

College of Engineering and Applied Science University of Colorado

Semi-annual Report prepared 3/20/03 by Robert H. Davis, Dean and Patten Professor

Introduction

The College of Engineering and Applied Science (CEAS) at the University of Colorado at Boulder is dedicated to *Excellence in Education and Research*. Student excellence will be achieved through active learning, including team projects, research experiences, and industry internships. Faculty excellence will be achieved through synergistic research and teaching, both in core areas of engineering and applied science and in multidisciplinary initiatives. In this Semi-annual Report, I highlight major advances made by the College in the past six months toward these goals and report on progress made on initiatives and recommendations discussed in the previous meeting of the CU Engineering Advisory Council and Resource Development Committee.

New Faculty and Administrators

The College is pleased to welcome the following new faculty and administrators in Spring 2003:

Wayne Ambler, Associate Professor and Director of the Herbst Program

Will Medlin, Assistant Professor, Chemical Engineering

George Morgenthaler, Faculty Director of the Discovery Learning Center (DLC)

Mario Vidalon, Director of the Center for Advanced Training in Engineering and Computer Science

JoAnn Zelasko, Assistant Dean for Administration and Managing Director of the DLC

Development Office Staff

The search for a new Engineering Development Director ended in January 2003, when Marc Thompson assumed the job. Marc was most recently the Senior Director of Development at the Oklahoma State University College of Engineering, Architecture and Technology. He brings with him twenty-one years of non-profit fundraising experience and nine years of oil and gas industry sales experience. He holds a BA in Communications from Ohio State University and a BA in marketing from the University of Central Oklahoma. Additionally, since January, Marc has hired two new staff members to join the CEAS Development team.

Allison Angulo began work in February 2003 as a CEAS Development Officer, responsible for soliciting gifts of \$50,000 and above on behalf of the College. Allison has previous development experience from Stanford University, the Harvard Institute for International Development, and the American Red Cross, along with business experience with Silicon

Graphics, Cisco Systems and the Van Heyst Group. Allison has a BA in International Business and Economics from CU-Boulder and an MBA from Thunderbird American Business School.

Robyn Knox began work in March 2003 as Administrative Assistant and Special Events Coordinator. Robyn brings with her an extensive paralegal background, including eleven years in that role with Ball Corporation. Most recently, Robyn spent five years with Ball Aerospace as training and development coordinator. Robyn serves on the University of Colorado Alumni Association national Board of Directors and is active in local community affairs. Robyn holds a BA in Psychology from CU-Boulder.

Terry Mayes has been promoted to Associate Director of Development for the College. In this role, Terry will handle in large part the administrative functions of the development office, while maintaining her role as a major gifts fundraiser. Terry, who served as Interim Director of Engineering Development during the search for a permanent director, also received the 2002 Charles G. McCord Award for Outstanding Professional Service to the University of Colorado Foundation.

Major Events

The Discovery Learning Center Grand Opening was held on 18 October 2002, following the meeting of the Engineering Advisory Council (EAC) and Resource Development Committee (RDC). An estimated 400 people attended the opening address by Hewlett-Packard Chairman Carly Fiorina and the dedication and ribbon cutting ceremony, which featured Agilent Technologies President Ned Barnholt, National Academy of Engineering President William Wulf, and NASA Astronaut Jim Voss as the main speakers.

The Boulder campus held a memorial service on 5 February 2003 for Astronaut-Alumna Kalpana Chawla, who was among the seven astronauts lost in the Columbia shuttle disaster. Dr. Chawla received her doctorate in aerospace engineering in 1988, with Professors CY Chow and Bob Culp as her dissertation advisors. She was selected for astronaut training in 1994, and first flew on the space shuttle Columbia in 1997. She was very active in the College as an alumna and had worked with many CU faculty and students, most recently those connected with the two CU experiment payloads on the January 2003 launch of Columbia.

The annual Engineering Awards Banquet is coming up on 11 April 2003, following the spring EAC/RDC meeting. The DEAA Selection Committee has chosen the following recipients for the 2003 Distinguished Engineering Alumni Awards:

Darrell Donly - Industry & Commerce (CivEngr'74, Bus'74)
Charles Dowding - Education (CivEngr'67)
James Sherman - Special (Assistant Dean for Student Services)
Awtar Singh - Private Practice (MS CivEngr'64)
Nathan Thompson - Research & Invention (ElCompEngr'83)
James Voss - Government Service (MS AeroEngr'74, HonDocSci'00)

Faculty Awards

Kristi Anseth of Chemical Engineering has been selected to receive this year's Curtis W. McGraw Research Award from the American Society for Engineering Education. The award goes to only one outstanding engineering faculty member under age 40 each year, in all disciplines combined.

