

Final Assessment of Progress Made on Our Strategic Plan for Excellence: 2003-2008

**College of Engineering & Applied Science
University of Colorado at Boulder**



**Robert H. Davis, Dean
August 2008**

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STRATEGIC PLAN FOR EXCELLENCE: 2003-2008**

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EXECUTIVE SUMMARY

In fall 2003, a five-year strategic plan was developed for the College of Engineering and Applied Science in the University of Colorado at Boulder. The plan has broad objectives of excellence in research, education and resources, with action items and measurable goals for each objective. Substantial progress has been made in all three areas (research, education and resources), though some of the goals and strategies were adjusted with time.

Highlights in research progress during the past five years include the formation of six research centers, the launch of campus initiatives in energy, biotechnology and nanotechnology, and increased university-industry collaborations. Highlights in educational programs during the past five years include establishing the Discovery Learning Program and the Earn-Learn Program, involving about one-third of our undergraduates each year in extracurricular active learning, initiating an Engineering Honors Program and a new BS degree in Chemical and Biological Engineering, and a fully successful accreditation review. Highlights in resource excellence during this period include 36 new faculty hires, with increased diversity, introduction of an engineering differential tuition and course-specific fees, expenditure of over \$6M for renovation of research and educational facilities, elections of Bernard Amadei (2008), George Born (2004) and Kaspar Willam (2004) to the National Academy of Engineering, selections of Frank Barnes (2004), Larry Carlson (2008) and Jackie Sullivan (2008) for the NAE Gordon Prize and Kristi Anseth (2004) for the NSF Waterman Award, and establishment of 13 endowed chairs or professorships.

On the other hand, progress has fallen short of goals in several areas, and the past five years have brought new challenges and opportunities for which midcourse corrections to the strategic plan were needed:

- *State funding of higher education continued to decline until FY07, when an increase occurred due to a referendum passed by voters*
- *Quality for Colorado and engineering differential tuition measures have received only one of four anticipated funding steps (a second step of differential tuition occurred in FY08)*
- *Undergraduate enrollments of women and minorities and graduate enrollments of international students in engineering have declined nationwide*
- *Rising energy prices have fueled new interest in research on alternative energy sources*
- *The start of the next University of Colorado capital campaign was delayed three years*
- *Federal grant funding has become more competitive and applications-oriented*

I. INTRODUCTION

In December 2003, the College of Engineering and Applied Science at CU-Boulder published *A Strategic Plan for Excellence 2003-2008*, to provide guidance over the five-year period of FY04-FY08, so that we make wise use of limited resources and focus on high-quality education and research programs that attract additional resources. Our broad vision is to be widely recognized for excellence and leadership in research and education, with an emphasis on active, discovery and service learning. The plan includes three broad objectives for the College (see http://engineering.colorado.edu/facultystaff/Strategic_Plan.htm):

- *Through interdisciplinary research excellence, develop new knowledge at the forefront of engineering and technology that enhances the well-being of individuals and society*
- *Through active engagement in discovery and service learning, provide educational excellence to recruit and prepare students for outstanding leadership and service*
- *Through outstanding faculty and staff, and enhanced facilities and funding, build resource excellence for supporting continued advancement in research and education*

Each of these objectives is accompanied by measurable goals and by action items to achieve these objectives and goals. An assessment of progress made on the proposed action items and quantifiable goals is provided in this report. Progress reports from prior years may be found at the web address given above.

II. RESEARCH EXCELLENCE

Our vision of excellence in research is supported by initiatives to enhance both core and emerging areas of research distinction in four categories: (1) New research centers and initiatives, (2) External funding for research, (3) Corporate partnerships and support of research, and (4) Faculty research development and productivity. For each category, the goals and results are provided below, followed by an assessment of planned actions in support of the goals.

II.1 New Research Centers and Initiatives

Goal: *Addition of at least five interdisciplinary research centers during FY04-FY08.*

Result: Six centers have been established:

1. Computer and Communications Security Research and Education Center (approved June, 2003; Alex Wolf, Director)
2. Research and Engineering Center for Unmanned Vehicles (approved October 2003; Brian Argrow, Director)
3. Industry/University Cooperative Projects Center (approved May, 2006; Jack Zable, Director)
4. Center on Nanoscale Science and Technology for Integrated Micro/Nano-Electromechanical Transducers (approved January, 2007; Y.C. Lee, Director)
5. Center on Fast Hybrid Testing (approved July, 2007; Victor Saouma, Director)

6. Colorado Center for Biorefining and Biofuels (approved June, 2008; Al Weimer, Director)

Goal: *Establishment of three major initiatives during FY04-FY08 in areas of emerging distinction aligned with campus-wide or system-wide efforts.*

Result: Four initiatives were begun during the past five years, with campus support:

Biotechnology: Under the leadership of Leslie Leinwand (MCDB), Kristi Anseth (ChBE) and Natalie Ahn (Chem & Biochem), this initiative has focused on interdisciplinary research and the hiring of five biotechnology faculty (including Melissa Mahoney in ChBE) in growth positions provided by the Provost and Deans, with five more positions approved for FY08-FY10. The program plan for a new building was approved in FY06.

Nanotechnology and Materials: Under the initial leadership of Roop Mahajan (ME), this initiative focused in FY04-FY06 on obtaining federal funding (\$0.6M in FY04, \$0.3M in FY05 and \$0.7M in FY06) and college and campus support (\$1.5M over FY05-FY07) to establish a Nanomaterials Characterization Facility in the Discovery Learning Center (DLC). In addition, a new center on micro/nano-electromechanical transducers, funded at \$1.5M/yr by DARPA, industry and CU, has been established in the DLC by Y.C. Lee.

Energy: A campus initiative in sustainable and renewable energy was announced by the Interim Provost in FY06, directed by Carl Koval (Chemistry & Biochemistry). The new Colorado Center for Biorefining and Biofuels (C2B2), led by Al Weimer (ChBE), is a key part of this initiative, as is the planned Center for Research and Education in Wind (CREW), led by Lucy Pao (ECE).

Space Systems: Under the leadership of Lee Peterson and Penny Axelrad, a campus initiative was formed starting in FY07 in aerospace systems science and engineering, focused on projects-based education and research. New faculty positions are being added, and a program plan for a building addition was approved in FY08.

Action Planned and Assessed: *Submit campus-wide proposals to the Provost and Chancellor for support of initiatives in emerging areas.* Action was taken during FY04-FY08 to establish four initiatives, as noted above. Campus funding has been provided for faculty hires and other requests. Efforts are also underway in computational science and engineering.

Action Planned and Assessed: *Provide seed funding of \$10K each for new interdisciplinary research centers.* This action was taken by the College to help form the six new centers noted above.

