

Summary and Recommendations from 9/29/06 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 Geoff Slaff (Amgen) and Peter Teets (retired Undersecretary of the Air Force and retired Lockheed Martin President). Development Director John Mabley introduced Dorea Atwood and Peter Gudlewski as new development staff. Dean Rob Davis introduced Mary Steiner as the new Assistant Dean for Students, and recognized Scott Donnelly (GE) for making the cover of the August 2006 issue of *Continental* magazine.

### 2. EAC Review and Preview

Peter Mannetti reviewed some of the EAC highlights from the past two years, including the formalization of three subcommittees, launch of the earn-learn program with over \$300,000 raised, establishment of the Engineering Honors Program, stepped-up outreach and recruiting with increases in members of new minority and female freshmen by one third over three years, and a role in the passage of Referendum C to help add state funding to higher education. Peter also noted that the position of Vice Chair of the Resource Development Committee is open (subsequent to the meeting, Joe Negler has accepted this important role). Rob Davis then gave a preview of EAC objectives for this academic year, including the launch of I-CUE, biotechnology building plans, elections in spring of new EAC Chair and Vice Chair and selections of new subcommittee chairs and vice chairs, and major research and educational initiatives in key areas such as biotechnology, computational science and engineering, energy, materials, and space.

### 3. College Update

Rob Davis gave a college update, including a report on progress toward meeting the goals of the college strategic plan and an overview of the new diversity plan for the College. These plans and assessment reports may be found at

[http://engineering.colorado.edu/facultystaff/Strategic\\_Plan.htm](http://engineering.colorado.edu/facultystaff/Strategic_Plan.htm)

<http://engineering.colorado.edu/downloads/DiversityPlan2006.pdf>

Educational highlights include a successful re-accreditation of all programs reviewed, launch of the Engineering Honors Program, and growth of the Earn-Learn and Discovery Learning Programs. Research highlights include increased industry support and participation in new centers in micro/nanotechnology and biorefining, but a concern is a drop in federal funding of research. Resource highlights include substantial increases this past year in private giving, an increase in state support for the first time in several years, higher-than-expected student enrollments and tuition revenues, and the awarding of several new endowed chairs and professorships. A copy of the Dean's PowerPoint presentation is available at

[http://engineering.colorado.edu/overview/advisory\\_boards.htm](http://engineering.colorado.edu/overview/advisory_boards.htm)

The discussion by EAC members primarily focused on recruiting top students, and improving grant funding, with the following recommendations:

- *Make scholarship decisions for top students early and call prospective students early (March-April is too late)*
- *Be aggressive in offering more scholarships, then go after needed funds*
- *Provide assistance in funding private scholarships – Lucy Sanders stated she would identify some sources*
- *Highlight new biotechnology building and initiative in recruiting materials and presentations*
- *Engage federal legislators from Colorado to support CU initiatives*

- *An advocate with federal agencies is needed, and the lack of progress is insane*
- *Energy initiative should be broader than biorefining and biofuels*

#### **4. I-CUE Update**

Rob Davis gave an update on Investment in CU-Engineering (I-CUE). Four proposals were selected for funding from the college: Cultivating Diverse, Pre-Engineering Students, Promoting Energy Independence, Materials Science & Engineering, and Space Systems Science & Engineering. Requests for ongoing campus support of these initiatives have been submitted. Private fundraising called '*the I-CUE Challenge*' will leverage college and campus resources and focus on support of people (scholarships, apprenticeships, and fellowships). The power-point slides are available on the site noted above. Discussion points and recommendations by EAC members include

- *Advertise earn-learn and discovery learning apprenticeships to prospective students*
- *Offer summer courses with credit to high school students to help connect them to CU and provide college preparation*
- *Establish alumni efforts at the department level to get support for I-CUE funding*

