations, maybe those who wouldn't fund technology initiatives, but will fund humanitarian aide projects
 - v. Compile a collection of press clippings (i.e. Tau Beta Pi publication *The Bent*) with EDC stories to provide to potential givers
 - vi. Plan to coordinate 2-4 phone conferences between now and spring meeting to keep the momentum going on this project
 - vii. Rob Davis noted need for EDC fundraising to be congruent with college priorities, such as a major endowment that funds a professorship in sustainable technologies and also Earn-Learn students doing EDC projects
- d. Biotechnology Building (Rob Davis)
 - i. Recommended package deal fundraising (raise money to build a building while also attaining funds to attract top students and faculty)
 - ii. Recommended the building provide lab space/incubator space for new companies
 - iii. Discussed the idea of eventually connecting the East Campus to the Main Campus – biotechnology building is projected to be on East Campus due to lower cost, more space available, and long-term plan of creating a research campus
 - iv. Discussed concern of moving an academic unit off campus; the ChBE Department is geared to do this
 - v. Size of the building is yet to be determined; a 200,000 Sq. Ft. facility would cost approx. \$80M, of which approx. \$30M would need to come from private fundraising (Engineering would not be solely responsible for raising these funds)
 - vi. For this initiative to be a success it must be a campus priority; the RDC expressed strong support

III. Preparing for the Next Campaign (Rob Davis)

- e. The last 2 campus wide campaigns were 1986-93 and 1996-03; if this pattern continues, than the next campaign will begin next year; however, no dates have been set due to staff changes (University President, Chancellor, and Foundation President)
- f. When the campaign begins, we need an airtight case for giving and committed volunteer leadership
- g. We need to develop a broader constituency of donors; the high dollar donors will give when they know there is broad support
- h. We definitely need a trained and professional development team for the campaign to be a success

IV. Wrap-up and Recommendations

- *JoAnn Zelasko will send out biotechnology building feasibility plan to RDC for feedback*
- *John Mabley will give updates to RDC members via phone, email, and visits on fundraising initiatives throughout the year*
- *RDC focus for EDC should be on identifying a major donor (or several major donors) to create a \$1M-\$1.5M endowment for EDC*
- *EDC staff can go after smaller gifts/support*

9. Facility tours

Between the subcommittee meetings and the report presentations from these meetings, two facility tours were held. JoAnn Zelasko gave a tour of the renovated engineering lobby, with new furniture designed to enhance student studying and work groups. Matt Rhode gave a tour of the new Aerospace Engineering Sciences graduate student area, which includes offices, a study lounge, and a room for office hours for teaching assistants.

10. Business Meeting

Amendments to the EAC Bylaws were approved, including an expansion of the maximum membership from 32 to 36 to accommodate the transition of the RDC being fully integrated into the EAC. The updated bylaws, as well as other EAC information, are available at http://engineering.colorado.edu/overview/advisory_boards.htm.

11. Wrapup and Future Planning

The next EAC meeting will be Friday, 21 April 2006. The Engineering Awards Banquet will be that evening, and the Dean's Dessert Reception will be held the evening before. Dean Davis noted that the 2nd National Solar Decathlon competition begins that day in Washington, D.C. (added note: CU successfully defended its title). He also noted that there are seven students displaced by Hurricane Katrina enrolled in the College, and 150 for the entire campus.

EAC/RDC attendees: Enid Ablowitz, Gary Anderson, Jean Becker, Hans Brunner, Kevin Coyne, Art Dawson, Scott Donnelly, Pam Drew, Mike Herriage, Betty Irvine, Gary Jacobs, Nan Joesten, Ray Kolibaba, Jon Liebman, Peter Mannetti, Merc Mercure, Vern Norviel, David Richmond, Chuck Robertson, Al Sanders, Kristy Schloss, George Sissel (for part of meeting), Greg Smith, Jim Voss, Roger Zimmerman