II.2 External Funding for Research

Goal: *Increased contract and grant awards by 10% per year, to \$60M by FY08.*

Result: This goal for increased contract and grant awards was exceeded in FY04, with a record of \$42.8M in new funding, but new contracts and grants awarded declined substantially in FY05 and FY06, before increasing again in FY07 and FY08:

FY03: \$37.5M (baseline) contract and grant awards
FY04: \$42.8M (+14%) contract and grant awards
FY05: \$39.1M (-9%) contract and grant awards
FY06: \$34.8M (-11%) contract and grant awards
FY07: \$40.3M (+16%) contract and grants awards
FY08: \$42.7M (+6%) contract and grants awards

These funds include only contracts and grants rostered in the College, and not those rostered in other units but involving college faculty, and it does not include private gifts or awards. Overall, contract and grant funding over the past five years has increased only 14%, well short of the goal.

Action Planned and Assessed: Increase total number and value of research grant proposals by 10% per year, from the FY03 baseline of 554 proposals for \$273M. The number and total value of proposals increased in FY04, but by less than the goal, and then decreased in FY05 and FY06, before increasing again in FY07 and FY08:

FY03: 554 (baseline) proposals totaling \$273M (baseline)
FY04: 577 (+4%) proposals totaling \$274M (+ 0.4%)
FY05: 553 (-4%) proposals totaling \$255M (-7%)
FY06: 478 (-14%) proposals totaling \$137M (-46%)
FY07: 507 (+6%) proposals totaling \$223M (+63%)
FY08: 526 (+4%) proposals totaling \$272M (+22%)

Action Planned and Assessed: Increase multi-investigator grant proposals of \$1M or more by 10% per year, from the FY03 baseline of 57 proposals. The number and total value of grant proposals of \$1M or more decreased substantially, until increasing in FY07 and FY08:

FY03: 57 (baseline) proposals totaling \$160M (baseline)
FY04: 53 (-7%) proposals totaling \$146M (-9%)
FY05: 45 (-15%) proposals totaling \$132M (-10%)
FY06: 24 (-47%) proposals totaling \$42M (-68%)
FY07: 34 (+42%) proposals totaling \$117M (+178%)
FY08: 44 (+29%) proposals totaling \$151M (+29%)

Action Planned and Assessed: Fund a new college program at up to \$35K per year for faculty travel to funding agencies. This program was established in FY04 to support faculty travel to funding agencies. It has grown but is still undersubscribed:

FY04: 8 awards totaling \$3400
FY05: 13 awards totaling \$6900
FY06: 19 awards totaling \$12,900
FY07: 16 awards totaling \$12,300

FY08: 24 awards totaling \$12,600

II.3 Corporate Partnerships and Support of Research

Goal: Increased contracts and grants from industry by 10% per year, to \$6M in FY08.

Result: This goal has been surpassed:

FY03: \$4.2M (baseline) contracts and grants from industry

FY04: \$4.7M (+12%) contracts and grants from industry

FY05: \$6.4M (+36%) contracts and grants from industry

FY06: \$7.0M (+9%) contracts and grants from industry

FY07: \$9.5M (+36%) contracts and grants from industry

FY08: \$8.5M (-11%) contracts and grants from industry

Action Planned and Assessed: Host at least 15 corporate visits per year to enhance partnerships and interdisciplinary research. The number of corporate visits to campus, each involving the Dean's office and/or Engineering Development, was 20 in FY04 and increased to 110 by FY07, substantially exceeding the target.

II.4 Faculty Research Development and Productivity

Goal: Increased faculty involvement in research, as measured by increases of 10% per year in the numbers of regular faculty with over \$50K, and over \$150K, in annual research expenditures.

Result: The results for faculty involvement in funded research have improved over the past five years, though by less than the goal, with 61% of the tenured and tenure-track faculty (not including those rostered in institutes) having over \$50K in research expenditures and 42% having over \$150K in research expenditures, as Principal Investigator in 2007:

2002: 86 of 168 over \$50K (baseline), and 49 over \$150K (baseline)

2003: 82 of 160 over \$50K (-5%), and 53 over \$150K (+8%)

2004: 97 of 164 over \$50K (+18%), and 62 over \$150K (+17%)

2005: 91 of 165 over \$50K (-6%), and 54 over \$150K (-13%)

2006: 93 of 163 over \$50K (+2%), and 59 over \$150K (+9%)

2007: 96 of 158 over \$50K (+3%), and 67 over \$150K (+9%)

Goal: Average number of peer-reviewed publications increased by 5% per year, from 2.4 journal papers and 2.0 proceedings papers per faculty member in 2002 to 3.0 and 2.5, respectively, in 2007.

Result: Good progress toward the publication goal was made (publications are counted on a calendar-year basis, as part of the annual faculty review):

2002 averages: 2.39 journals (baseline) and 1.99 proceedings (baseline)

2003 averages: 2.32 journals (-3%) and 1.93 proceedings (-3%)

2004 averages: 2.70 journals (+16%) and 2.28 proceedings (+18%)
2005 averages: 2.66 journals (-1%) and 2.65 proceedings (+16%)
2006 averages: 2.67 journals (+0%) and 2.47 proceedings (-7%)
2007 averages: 3.01 journals (+13%) and 2.35 proceedings (-5%)

Goal: Annual PhD degrees increased by 10% per year, to 100 by FY08.

Result: The number of PhD degrees awarded has fluctuated, falling well short of the goal:

FY03: 71 (baseline) PhD degrees
FY04: 74 (+4%) PhD degrees
FY05: 69 (-7%) PhD degrees
FY06: 76 (+10%) PhD degrees
FY07: 92 (+21%) PhD degrees
FY08: 74 (-20%) PhD degrees

Action Planned and Assessed: *Develop a culture of excellence, with expectations and incentives for increased faculty research productivity.* In FY04, written expectations and guidelines on meritorious and excellent performance were provided to the faculty, along with updated procedures for annual and promotion reviews. A Faculty Excellence Program was established in FY05, and it includes \$75,000 budgeted annually for Dean's Faculty Fellowships, Dean's Performance Awards, and Dean's Seed Fund for Novel Ideas.