#### **5. Program and Student Presentations**

Barbara Bauer made a brief announcement and handed out a flier on the TeachEngineering Digital Library, which is our initiative led by the Integrated Teaching and Learning Laboratory and serves as a national resource for K-12 teachers. Wayne Ambler gave an overview of the Herbst humanities Program, including its role in ethics and other broad issues, and John O'Brien gave a testimonial of the importance of this program in his education. Barb Lawton gave an overview of the Engineering Management Program and how its Masters degree can serve the needs of industry and is offered via distance education (see <http://emp.colorado.edu>), and Jim Walker gave a testimonial of how this program has enhanced his career. At lunch, Bernadette Garcia and students Lisa Hewitt, Leah Crumbaker and Alex Paulson reported on the Colorado Space Grant Consortium and the hands-on experiences it provides for students.

#### **6. Subcommittee Meetings**

After lunch, the three subcommittees met, and reports from the subcommittees were made later in the afternoon and are summarized below.

#### **7. Tours**

Tours were held of the Colorado Space Grant Consortium and of the new Nanotechnology Characterization Facility, both which are in the Discovery Learning Center.

#### **8. Subcommittee Reports**

##### **8.1 Education and Outreach Committee (EOC)**

*EAC participants:* Jean Becker, Barbara Bauer, Dan Hernandez, Mike Herriage, Betty Irvine, Jon Liebman, Peter Mannetti, Lucy Sanders, Kristy Schloss, George Sissel, Jim Voss, Roger Zimmerman

*CU participants:* John Bennett, Larry Carlson, Janet DeGrazia, Scot Douglass, Zoya Popovic, Anthea Johnson Roen, Lelei Finau Starkey, Revi Sterling, Mindy Zarske

- 1) The committee convened and reviewed progress on actions recommended at the Spring 2006 EAC meeting.
- 2) The committee reviewed recent progress and activities related to education, recruiting and outreach.
- 3) The committee discussed the first "Industry Night", designed to provide a forum for Honors Students and Fellows to interact with industry leaders, which was held on 9/28/06 (the night before the Fall EAC meeting). Preliminary feedback is highly favorable. More detailed feedback is being collected.

- 4) The committee briefly discussed the Rural Engineering Program, but deferred significant discussion of this program to the Spring 2007 EAC meeting. It was noted that the program is within \$100K of its funding goal, and the initial focus of the program will likely be the Western Slope of Colorado in Fall 2007.
- 5) The committee focused its discussion in three areas: the Honors Program, the College's relationship to DSST and Centaurus High Schools, and aspects of the College's response to the National Academy of Engineering document "Educating the Engineer of 2020". This discussion is summarized below.

*Honors Program:*

The committee received an update from Scot Douglass, the Faculty Director of the Honors Program. The following outline summarizes that discussion.

- Approved by Administrative Council on 11/14/05
- Plan to be in steady state by 2009 - administrative policies are in place, every class is represented, and a full cohort of incoming freshman is established
- 21 students entered program this year (20 out of 24 students accepted direct invitation)
- Piloting 6 Honors Thesis students this year
- Core Values of Honors Program:
  - Excellence, community, intentionality, opportunity and personal engagement
  - We desire to foster a community of talented and committed students who take personal and collective responsibility for enhancing their educational formation while providing them with opportunities and academic challenges that match their abilities and ambitions
- Contents of Honors Program:
  - Includes academically rigorous courses and extracurricular programs, opportunities for community building (regular meetings, commons room for students)
  - Future directions:
    - Targeted internship programs (e.g., NASA SHARPS program)
    - Residential Honors dormitory for engineering honors students
    - Size of program: approximately 10% (60-65) of incoming students - next year to 40 using a formal application process

*DSST/Centaurus Relationships:*

The committee discussed ways in which the College could improve and leverage its relationship to area high schools, focusing particularly on DSST and Centaurus. These schools are of interest because the Denver School of Science and Technology has a rigorous curriculum and a diverse student body, while Centaurus also has a diverse student body and a pre-engineering program developed in collaboration with CU Engineering.