Charbel Farhat and Michel Lesoinne of Aerospace Engineering were awarded the Gordon Bell Award from the Institute of Electrical and Electronics Engineers. This award is one of the most prestigious honors in high-performance computing. The team authored engineering software for high-performance structural and solid-mechanics simulation.

Clayton Lewis of Computer Science received the Sullivan-Carlson Innovation in Education Award, presented at the Integrated Teaching and Learning Laboratory (ITLL) Fall Design Expo in December 2002. The award is selected by students each fall to recognize a faculty member in the College who promotes student-centered, hands-on learning.

Garret Moddel of Electrical and Computer Engineering was named the CU Physical Science/Engineering Faculty Inventor of the Year for 2002. The award was one of four given in November 2002 by the CU Technology Transfer Office. Prof. Moddel's optical interconnect technology has been licensed to Phiar Corporation, a development-stage company he formed with an attorney and a former graduate student.

Student Awards

CU-Boulder's Solar Decathlon team won first place in the U.S. Department of Energy/National Renewable Energy Laboratory competition held in Washington, DC in Fall 2002, beating out 13 other university teams as the overall contest winner. The team, led by Civil, Environmental and Architectural Engineering Professor Michael Brandemuehl and Architecture Professor Julee Herdt, brought its model solar home back to the Boulder campus and has been leading outreach on renewable energies for the public and campus community. The team also won the 2003 Wirth Chair Award for Community from the University of Colorado at Denver, honoring the team's achievement in fostering sustainable development.

Engineering graduate students Nate Beckwith (electrical), John Poole (civil) and Holly Shelton (mechanical), along with 1996 mechanical engineering graduate Jason Jenkins (now an MBA student), won first place in the Graduate Business Plan Competition held by the Leeds School of Business at the University of Colorado in December 2002. The team garnered a \$2,500 cash award and a \$10,000 Seagate/CTEK Incubator Services Award for its "Signifi" laser-engraving kiosk.

CU's 2001-2002 American Institute of Chemical Engineers student chapter has been named an "Outstanding Chapter" by the New York AIChE Headquarters. This award is in recognition of the student chapter's activities over the last year, including hosting of the

Rocky Mountain Regional Student Conference, outreach to middle schools, general community service, and other activities.

Outreach Highlights

The ITL Program has received funding from the National Science Foundation to lead an initiative to create a web-based digital library populated with searchable, standards-based K-12 curricula for use by engineering faculty and K-12 teachers to teach engineering in K-12 settings. The team also includes Tufts, Colorado School of Mines, Duke, Oregon State University, and the American Society for Engineering Education.

The ITL K-12 outreach program was one of three programs showcased in the November 2002 issue of ASEE Prism magazine, indicating the program is one of the most highly regarded in the country. The article, called "The ABCs of Engineering," also describes outreach programs at Tufts University in Massachusetts, where the state has mandated engineering education in K-12 schools, and at Southern Methodist University, where private industry is sponsoring the provision of a K-12 engineering curriculum. CU's approach was described as a "hub and spoke" method of building alliances.

Additionally, in an effort to recruit highly prepared students from groups traditionally underrepresented to the campus and College, CU-Boulder (led by the College of Engineering and Applied Science) has finalized a guaranteed admissions agreement between our campus and the newly chartered Denver School of Science and Technology. The DSST is a public charter high school that will open in Fall 2004. At least 40 percent of its students will come from low-income families, and the school is targeting a 45 percent female enrollment. To promote the partnership, the DSST will be a target school for CU's Pre-collegiate Development Program, and formal partnerships will also be established with the College's ITL K-12 Outreach Program, Multicultural Engineering Program, and Women in Engineering Program.

Other Noteworthy Items

The Board of Regents has approved renaming the Department of Chemical Engineering to the Department of Chemical and Biological Engineering, effective July 2003. The name was changed to better reflect the biological transformations that many chemical engineering faculty are involved in and to make the unit more competitive in attracting funding. The change was first approved by the Department and the Administrative Council of the College, and 93 percent of department alumni who responded to a survey also are in favor of the change.