Action Planned and Assessed: *Recruit faculty leaders in strategic research areas.* While most searches in the past five years focused on junior candidates, more experienced candidates were considered where needed, leading to five senior and six mid-career hires:

David DiLaura, Professor, Civil, Environmental & Architectural Engineering, Lighting (previously Senior Instructor at U. Colorado)
Al Gasiewski, Professor, Electrical & Computer Engineering, Environmental Technologies & Sensors (previously at NOAA)
Gregor Henze, Professor, Civil, Environmental & Architectural Engineering, Structural Engineering (previously at U. Nebraska)
Se-Hee Lee, Associate Professor, Mechanical Engineering, Materials (previously at NREL)
Karl Linden, Professor, Civil, Environmental and Architectural Engineering, Water Quality (previously at Duke)
Todd Murray, Associate Professor, Mechanical Engineering, Materials (previously at Boston U.)
Charles Musgrave, Associate Professor, Chemical & Biological Engineering, Materials (previously at Stanford)
Hanspeter Schaub, Associate Professor, Aerospace Engineering Sciences, Spacecraft Control (previously at Virginia Tech)
Daniel Scheeres, Professor, Aerospace Engineering Sciences, Space Systems (previously at U. Michigan)
Diane Sieber, Associate Professor, Herbst Program of Humanities, Spanish Literature (transfer from Spanish & Portuguese at U. Colorado)

Jeff Thayer, Associate Professor, Aerospace Engineering Sciences, Remote Sensing
(previously at SRI International)

II. 5 Discussion of Research Progress and Outlook

Good progress had been made in the past five years on launching several new research centers and campus-wide initiatives. However, these entities are in their early stages and will need nurturing and growth. Additional centers and initiatives are in their planning stages and need brought to the implementation stage.

New research grants and have increased by a net of 14% over five years, falling well short of the goal of 10% annual growth. With increasing competition for external funding, and a shifting of some federal agencies from fundamentals to applications, meeting the stated goals proved difficult. Faculty will need to diversify their efforts and seek more partnerships with industry, government labs, and other academic institutions. Large increases in corporate visits to the College and in the amount of contracts and grants from industry are positive steps in this regard. Another measure of progress is an increase in the number of peer-reviewed publications per faculty member.

New guidelines were established on faculty recruitment and evaluations, to enhance quality, and a Faculty Excellence Program was developed. A major recent focus of the Research and Corporate/Government Relations Subcommittee of the Engineering Advisory Council and of the Faculty Research Council has been to promote industry-university collaboration in support of major proposals. This activity is paying off, with three new centers with industry and federal sponsorship established in the past two years. Also, college leadership worked with campus leadership on a revised graduate tuition policy to help with graduate recruitment, and the Administrative Council of the College has added financial incentives to encourage increased recruitment of PhD students.

III. EDUCATIONAL EXCELLENCE

Our vision of excellence in education is supported by initiatives to enhance student learning in four categories: (1) Enhanced courses and curricula, (2) Extracurricular educational enrichment, (3) Student recruitment and outreach, and (4) Improved communications, advising and assessment. For each category, the goals and results are provided below, followed by an assessment of planned actions in support of the goals.

III.1 Courses and Curricula

Goal: *Enriched curricula so that all undergraduate students take at least two courses in which oral and written communication constitutes a significant learning objective, two courses where team-based learning is emphasized, and a meaningful capstone design experience, in addition to humanities and core subjects in math, science, and engineering.*

Result: All 12 undergraduate degree programs, excluding Engineering Physics, have reported that they have at least two required courses where communication is emphasized, at least two required courses where team-based learning is emphasized, and at least one required course with a capstone design experience. In addition, courses across the College are making increased use of the OWL (Online Writing Laboratory), directed by the Herbst Program.

OWL provides a mechanism for engineering students to obtain prompt written feedback on the quality of writing in papers written for engineering courses. See <http://engineering.colorado.edu/HOMER/owl.htm>.

Goal: Increased number of instructor ratings (by students via the Faculty Course Questionnaire) above 3.0/4.0 and decreased number of instructor ratings below 2.0/4.0, to more than 75% above 3.0 and less than 3.5% below 2.0 by FY08.

Result: The fraction of instructor ratings above 3.0 has increased since FY03, and that below 2.0 has decreased, as desired (see table below). Starting in FY07, the scale was changed (to a 1-6 scale from a 0-4 scale) and the corresponding metrics were changed to the % of ratings above 4.0 and below 3.0, and the goal was met in FY08. It is interesting to note that the average class size in FY05 of courses in which instructors were rated below 2.0 is 77 students, whereas the average size of all classes is only 31 students; the corresponding numbers for FY06 are 46 and 31, respectively.

Year	FY03	FY04	FY05	FY06	FY07	FY08
# rated	578	667	632	699	763	800
>3.0	397 (69%)	469 (70%)	444 (70%)	485 (69%)	--	--
<2.0	27 (4.7%)	23 (3.4%)	26 (4.1%)	27 (3.9%)	--	--
>4.0	--	--	--	--	591 (77%)	617 (77%)
<3.0	--	--	--	--	28 (3.7%)	18 (2.2%)

Note: FY includes summer, fall and spring courses

Action Planned and Assessed: Enhance student learning by design of curricula enriched in the humanities, writing, ethics, hands-on learning, team-based projects, and capstone design. GEEN 1400 “Engineering Projects,” in which team-based, open-ended design projects are the norm, continues to be taken by approximately two thirds of our freshman class. This course has had a demonstrable positive impact on retention, particularly for women and students of color (see <http://itll.colorado.edu/GEEN1400/index.cfm?fuseaction=RetentionStudy>). In addition, all departments in the College continue to offer discipline-specific, project-oriented courses. The laboratory course fees that were approved in FY05 and became effective Fall 2005 have provided significant funding to departments and the Integrated Teaching and Learning Program for maintaining and improving educational infrastructure. In FY06, the Undergraduate Education Council undertook a critical review of the options available to engineering undergraduates to meet their humanities and social science elective requirements. The result of this review was a substantial revision of the Humanities and Social Science requirements, which became effective for students entering in Fall 2006. Instead of an ad hoc list of courses, courses approved for humanities and social science credit are now drawn from the Arts and Sciences Core Curriculum. In addition, students are strongly encouraged to develop a coherent plan of study for meeting the H&SS requirements. Additional details can be found at http://engineering.colorado.edu/Advising_Guides/HSS.pdf.

Action Planned and Assessed: Establish a faculty subcommittee to consider the appropriate role of biology in the undergraduate curriculum, and make recommendations to the College faculty for implementation. While a College Committee on Bioengineering has been established, it was decided to not make a college-wide recommendation on the role of biology

in the undergraduate curriculum at this time, but instead to leave this issue to the individual departments. The Department of Chemical and Biological Engineering in FY04 established a course in Biology for Engineers, which is required for its majors and elective for other majors, and a new elective course in Foundations of Bioengineering, starting in FY05. During FY06, a new major, B.S. in Chemical and Biological Engineering, was proposed and approved.

Action Planned and Assessed: *Establish a New Faculty Program and Faculty Excellence Program to assist faculty in teaching and research.* The New Faculty Program was established in FY04, and the Faculty Excellence Program was established in FY05.