- **Interest and ability** – The goal of the College's interactions with DSST and Centaurus is to increase the number of prospective students who are both interested in and qualified for undergraduate engineering at CU. It was observed that students who become interested in engineering late in their HS careers may be deficient in math or science. The College has committed to assisting such students who are members of pre-engineering programs, with summer math and science classes taught by BVSD.
- **Perception issues** – The committee discussed issues related to the perception of CU Engineering across Colorado.
  - Two perceptions that need to be addressed are:
    - CU is unwelcoming to diverse population
    - The Colorado School of Mines is the leading engineering university in the state (CU holds this honor by a considerable margin, as measured by rankings)

- John Bennett met with Mayor Hickenlooper and DPS Superintendent Michael Bennet to discuss how CU can improve its relationship to DPS schools, particularly in the context of the FIRST Robotics Program. The College has committed to helping support every DPS HS that fields a team next year.
- Dan Hernandez discussed his presentation on his “CU Branding Exercise Research Project.” The possibility of engaging Leeds School students in the branding effort was discussed.
- **Junior Internships** - George Sissel described the need for internships for HS Juniors at DSST
  - If interested:
    - Contact the internship coordinator at DSST or Lelei Finau at CU
    - Visit DSST on Thursday mornings to see how the program works
- **Summer Internships** – The committee also discussed the opportunity to combine undergraduate and HS internships, as outlined below.
  - DSST students for engineering interns with local industries sponsored by CU Boulder
  - Have CU Engineering student as a mentor
  - 25 companies to take four HS students and an undergraduate mentor each for summer interns (\$20K for each “pod”) and will put its logo on the promotional materials - need transportation - end of junior year
  - Systems administration kids could work as desktop support for local companies in the summer
  - Work for pay and future scholarship to CU (e.g., program participation could earn “scholarship credit” toward cost of attending CU)
  - If interested - please contact John Bennett
- **Pre-Engineering Academy** – The committee discussed the pre-engineering academy concept as it relates to area high schools such as Centaurus, as follows:
  - Begins in freshman year and includes projects with capstone project in senior year
  - Guaranteed admissions agreement with CU
  - Last year 20 grads - 13 attending CU (3 underrepresented minorities, 3 women)
  - Highly diverse population
  - Want to stay close to home
  - Employ 6 former pre-engineering academy students as earn-learn apprentices through the ITLL (Integrated Teaching and Learning Lab) to support the program at their former schools.
  - Graduate CU Engineering student in class weekly in pre-engineering class - 65 classes a week
  - Evaluate successes and leverage elsewhere

*College’s Response to “Educating the Engineer of 2020”:*

The committee discussed the NAE document “Educating the Engineer of 2020”, focusing on the desired outcomes (as that term is used in ABET parlance). Some of the committee’s observations are as follows:

- There is considerable emphasis on non-technical skills
- There is considerable emphasis on professional engineers and Masters-level preparation
- The committee reviewed the data gathered by Terry Mayes from a survey of EAC members regarding skills required of engineering graduates. The survey instrument and the results of this survey are available online at [http://engineering.colorado.edu/overview/advisory\\_boards.htm](http://engineering.colorado.edu/overview/advisory_boards.htm). These results can be summarized:
  - The EAC survey results are mostly in synch with NAE recommendations
  - Engineering education is not just vocational program
  - The EAC added other desirable attributes

- The focus on a more well rounded individual is important
- The EAC list contains 24 items including all 10 from the NAE report -
  - Of the 10 NAE characteristics, only 4 are in the top half of EAC rankings
  - Most could be incorporated into the other 10 as subsets

The committee briefly discussed the desirability of creating a non-accredited Bachelors of Arts (or similarly titled) engineering degree, such as for those students interested in education. There was considerable opposition to this idea, in part because such a degree is not in CU's charter as a leading research institution. There was also concern expressed that such a degree would represent a potential refuge for weaker students and thus "watering-down" the program. In the alternative, the committee supported providing opportunities for those who don't want to be PEs or work as engineers, such as a minor or certificate in engineering education.