Humanities Advisor Erik Fisher was awarded a Humanities Focus Grant from the National Endowment for the Humanities, a very competitive grant and the first of its kind for CU-Boulder. The grant has supported an interdisciplinary group of faculty from the College of Engineering and Applied Science and the College of Arts and Sciences to study and practice "Dialogues Between Two Cultures" throughout the 2002-03 academic year. The project builds on existing collaborations between technical and humanistic faculty, initiating several

new courses and a series of nine public lectures, primarily given by visiting scholars who work in collaborative settings that integrate the technical and humanistic disciplines.

Progress on “Discovery Learning: More Than a Building”

The breakout session on “Discovery Learning: More Than a Building” at the 10/17/02 EAC/RDC meeting was chaired by Associate Dean John Bennett. It made recommendations on expanding the discovery learning initiatives and vision, clarifying tenant expectations and accountability, using the building resources and technology, and ongoing budget and management. A summary of the recommended actions is provided below.

| <i>SUMMARY OF RECOMMENDED ACTIONS</i> |
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| Engage faculty in Discovery Learning Initiative (DLI) |
| Do live webcasts of DLC events for alumni and corporate affiliates |
| Issue certificates for undergrads who participate in DLC/DLI |
| Consider collaborations with Journalism and Mass Communication to improve communication and display of technical information |
| Create new K-12 teacher involvement in research |
| Teach grad students how to teach |
| Offer a graduate course in research methods |
| Offer a graduate course in technical communications |
| Additional items for DLC Collaboratory usage rules: -Priority system for external vs. internal use -Minimize non-research, non-educational functions -Benchmark fees for local facilities |

To begin implementing these recommendations, we have appointed a Faculty Director and a Managing Director of the DLC to support the tenants of the DLC, to expand the usage of the DLC, and to increase outreach activities.

The Faculty Director, Dr. George Morgenthaler, is responsible for providing assistance and support to ensure the DLC tenants can meet their research, educational and outreach goals. He will help identify new partnerships to broaden the impact of DLC projects, help increase corporate and federal funding for DLC projects, assist tenants in preparing grant proposals, and expand the DLC initiatives. He will also periodically collect and review the metrics for each DLC projects as input to the Dean’s review of the DLC. The first review will be conducted before the end of this semester. The Faculty Director will also support and expand the outreach activities of the ITLL, MEP, and WIEP Program Directors, as well as other college faculty and programs, to ensure optimal utilization of the DLC as an outreach resource.

In addition to her responsibilities as Assistant Dean for Administration, JoAnn Zelasko is also the DLC Managing Director. She is responsible for the overall facility management of the DLC to ensure that the DLC tenants are very satisfied and that the DLC is a showcase facility for the College and the University. She works with the DLC tenants on requests for

new communications, networking, or space needs or moves. JoAnn is also responsible for the Bechtel Collaboratory and the increased usage of the facility by university and external groups. Three student managers are working part-time to support the video and audio conferencing needs of the users and to keep the facility in top operating condition. There have been eight meetings scheduled this semester; the goal is to have at least two per week in the fall semester. We will be holding an “open house” for faculty and staff to demonstrate the video, web, and audio capabilities of the Collaboratory. The open house will be held before the end of the semester. We are in the process of building a library of material that can be shown on the video wall. The Managing Director is investigating the market for external use of the DLC Bechtel Collaboratory.

Courses on teaching, research, and communications methods for graduate students are part of the educational initiatives led by the Associate Dean for Education, John Bennett. Several departments already offer related courses, and the goal is to coordinate one or more college-wide courses on the common material.

JoAnn and George work closely the CEAS Communications Office and the Engineering Development Office to optimize public relations opportunities for the DLC. The DLC was used for Engineering Career Day for High School Women on Saturday, 1 March 2003. Engineering Development hosted the University Alumni Director Group on the same day for a short briefing and tour of the building. JoAnn is also working with Engineering Development to use the video wall and the lobby as a “special visitor event center” on home football game days this fall.