III.2 Extracurricular Educational Enrichment

Goal: *Expanded opportunities for extracurricular enrichment experiences, with the fraction of undergraduate students participating in discovery, professional or service learning each year reaching one-third by FY08.*

Result: FY04 was the first year that metrics for extracurricular enrichment were determined, with 23% of undergraduates participating. Participation increased to 37% in FY05 and then declined to 31% in FY06 (most of the contraction is in service learning and can primarily be traced to a tightening of the reporting method) before increasing again to exceed the goal in FY07 and FY08. The College also introduced the Active Learning Award during FY05. This award is given at graduation to those students who can demonstrate their participation in all three forms of extracurricular active learning (discovery, professional and service) during their undergraduate years. The first award was made to one student graduating in December 2004. At the May 2005 commencement, 21 students received the award, 25 in FY06, 33 in FY07, and 38 in FY08.

Year	FY04	FY05	FY06	FY07	FY08
Discovery Learning	492	636	617	737	590
Professional Learning	137	357	325	359	447
Service Learning	265	488	337	350	420
Total Participating	618	1014	855	962	984
Total Undergraduates	2667	2736	2739	2755	2914
% Participation	23%	37%	31%	35%	34%

The total participating is less than the sum of discovery, professional and service learning, because students participating in two or more activities are counted only once in the total.

Action Planned and Assessed: *Establish a college-wide Discovery Learning Initiative to expand undergraduate research.* The Discovery Learning Program operated during the 2005-2006 academic year with 22 apprentices, and was expanded starting with the 2006-2007 academic year to support 35 apprentices. The program is now a year-long opportunity. The change from a semester-long program has been well-received by both apprentices and professors, who appreciate the opportunity to perform more in-depth research than can be accomplished in a single semester. Overall, 77% of the students and 89% of the faculty rated the experience as very good or excellent in FY08. The Dean’s Fund for Excellence continues to support the program by paying 50% of the student’s funding (up to a total of \$750/semester); the other 50% is covered by the hiring faculty member. To date, six

Discovery Learning Symposia on undergraduate research have been held (April 2004, December 2004, April 2005, April 2006, April 2007, and April 2008).

Semester	# of Projects Offered	# of Students Applied	# of Students Accepted
Spring 2004	26	46	12
Fall 2004	21	28	12
Spring 2005	38	28	22
AY 2005-06	37	48	23
AY 2006-07	56	65	35
AY 2007-08	54	56	36

Action Planned and Assessed: Establish a college-wide Service Learning Initiative to expand undergraduate involvement in K-12 outreach, Engineering for Developing Communities, course assistance, etc. Since piloting the Earn-Learn Program in Spring 2004 with 15 students, this program to support student employment in service to the College was expanded to support nearly twice as many students during Fall 2004 (27), more than doubled in Spring 2005 (60), and has expanded further (76 in Fall 2006, 68 in Spring 2007 79 in Fall 2007, 76 in Spring 2008), helping to catalyze service learning in the College. Students in the Earn-Learn Program receive half of their support from the hiring department or program, with the remainder coming from contributions from donor or Dean’s funds. Overall, 87% of the students and 92% of the faculty rated the experience as very good or excellent in FY08. Since hired as Program Coordinator in February 2005, Robyn Sandekian has further supported service learning through Engineering for Developing Communities (EDC) and curriculum development, including a new undergraduate track for civil engineering majors in Engineering for Developing Communities, and distributing fliers and other information on service-learning opportunities to faculty.

Action Planned and Assessed: Establish a college-wide Professional Learning Initiative to expand professional opportunities (internships, co-op, etc.) and career advising for students and to better prepare them for engineering practice. The College’s Co-op Committee has made significant progress in developing common procedures and standardized forms for students wishing to participate in co-op. Outputs from this group include:

- A co-op strategic plan proposing actions for moving co-op opportunities forward in the college.
- A 22-page student handbook which fully explains the program to interested students.
- A 2-hour training program; three “classes” of co-op students have received this training starting spring 2007.
- A co-op logo to be used on all co-op materials (courtesy of Courtney Staufer).
- A student brochure to advertise co-op opportunities to undergraduates.
- An employer brochure to encourage participation by employers.
- Revised co-op web pages on the College’s active learning website.

Action Planned and Assessed: Establish and fill a new position: Director of Academic Programs and Assessment. A Director of Academic Programs and Assessment, Terry Mayes, was hired in February 2004 to coordinate discovery, service and professional learning.

Action Planned and Assessed: Establish a college-wide Engineering Honors Program. In FY05, an ad-hoc committee consisting of faculty and students met over a period of several months and developed a detailed outline for the Engineering Honors Program. In late Spring 2005, this outline was presented to the Undergraduate Education Council, the Administrative Council, and the Engineering Advisory Council. A full draft of the proposal, taking into account the feedback received, was approved in FY06, and the Engineering Honors Program started in Fall 2006. Professor Scot Douglass has been selected as its Faculty Director. The Honors Program admitted 24 students in Fall 2006 and 45 students in Fall 2007.

III.3 Student Recruitment and Outreach

Goal: Number of undergraduate applicants increased by 5% per year, without increased enrollments, and with improved quality of the entering class.

Result: The Fall 2003 baseline data for undergraduate enrollments are shown below, as well as the more recent data. The number of applicants has increased 22% over four years, as desired, but most of the increase occurred in the past year. The number offered admission increased only 9%, as the fraction admitted was lowered to 64% from 72%. However the number of first-year students enrolling increased 20%, over this same period, as the fraction of students accepting admissions offers increased from 32% to 36%. Quality measures of the entering class have been nearly steady, except for an upward trend in HS GPA. Not shown in these data are large changes in the distribution of students among majors, which has led to some departments (AES, ChBE and ME, in particular) having large classes and overcapacity laboratories. An enrollment management plan has been implemented to help limit the swings in distribution by major.

Year (Fall)	2003	2004	2005	2006	2007
Tot. BS students	2667	2736	2739	2755	2914
# applied	2630	2599	2474	2679	3206
# offered adm. ²	1890	1956	1781	1805	2052
# new enrolled	610	633	669	654	731
Avg. HS gpa ¹	3.69	3.72	3.71	3.75	3.79
Avg. class rank	84%	85%	82%	84%	85%
ACT Math	29	29	29	29	29
ACT English	28	28	27	27	27
SAT Math	670	660	650	660	660
SAT Verbal	610	600	590	590	600

¹Weighted grade-point-average with a maximum of 4.0

²Does not include those who were admitted to Arts & Sciences as an alternative choice

Goal: Increased PhD enrollments by 5% per year, to 600 by Fall 2007, with MS enrollments holding steady, and improved quality measures of incoming graduate students to 3.6 average

undergraduate GPA and 765 average quantitative GRE, while increasing applicant pool so that 30% or less are offered admission.