*Summary of Recommendations and Follow-up:*

- *Continue to engage with DSST and Centaurus High Schools*
- *Prepare for Spring discussion by reading "Attracting Rural Children to Undergraduate Engineering"*
- *Work to improve the perception and "brand recognition" of CU Engineering using the framework developed by Dan Hernandez*

**8.2 Research and Corporate/government Relations Committee (RCRC)**

*EAC participants:* Kevin Coyne, Scott Donnelly (Chair), Pam Drew (Vice Chair), Ray Kolibaba, Merc Mercure, Geoff Slaff, Frank Prager

*CU participants:* Victor Bright (CU Facilitator), Carlos Felippa, Gerhard Fisher, Tanya Kelly-Bowry, Lynne Lyons, Ted Randolph, Kate Tallman, Stein Sture, Yunping Xi

Victor Bright presented a brief review of recent progress made on the prior meeting's recommendations. He then gave an update on the Discovery Learning Initiative, its status, and summarized recommendations of the Discovery Learning Task Force. In the limited discussion that followed, the RCRC members again expressed opinions that the discovery learning initial concept should be somewhat relaxed and focused more on graduate students and industry relevant research. The DLC is viewed by the RCRC as a building with excellent laboratory space potential. There does not seem to be a clear consensus among the RCRC members on what the DLC should look like in the future, although the recommendation by the task force to have a discovery learning initiative (DLI) director was perceived positively. The entire concept of DLI is viewed by the RCRC as more of an academic, education-driven concept. This concept is fine to pursue if it brings additional state and federal support, but the DLI concept in itself is not perceived as a selling point to industry to fund research. It may be better to focus the DLC on one of the I-CUE themes that uses discovery learning, than on the theme of discovery learning itself.

Kate Tallman, of the CU-Boulder's Tech Transfer Office, presented an update on TTO's function and recent initiatives, including current trends and statistics for the CEAS related to start-ups, innovation disclosures, proof-of-concept funding for faculty, issues and concerns related to developing intellectual property agreements, and current TTO policies for IP and industry-supported research. The RCRC members commented that the CU TTO's policies are not unreasonable, except for a few timing issues in implementation of certain terms, particularly in providing companies with more time to decide course of action after a grant ends. Resolving these issues is important, so that no opportunities are missed in the current tight national competition for funding and resources. There seems to be a sense of agreement now between the TTO and RCRC members' views. Once the timing issues are resolved, the TTO should take a more proactive approach in marketing the CEAS technologies and IP. IP is viewed by the RCRC as a competitive advantage in recruiting companies to participate in the University's research programs.

Tanya Kelly-Bowry and Lynne Lyons from the CU Office of State and Federal Government Relations reported on what is being done to possibly hire a full-time advocate to act on behalf of the College and campus with government agencies and corporations to advance major research funding and earmark opportunities. They explained the function of their office and how the initiatives from CU system-wide are selected and prioritized to be included in the legislative agenda. The comments made reflected the fact that the campus administration is aware of the issue and is working on collecting data and identifying possible resources to support stronger advocacy with government funding agencies. A survey is being currently conducted of some AAU and Big 12 schools to assess what is being done to have stronger presence in Washington, D.C. The RCRC members expressed deep frustration with the lack of progress on this issue, considering that it was brought up more than a year ago, and offered once again to facilitate contacts with individuals within their companies who have similar jobs. The RCRC members expressed urgency in hiring a college-level advocate, as CU-Boulder needs to be far more proactive in seeking federal support for research, buildings, and earmarks. The CU level earmarks in particular are perceived as very low in comparison to peer universities. A suggestion was made that, rather than prioritizing projects such as buildings, equipment, etc., CU-Boulder should instead present a list of initiatives and projects to Colorado's congressional delegation, and work with the legislators on the initiatives/projects that they think are most exciting. A suggestion was made that the RCRC members compose a letter to the Provost and the Chancellor emphasizing the urgency for a government agencies advocate and their willingness to work with the Federal Relations staff, CU-Boulder administrators, and faculty to improve opportunities for CU-Boulder and CEAS to receive federal funding and earmarks.