Progress on “Planning for the Future: Meeting College Needs”

The breakout session on “Planning for the Future: Meeting College Needs” at the 10/17/03 EAC/RDC meeting was chaired by Associate Dean for Research Stein Sture. It considered faculty productivity, the Exabyte Building, the new building (Engineering Teaching & Research laboratory) proposed last year, and a proposed infant care center. Key recommendations are given below.

| <i>SUMMARY OF RECOMMENDATIONS</i> |
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| Have high performers coach others in securing grants |
| Exabyte building is best opportunity in near term for more space, but moving Computer Science might not serve students or help integrate it with related campus groups |
| A new building is not practical at this time, given economic situation and lack of state funds |
| An infant care center in the College would be expensive and hard to do well; if the need is critical, then a campus-wide initiative should be considered |

The Dean has formed a Faculty Leadership Advancement Group (FLAG) of early/middle career faculty who are highly successful, with goals of providing advice, sharing best practices and developing future leadership. In addition, the members are serving as a

resource to help other faculty. The Associate Dean for Education and one of the FLAG members have put together a college-wide mentoring program for new faculty to share tips on research, teaching, etc., as a supplement to department-based mentor assignments. The Associate Dean for Research will study the possibility of offering coaches to more senior faculty who have been less successful in obtaining grants.

The CU-Boulder campus has proceeded with purchase of the Exabyte building (an 80,000 square foot office/warehouse about one mile northeast of the main campus), and the goal is for it to be ready for occupancy this summer. Our college decided not to recommend that the Department of Computer Science be moved to the Exabyte building. Instead, a formal proposal has been submitted to the Provost for the CADSWES research center to be an Exabyte tenant, which would free up space in the main Engineering Center to help provide for the needs of Computer Science and others. The Exabyte building is also seen as a potential source of space for several new research initiatives that are in the planning stages.

The College has decided to not proceed with a new building at this time, and the architects have been notified to discontinue the development of a program plan. In the meantime, the need and vision for future growth will be established as part of the College's strategic-planning process. Also, we have initiated a task force to study the possibility/feasibility of expanding the current building by adding third floors on several wings over time.

The Dean met on 12/02/02 with Ofelia Miramontes, Associate Vice Chancellor for Diversity and Equity, to discuss the possibility of the College partnering with the rest of campus on an infant day care center. Ofelia noted that a campus task force concluded a year ago to not pursue an infant care center, as its findings showed that there is enough capacity in existing centers in Boulder, that insurance and other costs are too high, and that it would be difficult to find a suitable outsource to run the center. Thus, an infant day care center will not be developed by the College or campus, at least in the near future, and we will instead look for ways to assist faculty, staff and students in matching with local options to meet their needs.

Progress On Resource Development Committee Breakout Session

The breakout session for the Resource Development Committee on 10/17/02 was led by Interim Development Director Terry Mayes and RDC Chair Gary Anderson. Key recommendations and current progress/plans are summarized below.

Discovery Learning Center Funding Shortfall (\$2M+)

- Fundraising Ideas:
 - Aggressively seek \$5M donor for DLC Naming Opportunity - \$2M to cover shortfall, \$3M for endowed operating fund
 - Eleven laboratory spaces available for naming @ \$250K
 - One study room available for naming @ \$50K
 - Multiple smaller naming opportunities available @ < \$25K
 - Committee formed to investigate various marketing ideas
 - Report on current DLC research activities to prior donors
 - Broaden search for new individual donors

- New DLC Faculty Director aggressively seeking corporate research partners

Resources and Strategies for Funding New ETRL Building

- In current economic climate, with lack of state funding, this idea deemed unfeasible
- Alternative growth opportunities being pursued include Exabyte building, remodeling existing space, and extensions or additional floors for wings of current building
- Potential to add third floor or wing extensions have initial cost estimates of \$3M to \$6M each

Most Promising Fundraising Prospects among other College Priorities

- First Priority:
 - DLC Shortfall – Development Staff will articulate a compelling vision statement and aggressively promote additional private support
 - Named Professorships – Development Staff will aggressively seek endowments to bring the number of professorships up to desired level of 20 by 2010. Average goal of 3 to 4 per year.
 - Earn-Learn Scholarships – Development Staff will create a marketing kit explaining the concept and aggressively promote this innovative concept to donors interested in establishing scholarship funds.
- Second Priority:
 - Teaching/Research Lab Remodels and Engineering Center Additions – Development Staff will work with each department to establish a vision and cost projection. Given state budget, success of each project will depend exclusively on private donors.
 - Named Chairs – Development Staff will aggressively seek endowed funds to establish an average of at least one new faculty chair per year. This effort will be linked closely to our promotion of planned giving options.

Infant Care Center

- This program was deemed unwise to pursue at this time due to budgetary and operating issues and other pressing needs.
- The infant care center should be a campus-wide initiative, which the college would support.