Result: The recent data for graduate enrollments are given below. PhD enrollments have been nearly flat, whereas regular MS enrollments have declined while professional-studies students (engineering management, telecommunications, and distance learning) initially decreased and then recovered. The applicant pool also decreased initially but is now increasing. The number of new graduate students declined in Fall 2004 and Fall 2005 but has now recovered, likely due at least in part to a new tuition policy where in-state tuition is changed for all graduate students on appointments.

Year (Fall)	2003	2004	2005	2006	2007
Tot. PhD students	485	500	491	488	493
Tot. MS students ¹	461	461	399	388	382
# applied ¹	2087	1666	1358	1477	1681
# offered adm. ¹	1149	931	840	902	969
# new enrolled ¹	269	240	221	242	247
Avg. ugrad. gpa ¹	3.45	3.54	3.43	3.51	3.54
Avg. quant. GRE ¹	753	757	744	756	758
# Prof. Study MS	N/A	197	165	215	331

¹Data do not include professional studies students, primarily in Eng. Man. & Telecom, or BS/MS students still enrolled as undergraduates

Goal: *Increased diversity of student population by 10% per year, to 7.5% and 10% underrepresented minorities (black, Hispanic, Native American) and 30% and 25% women at the graduate and undergraduate levels, respectively, by Fall 2007.*

Result: The Fall 2003 baseline data for diversity metrics are shown below, along with corresponding data for diversity of regular faculty (tenured/tenure-track faculty in the College, including those budgeted elsewhere). Also provided are more recent data, which generally show increases in diversity of both faculty and students. National trends show a slight decline in the diversity of engineering undergraduates.

Year (Fall)	2003	2004	2005	2006	2007
% women ugrads	17.5%	17.2%	16.9%	17.7%	18.6%
% female new fr	14.1%	17.3%	18.0%	18.2%	22.1%
% female grads ¹	23.6%	21.8%	23.1%	24.1%	24.5%
% minority ugrads	7.3%	7.1%	7.4%	7.4%	7.6%
% minority new fr	5.7%	7.2%	9.0%	7.5%	9.0%
% minority grads ¹	5.0%	5.6%	4.4%	5.4%	4.3%
% foreign ugrads	3%	2%	2%	3%	2%
% foreign grads ¹	35%	30%	28%	31%	29%
% female faculty	11.2%	11.6%	14.3%	15.8%	15.9%
% minority faculty	5.3%	4.6%	5.1%	5.1%	5.1%

Minority refers to black, Hispanic, and Native American

¹Data do not include professional studies students, primarily in Eng. Man. & Telecom, or BS/MS students still enrolled as undergraduates

Action Planned and Assessed: *Improve student recruiting efforts to enhance the quality and diversity of entering students, through a proactive role of college personnel.* A survey of students offered admission was performed in each of the past five years. Adequacy of financial aid was cited as the area needing the most improvement by students who did not come to CU-Boulder. Efforts to increase financial aid for both undergraduate and graduate students are part of the resource portion of the Strategic Plan. An admissions database of prospective students is now in use by all departments and programs to track and manage undergraduate recruiting efforts. The admissions database is currently updated weekly using data from the Office of Admissions. We have taken a more strategic approach to our merit-based scholarship awards, increasing both the award amounts and the award durations, and offering them earlier. Most awards are now for four years, depending upon continued academic achievement. Representatives of the College (Lelei Finau-Starkey, Anthea Johnson Roen, Bev Louie) traveled to select high schools around the state as part of campus recruitment efforts. “Explore CU Engineering Day” was held for admitted students and their parents for each of the past three years. This event has been a major success and continued to provide a high return on investment for the College. Of the 216 prospective students who participated in 2007 (approximately 300 family members and friends also attended), 72% overall confirmed their intent to enroll in the College, 69% of the women who attended confirmed their intent to enroll, and 100% of the non-Asian minority students who attended confirmed their intent to enroll. Additional undergraduate recruiting efforts, particularly those undertaken by our Integrated Teaching and Learning Program, Multicultural Engineering Program, and Women in Engineering Program, were integrated with K-12 outreach programs and are described below.

Action Planned and Assessed: *Establish an Engineering Outreach Program to K-12 students and teachers.* The key K-12 outreach programs of the College are listed below for a typical year (FY07). In addition, Jackie Sullivan, Co-Director of the ITL Program and recently appointed as Associate Dean for Student Cultivation, was instrumental in the recent creation of a pre-collegiate division of the American Society for Engineering Education. Since the student diversity measures have not increased substantially, and have declined in some cases, a review of our outreach programs has been initiated, with the goal of tracking individual students over time and determining the fractions of participants in different programs who later apply to and enroll in the College. Included in this effort is the development of an outreach database as described in the above section. For example, 227 (24% female, 6% underrepresented minority) high school students with June 2007 graduation dates attended our High School Honors Institute in Summer 2005 or Summer 2006. Of these students, 111 applied to our college and 59 (24% female, 5% underrepresented minority) confirmed their intent to enroll in the College for Fall 2007.

- **Admitted Students Day** (Spring 2007), 216 students
- **Boettcher Finalist Day** (Spring 2007), 6 students
- **Butterfly Hope Educational-Enrichment Program** (Summer 2007, 4 days over 4 weeks), 37 3rd through 6th grade students
- **Colorado Space Grant Consortium** (Summer 2007, 1 day each), 51 students ages 6-14
- **Dragon Discovery Engineering Program at Sanchez Elementary School** (Summer 2007, 3 weeks), 18 3rd – 5th grade students