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

- *CU TTO should resolve timing issues on implementation of certain IP terms, and then market CU's technology & TTO's terms and emphasize its flexibility to work with industrial sponsors. TTO needs a marketing campaign on the CEAS IP, needs to develop a brochure summarizing CEAS IP, start-up, etc, and focus on industry outreach.*
- *RCRC members will facilitate contacts with individuals within their companies who interact with government agencies. RCRC members, led by Scott Donnelly, will prepare and send a letter through the CEAS Dean to the CU-Boulder upper administration emphasizing the urgency and need for a government agency advocate. The committee would like this individual to be focused on the College instead of campus. The CU Federal Relations office staff will provide the RCRC with the link to the CU State and Federal Government Relations website, will setup a meeting with the RCRC members to learn more on how their companies interact with government agencies, and send progress report and peer universities survey results by December 2006.*

### **8.3 Resource Development Committee (RDC)**

*EAC/RDC Participants:* Gary Anderson (Chair), Bruce Buckland, Paul Hamilton, Gary Jacobs, Nan Joesten, Joe Negler, Vern Norviel, Lanny Pinchuk, Al Sanders, Peter Teets

*CU/CUF Participants:* Rob Davis (Co-Facilitator), John Mabley (Co-Facilitator), Dorea Atwood, Chris Bowman, Marty Dunn, John Quigley, Ami Sadler, Ann Scott, Pat Sullivan

#### *Introductions:*

Peter Teets, the newest member of the committee, was introduced. The development team, and its newest member, Dorea Atwood, were also introduced.

*Program Updates:*

Gary Anderson provided a financial update for the Earn-Learn apprenticeship program, noting that approximately \$1,500 in employment compensation per semester was paid to each student, representing 118 student semesters in FY06. Half of the cost of each apprenticeship was sourced from the department or program and half from private or college contributions. Gary pointed out that, to meet the objective to provide approximately 150 student semesters of support per year, an endowment of roughly \$5 million would be required.

Comments and suggestions were solicited as to how to garner support for an endowment for the purpose of Earn/Learn apprenticeships. A discussion ensued about funding this and other programs that are valuable to students, such as Engineering for Developing Communities (EDC), for which Gary had provided an update as well. The EDC program has motivated particular donors in the past.

*Biotechnology Building:*

Rob Davis provided an update on the progress of the biotechnology building. The program plan was approved by the campus in April and approval from the state is anticipated in May 2007. The primary focus of the initiative is capital to provide enhanced resources for teaching and research. \$40 to \$45 million will be required from private funding sources and the balance of the \$113 million building project will come from other sources such as the state and university funds and indirect costs on contracts and grants. It was noted that space on the main campus was tight and that, with the new Biotech Building, the vision is for the east campus to be a science and engineering campus.

It was also noted that a search is in process for a fundraiser who will be dedicated to the biotech initiative. The search process is attracting some very good candidates but is requiring more time than expected. Interviewing is expected to commence soon. Vern Norviel observed that a clear goal and well-articulated case can garner support for such a project. He mentioned a particular experience at Stanford where donors gave significant amounts as tribute to an influential Stanford alum, despite the fact that some donors were not themselves alums of the school. A question surfaced about how the biotech initiative interfaces with the UCDHSC campus, and it was explained that the Boulder initiative is more focused on basic research while the health sciences campus is more focused on clinical applications.

*Investment in CU-Engineering*

Rob Davis introduced the selected I-CUE initiatives and provided a handout showing that about \$250K in annual gift support would be required from private sources. It was noted that the CU system might help leverage support for diversity.