Annual Giving

- Development Staff will work with CUF Annual Fund Staff to ensure that a compelling appeal for college funds is presented to all CEAS alumni.
- A statement of accountability from Dean Davis will be a part of this appeal, outlining how unrestricted funds have been used by the College in the past and how he intends to use them in the future.

Campaign Progress

| Unit | Fiscal Year to Date (7/1/02 – 2/28/03) | Campaign to Date (7/01/96 – 2/28/03) | Goal |
|----------------|---|---|---------------|
| Engineering | \$7,866,733 | \$92,827,228 | \$54,150,000 |
| Boulder Campus | \$25,317,346 | \$345,359,790 | \$297,312,350 |

Progress on “Climate for Diversity: Improving Our College”

The breakout session on “Climate for Diversity: Improving Our College” at the 10/17/02 EAC/RDC meeting was led by Professor JoAnn Silverstein, Chair of Civil, Environmental and Architectural Engineering. It considered diversity data for the College, and the following actions for improving diversity were suggested.

| <i>SUMMARY OF SUGGESTED ACTIONS</i> |
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| Target outreach activities starting at middle schools |
| Keep a good database and records |
| Administer surveys to current students and high school students, teachers and counselors on perception of CU-Boulder and Engineering |
| Form alliances (tribal councils, A & S College) |
| Improve faculty recruitment, retention and mentoring |
| Show zero tolerance for professional misconduct and sexual harassment |
| Establish a budget and go after resources |

In fall 2002, 19.4% of undergraduate students and 23.3% of graduate students in the College are women, up from 17.9% and 14.9% respectively, in Fall 1992. Underrepresented minorities (Black, Hispanic, Native American) represent 7.5% and 3.6% of the undergraduate and graduate students, respectively, compared to 7.6% and 3.9% in Fall 1992. While modest improvements have been made in enrollment of women, substantial further growth is needed to achieve parity with the general population for both women and minorities. For tenure-track faculty, the number of women has increased from 10 (7.4%) in Fall 1992 to 17 (10.8%) in Fall 2002, while the number of underrepresented minorities has increased from 7 (5.2%) to 9 (5.6%). Again, there is a long way to go to achieve parity with the general population.

To address diversity issues in the College, the Climate for Diversity Committee was reconstituted in Fall 2002, after a lull in activity for several years. This committee reports directly to the Dean, who will oversee college activities for improvement of diversity. A potential difficulty that we are facing is the recent activity by watchdog groups, such as the Center for Equal Opportunity (see attached letter dated 2/24/03), which have questioned the

legality of providing scholarships or fellowships targeted for students with minority status. Our college is participating in campus discussions on how to respond to this issue.

Outreach activities to middle schools and high schools have been decentralized in the College previously, occurring primarily through the Integrated Teaching and Learning Laboratory, the Women in Engineering Program, the Multicultural Engineering Program and the Dean's Student Programs Office, with some involvement of individual departments as well. Starting this year, these outreach activities will be coordinated centrally by the Associate Dean for Education, John Bennett. They are being expanded this year by the inclusion of an outreach component for the Discovery Learning Center and the hiring of a recruitment coordinator and a retention coordinator in the Multicultural Engineering Program. The Associate Dean will also oversee the administration of the recommended surveys, the formation of alliances, and the College's proactive response to funding opportunities for enhanced outreach and recruitment of students.

The Dean, with the assistance of his Human Resource Director and Assistant Dean for Student Services, is now keeping a record of student and faculty diversity statistics over time. Improvement of faculty (and student) recruitment, retention and mentoring is a major goal of our office. Affinity and leadership development groups for new and early/mid-career faculty have been established. Six departments are undertaking searches for new faculty this year; one of these searches is now complete (with the hiring of a woman).

The College has worked with the Office of Sexual Harassment Policy to offer a series of department-based workshops in Fall 2002, with college-wide makeup sessions in Spring 2003. The Dean has requested that every faculty member attend one of these workshops. With the help of his Administrative Assistant, each faculty member not attending one of the prior workshops was scheduled for one this semester and all but four of the 160+ faculty have participated (not including seven faculty on sabbatical or away on leave). Arrangements are being made with the remaining faculty. The Dean has also articulated to the faculty and staff that our treatment of all members and affiliates of our college is to be fair, professional, respectful, and beyond reproach.