- **Engineering Ambassador Tours - part of the CU Student for a Day Program** (AY 2006-2007), *approximately 400 HS students*
- **Discover Engineering Day at CU** (Spring 2007), *139 HS students*
- **Engineering Open House** (Fall 2006, 1 day), *299 HS students*
- **Girl Scout Badge Days** (AY 2006-2007, 1 day each), *over 500 female K-12 students*
- **High School Honors Institute** (Summer 2007, 4 days), *262 HS students*
- **IBM Exploring Interests in Technology and Engineering (EXITE) Camp** (Summer 2007, 1 week), *26 female middle school students*
- **Lafayette ES Robotics Engineering Camp in Lafayette** (Summer 2007, 1 week), *25 K-5th grade students*
- **MESA Fall Fling for HS students** (Fall 2006, 2 days), *approximately 200 HS students*
- **MESA Mark** (Fall 2007, 1 day), *75 teachers*
- **Pre-Collegiate Engineering Summer Programs in the ITLL** (Summer 2007, 5 weeks), *24 12th grade students*
- **Ryan ES Engineering Camp in Lafayette** (Summer 2007, 1 week), *25 2nd-5th grade students*
- **Senior Day** (Fall 2006) *60 12th grade students*
- **SHPE/IBM Camp** (Summer 2007, 1 week), *27 10th grade students*
- **St. Vrain and Denver Public Schools/MESA Mentor Outreach** (AY 2006-2007), *approximately 20 CEAS mentors*
- **Student Hands-On Training (SHOT)** (Summer 2007, 3 days), *45 college students*
- **Success Institute** (Summer 2007, three separate one-week sessions for rising 9th-12th grade students), *87 HS students*
- **Summer Bridge** (Summer 2007, 5 weeks), *24 underrepresented HS students*
- **Teach Engineering Digital Library**, coordinated by ITLL to develop standards-based K-12 engineering curricula accessible on the web (ongoing)
- **Teacher Workshop in K-12 Engineering Curricula** (2 workshops, 2 days each, Summer 2007), *12 teachers*
- **Tomorrow's Engineers... creAte. iMagine. Succeed. (TEAMS)**, (AY 2006-2007), *approximately 1800 K-12 students at Lafayette, Ryan and Sanchez Elementary Schools, Angevine Middle School and Centaurus HS and DSST in Denver*
 - **Lafayette Pre-Engineering Academy**, part of TEAMS (AY 2006-2007), *184 9th-12th grade students*
- **Upward Bound NanoSatellite Course** (Summer 2007, 6 weeks), *30 students entering 10th grade*

Totals: approximately 4,085 students, 87 teachers

To help support these programs, external grants and private gifts have been received from Agilent Technologies (HSHI), Ball Aerospace (HSHI), U.S. Bureau of Reclamation (HSHI), Colorado MESA (MEP/WIEP outreach coordinator), CU Continuing Education (MESA Curriculum Modules), CU Outreach Committee (Success Institute), Daniels Fund (Teach Engineering Digital Library), Gates Family Foundation (Teacher Workshops, TEAMS), IBM (HSHI, SHPE/IBM Engineering Camp), J.D. Abrams (Upward Bound NanoSatellite Course), Lexmark International (HSHI), Lockheed Martin (HSHI), NASA (Colorado Space Grant Consortium), and NASA grant to S. Palo (partnership on major award to develop MESA

Curriculum Modules), NSF (GK-12 Track II grant, Teach Engineering Digital Library), Raytheon Systems (HSHI), U.S. Air Force (CSGC SHOT Workshop), U.S. Department of Energy (Success Institute), Seagate Technologies (MESA Fall Fling), Shell Oil Company – US (HSHI, Success Institute), and Sun Microsystems (HSHI) among others.

Action Planned and Assessed: *Establish and fill a new position: Director of Outreach and Education.* A Director of Outreach and Education, Kristin Germain, was hired in October 2003 to coordinate college outreach and recruiting efforts. She subsequently left Colorado and was replaced by Lelei Finau-Starkey in September 2005.

Action Planned and Assessed: *Increase graduate training support by submitting at least ten graduate training proposals per year.* Eight proposals per year, on average, were submitted for graduate training programs, defined as programs that provide financial support (including stipend and tuition) and education and research training of a group of graduate students in a common area. A particular success is that four of seven proposals in FY06 to the U.S. Department of Education's Graduate Assistantships in Areas of National Need program were successful, which is significantly better than the average success rate of less than 10% for this program.

III.4 Communications, Advising and Assessment

Goal: *Full accreditation of undergraduate engineering programs, with effective assessment strategies and continued improvement, including preparation for professional licenses where appropriate.*

Result: Several standardized measurement tools have been developed and implemented at the college level to assist in our assessment efforts, including senior and alumni surveys. In addition, the College has implemented a standardized method for reporting the results of the Fundamentals of Engineering exam. Our Environmental Engineering major was accredited in FY04, so that 8 of 12 undergraduate majors are now accredited by the Accreditation Board for Engineering Technology (ABET). The exceptions are Applied Mathematics, which is not eligible for accreditation through ABET, Chemical and Biological Engineering, which must have graduates before it can be reviewed for accreditation, and Computer Science and Engineering Physics, which have not yet sought accreditation. Both Computer Science and Chemical and Biological Engineering plan to seek accreditation in 2009. In the prior ABET general review (1998-99), one program received accreditation until the next general review (best), two were required to submit interim reports, three were required to have interim visits, and one required a show-cause visit (worst). All of the ABET-accredited degree programs in the College underwent a general review during the 2005-06 academic year. Each degree program prepared and submitted a comprehensive self-study report in support of this review. A college-wide document providing an overview of the College was also submitted. The Director of Academic Programs and Assessment, Terry Mayes, was hired in Spring 2004 and oversaw preparations for the ABET accreditation visit. The visit was very successful, and all eight programs received full accreditation until the next general review.

Goal: *Improved ranking of our undergraduate program to the top 30 in 2005 and the top 25 in 2007.*

Result: Using the *U.S. News & World Report* undergraduate program rankings, the initial goal was achieved in FY04, but the rankings subsequently slipped before showing slight improvement:

8/02 Undergraduate Program Ranking: 31 (17 among publics)
8/03 Undergraduate Program Ranking: 29 (17 among publics)
8/04 Undergraduate Program Ranking: 33 (18 among publics)
8/05 Undergraduate Program Ranking: 36 (21 among publics)
8/06 Undergraduate Program Ranking: 34 (19 among publics)
8/07 Undergraduate Program Ranking: 33 (19 among publics)

Goal: *Improved ranking of our graduate program to the top 30 in 2007 and the top 25 in 2009.*

Result: Good progress was made toward the initial goal for our graduate program, using the *U.S. News & World Report* rankings, but the most recent rankings slipped:

4/03 Graduate Program Ranking: 37 (21 among publics)
4/04 Graduate Program Ranking: 33 (19 among publics)
4/05 Graduate Program Ranking: 33 (19 among publics)
4/06 Graduate Program Ranking: 39 (22 among publics)
4/07 Graduate Program Ranking: 40 (23 among publics)
4/08 Graduate Program Ranking: 39 (23 among publics)

Goal: *Improved quality of undergraduate advising, as measured by surveys of graduating seniors, with a goal of 100% rating their advising experiences as satisfactory or better within three years.*

Result: In addition to continuing our measurement of several key dimensions of our graduating seniors' advising experience (including advisor availability, accuracy, awareness of opportunities, advisor interest in the student, and quality of career advice), we are now asking our graduating seniors to rate their overall advising experience. All of these dimensions are measured for both staff and faculty advisors. The following chart demonstrates that the evaluations have improved over the past four years in essentially all categories. Staff advisors continue to score higher than faculty advisors. Career advising by both faculty and staff advisors offers the most opportunity for improvement.