Presentations of the energy and materials I-CUE initiatives were delivered by Professors Chris Bowman and Marty Dunn, respectively. Chris explained that the energy initiative is designed to promote energy independence and that it will help to enhance personnel at all levels—undergraduates, graduate students, and faculty. Marty explained that the materials initiative would fill a current gap at CU for a materials science PhD degree program. He mentioned that not one of the top 30 programs in the country is without such a degree program.

John Mabley discussed the elements of a fundraising strategy that would be applied to I-CUE. The key principles are “inside/out,” “top down,” and “faculty involvement.” John explained that inside/out referred to first exploring donor interest among the “insiders,” or those with existing affinities, such as members of the EAC and RDC. “Top down” refers to approaching donors who are already known and who are believed to have the highest financial capacity. The last category refers to more energetically enlisting the help of faculty, administrators, etc in making the case to potential donors. John noted that the time window for raising support for the I-CUE proposals is this year and next, to avoid complicating fundraising for a system-wide campaign currently in the advanced planning phase.

John presented a summary of the results of a survey taken by RDC members at the last meeting. Eleven members responded to the survey. The responses to questions, such as the reason they served on the committee, varied. Suggestions from respondents for improvement included adding more staff, improving public relations, and promulgating planned gifts. Al Sanders suggested a strategy for increasing donations he had first learned from Lanny Pinchuk: connect, involve, collect. He suggested that if the first two are done thoroughly, collection would follow naturally.

*Planned Giving:*

Ami Sadler from the Foundation's Office of Gift Planning made a presentation about the opportunities donors have for including bequests as a part of their giving to the College. She also highlighted a new tax savings advantage available to some donors: the Pension Protection Act. She offered to meet with donors that any RDC members identify as potential planned gift prospects.

*Action Steps:*

- *Planning for biotech fundraising is in process with support of a campus and foundation committee co-chaired by Rob Davis and Carolyn Whitehead. Search efforts are progressing for a professional fundraiser who will be dedicated to biotech fundraising. RDC volunteers will be kept informed of further progress. Assistance of members is requested concerning identification of prospective donors.*
- *Development staff to send out a digest of survey results from April 2006 meeting.*
- *Development staff to seek meetings with RDC and EAC volunteers to discuss I-CUE support, and provide by the next meeting a summary of attractiveness and feasibility of I-CUE fundraising priorities.*

## **9. Wrap-up & Next Steps**

The next EAC meeting will be Friday 20 April 2007, and members will be invited to the college awards banquet that evening and a dessert reception at the Dean's residence the evening before. Issues to be covered at the next meeting include (i) I-CUE: progress and plans for campus and private funding, (ii) Strategic planning: college portion of expected campus process, (iii) Biotechnology building: fundraising plans and progress for capital and programmatic support, and (iv) leadership transition: Chairs and Vice Chairs for EAC and subcommittees.

Peter Mannetti explained the need to expand the maximum membership, so that new members may be added in a year (like this one) when very few terms of current members are ending. There was a unanimous vote to set aside the 30-day rule for making a motion and to expand the maximum EAC membership from 36 to 40.

## **10. Closed Meeting**

A members-only meeting was held at the end of the EAC meeting. Feedback provided to the Dean as follow-up action items include:

- *A letter will be written about the importance of a federal advocate for the College, to help the Dean move this issue forward with the Chancellor and Provost*
- *EAC members are willing to meet with the Chancellor to advocate for the College*

*EAC/RDC Attendees: G. Anderson, B. Bauer, J. Becker, B. Buckland, K. Coyne, S. Donnelly, P. Drew, P. Hamilton, D. Hernandez, M. Herriage, B. Irvine, G. Jacobs, N. Joesten, R. Kolibaba, J. Liebman, P. Mannetti, J. Negler, V. Norviel, F. Prager, A. Sanders, L. Sanders, K. Schloss, G. Sissel, G. Slaff, P. Teets, J. Voss, R. Zimmerman*