Dimension of Advising	Satisfactory or Better				Mean Score			
	AY05	AY06	AY07	AY08	AY05	AY06	AY07	AY08
Availability of staff advisor	91%	96%	96%	95%	4.03	4.25	4.38	4.29
Accuracy of staff advisor	90%	93%	96%	95%	4.03	4.21	4.50	4.40
Staff advisor's awareness of opps.	77%	85%	93%	93%	3.52	3.78	4.35	4.27
Staff advisor's interest in the students	86%	92%	96%	94%	3.96	4.27	4.59	4.52
Career adv. provided by staff advisor	62%	73%	85%	85%	3.04	3.40	3.82	3.76
Overall satisfaction with staff advisor	N/A	94%	95%	94%	N/A	4.16	4.45	4.35
Availability of faculty advisor	86%	87%	89%	92%	3.73	3.85	3.95	3.88
Accuracy of faculty advisor	85%	84%	88%	89%	3.65	3.84	3.91	3.89
Faculty advisor's awareness of opps.	74%	80%	80%	82%	3.34	3.55	3.58	3.58
Faculty advisor's interest in the students	79%	82%	85%	89%	3.55	3.76	3.92	3.92
Career advising provided by fac. advisor	64%	74%	77%	80%	3.04	3.33	3.58	3.54
Overall satisfaction with faculty advisor	N/A	81%	86%	88%	N/A	3.69	3.83	3.78

Action Planned and Assessed: *Establish a college-wide Engineering Advising Program.* The undergraduate advisors continue to meet monthly as they focus on methods to improve college advising. Several initiatives resulted from this team's work, including:

- In response to a request from Engineering, the Registrar's Office developed two customized online and on-demand reports for our use through the Registrar Query System (RQS). These reports provide advisors with useful information re: the students they are advising, and allow advisors to respond quickly to data requests.
- Communications were strengthened between the Dean's Office and the advisors by providing advisors with information regarding which students receive "Letters of Concern" as a result of low test scores in calculus, physics and chemistry classes, and providing results of the online math assessment for freshmen.
- A new Dean's Office mailbox was created to facilitate important communications from the Deans to our students.
- Advising flags were placed on all freshman students to ensure that they receive faculty advising, including those students in programs that have not provided faculty advising in the past. A second advising flag was placed partway through each program.
- A set of Advising Best Practices is under development, which assists in training new advisors and has facilitated discussions on a variety of topics. Best-practices documents have been completed for Active Learning, Change of Major, Final Grade Lists, Graduation Process, New Student Welcome, Probation and Suspension, Road to Graduation, and Student Files, and Transfer Credit Evaluation.
- The advisors are currently previewing the Advisor Tools System (graciously made available by A&S). This system has many useful features, including academic term reports, an online appointment scheduler, and note-taking feature. We will decide whether to use this system in engineering in the next few months.

- On-line degree audits are now used by all departments except Civil, Environmental and Architectural Engineering, which is expected to add this feature when we convert to a new system.

The College's first college-wide Advising Fair was held on March 6, 2007. Feedback from surveys of students and respondents was generally positive, with some suggestions for improvement, but the department chairs recommended to allow each program to plan for its own advising events instead of college-wide fairs in the future. It was felt that this approach would provide more flexibility for the departments and students.

Action Planned and Assessed: *Develop effective marketing tools for the College to its constituents.* In addition to ongoing publications (such as *CUEngineering*, *Alumni Focus*, and *Corporate Partner*), several new or revised marketing tools were introduced in FY06- FY08:

- *Undergraduate Program Brochure* printed and put into use in Fall 2005
- Graduate reputational fliers (7 fliers updated in Fall 2005, including one for each department and the College as a whole, sent to deans and department chairs in advance of the annual ratings survey)
- *CU Engineering Signature* (new brochure highlighting what is unique about the College developed in summer 2006 for donors and upcoming reputational mailing to deans)
- Glossy brochure developed for *Industry/University Cooperative Projects Center* in mechanical engineering
- Web site (36 profiles of alumni, students, and faculty now on the web site; new web site developed for Nano Sciences and Engineering initiative; online networking tool developed for alumni, new web pages added or active learning, co-op program, and projects courses)
- Advertorial in *U.S. News & World Report* "Best Colleges" (published full-page ad in Aug.'07 magazine with 700 reprints available for use with prospective students)
- Co-op brochures (developed complementary brochures marketing co-op program to students and employers)
- Marketing/fundraising fliers (rewrote/redesigned 18 fliers and developed 6 new fliers for a total of 24 now available on departments, programs and strategic fundraising areas)
- *Systems Biotechnology Building* (developed case statement for biotech initiative)
- Reputational brochure announcing the ITL Program's Gordon Prize in Spring 2008
- Brochure and website to market the new *Engineering Entrepreneurship Certificate Program* in Spring 2008
- 13 new fliers highlighting each of the undergraduate majors in the College and the open option program for prospective students in Fall 2007
- New alumni e-newsletter to be distributed three times a year in place of annual *Alumni Focus* newsletter launched in Spring 2008
- A video for student recruitment made in Summer 2008
- Case statement for *Aerospace and Energy Systems Building* developed in Summer 2008

III.5 Discussion of Educational Progress and Outlook

The full accreditation of all eight undergraduate degree programs reviewed during FY06 was a major accomplishment, for which we are grateful to the many dedicated staff and faculty who worked very hard to prepare for the review. The Engineering Honors Program and a new BS degree in Chemical and Biological Engineering began in Fall 2006, and they are helping attract and retain diverse students of high quality. Moreover, the support programs in the College (ITLL, Herbst, MEP, WIEP, CSGC) underwent extensive review during FY06, and the resulting recommendations are expected to further strengthen our undergraduate programs. Active and team-based learning has been included throughout the curricula, starting with engineering projects in the freshman year and continuing through capstone design in the senior year, with significant facilitation by the Integrated Teaching and Learning Laboratory. Piloting of the Discovery Learning Program and the Earn-Learn Program in FY04 was very successful, and these programs have helped catalyze extracurricular, active-learning experiences for our students. In each of the past three years, approximately one-third of our undergraduates participated in one or more discovery, professional and service learning experiences.

Initiatives on undergraduate advising have led to improved survey results on student satisfaction with advising. These surveys also point to the need for improved faculty advising and career advising, which will be an emphasis in the coming years.

Undergraduate applications and enrollments increased substantially in Fall 2007. Recruitment and communication efforts have contributed to the increased applications and acceptance rate of students offered admission. Representation of women in the freshman class has steadily increased, while underrepresented minority students have had smaller gains. While it is expected that our increased K-12 outreach efforts to strengthen the pipeline of young students with interests in math, science and engineering may take several years to show results, especially for students from groups traditionally underrepresented in these areas, assessment will be needed to focus efforts on the most successful programs. Another concern is that the College's undergraduate program rankings have slipped in 2004 and 2005, which is also true of the campus as a whole and may be tied to negative publicity; the small improvements in 2006 and 2007 are encouraging.

In looking ahead, major educational undertakings include growing the new Engineering Honors Program, BS degree in Chemical and Biological Engineering, and interdisciplinary BS degree program in Environmental Engineering. Action will also be taken on a new Diversity Plan for the College, including strengthened advising and targeted recruitment and outreach efforts with Lafayette and Denver schools with engineering and technology foci and high enrollments of underrepresented students; improvements in first-year curricula and courses are also planned, to help support students from diverse academic backgrounds.

IV. RESOURCE EXCELLENCE

Our vision for resource excellence is to facilitate the ambitious goals and plans for educational and research excellence, by generating the necessary supporting resources and employing these with wise stewardship in four categories: (1) Faculty, (2) Facilities, (3) Institutional funds, and (4) Private giving. For each category, the goals and results are provided below, followed by an assessment of planned actions in support of the goals.

IV.1 Faculty Resources

Goal: Hiring of outstanding faculty, with increased diversity and competitive salaries and startup packages.

Result: During FY04-FY08, 51 regular faculty were hired, including 14 women and 16 persons of color (12 Asian, 4 Hispanic). The starting salaries are competitive (assistant professors in the College are paid 4.6% above the AAU average in 2006-07) and the average startup package for hires starting in FY08 is \$340K (national data not available).

Goal: Retention of top faculty, with competitive salaries, endowed positions, and at least one-half of retention offers accepted.

Result: Faculty raise pools in the College of 2.6% for raises effective in FY04, 2.8% for FY05, 3.3% for FY06, 3.6% for FY07, 5.1% for FY08 (not including a midyear raise for selected faculty) and 5.3% for FY09 have outpaced inflation (1.9% for 2002, 1.1% for 2003, 0.1% for 2004, 2.1% for 2005, 3.6% for 2006, and 2.2% for 2007), despite reductions in state funding. The average faculty salaries in the College exceeded the AAU averages in FY07 by 4.6% at the Assistant Professor level, but lagged by 2.6% and 4.0% at the Associate and Full Professor levels, respectively. Our top faculty continue to receive attractive offers from other institutions. During FY04-FY08, 15 retention offers were made, with nine accepted, and six faculty moving to other institutions. To help with retention, 13 new endowed chairs and professorships were established and awarded in FY04-FY08.

Goal: At least three faculty elected to the National Academy of Engineering in the next five years, and at least one major national or international society award received by a faculty member in each department each year.

Result: In FY04, two faculty (George Born and Kaspar Willam) were elected to the National Academy of Engineering (NAE), and Bernard Amadei was elected to the NAE in FY08. In FY06, Fred Glover (previously elected to the NAE) was appointed to the faculty in Electrical and Computer Engineering. Key awards to college faculty over the past five years include the NAE Bernard M. Gordon Prize for Innovation in Engineering Education to Frank Barnes in 2004 and to Larry Carlson and Jackie Sullivan in 2008, and the NSF Alan T. Waterman Award to Kristi Anseth in 2004. Selected faculty awards for the past five years are listed below, not including numerous young-investigator or early-career grants.

Selected Faculty Awards in FY04-FY08

Aerospace Engineering Sciences

Dennis Akos, Institute of Navigation Samuel M. Burka Award

George Born, Elected to the National Academy of Engineering

Bill Emery, IEEE GRS-S Education in Remote Sensing Award

Eric Frew, AIAA Rocky Mountain Young Engineer of the Year

Donna Gerren, AIAA Faculty Advisor Award

Dave Klaus, American Society for Gravitational and Space Biology Young Investigator Award, AIAA Rocky Mountain Educator of the Year

Kristine Larson, American Geophysical Union (AGU) Geodesy Section Award
Steve Nerem, American Geophysical Union (AGU) Geodesy Section Award
Scott Palo, Sigma Xi Northwest Regional Young Investigator, AIAA Rocky Mountain Educator of the Year
Ryan Starkey, AIAA Lawrence Sperry Award

Chemical and Biological Engineering

Kristi Anseth, AIChE Colburn Award, NSF Waterman Award, Society for Biomaterials Clemson Award
Christopher Bowman, AIChE Wilhelm Award, ACS Cooperative Research Award, Society for Biomaterials Clemson Award
Janet deGrazia, ASEE Rocky Mountain Outstanding Educator
Steven George & Alan Weimer, R&D 100 Award
Doug Gin, ACS Colorado Section Award
Christine Hrenya, ACS PROGRESS/Dreyfus Lectureship Award
Melissa Mahoney, MIT Technology Review Top 35 Young Innovators
Ted Randolph, AIChE Professional Progress Award, Academy of Pharmaceutical Research and Science Ebert Prize
Alan Weimer, U.S. Department of Energy Hydrogen Program R&D Award

Civil, Environmental and Architectural Engineering

Bernard Amadei, ASME Ralph Coats Roe Medal, American Rock Mechanics Association (ARMA) Applied Rock Mechanics Award, Hoover Medal, AAES Norm Augustine Award, World Federation of Engineering Organizations (WFEO) Hassib J. Sabbagh Award, Heinz Award for the Environment, Elected Member of National Academy of Engineering
Angela Bielefeldt, Assoc. of Environmental Engineering & Science Professors' Outstanding Teaching Award
Paul Chinowsky, Construction Industry Institute Researcher of the Year
Ross Corotis, National Academies Jefferson Science Fellow, International Association for Structural Safety and Reliability (IASSR) Senior Research Prize in System Reliability and Optimization
Jim Diekmann, ASCE Peurifoy Research Award
Dan Frangopol, International Association for Bridge Maintenance and Safety (IABMAS) Lin Medal, ASCE Nathan Newmark Medal
Vijay Gupta, AGU Robert Horton Medal
Keith Molenaar, Society of American Military Engineering Toulmin Medal
Roseanna Neupauer, ASCE Walter Huber Prize and New Faculty Excellence in Teaching Award
Balaji Rajagopalan, World Meteorological Organization Norbert Gerbier-MUMM International Award
Joseph Ryan, U.S. EPA National Notable Achievement Award
Kaspar Willam, Elected to the National Academy of Engineering, ASCE Newmark Medal

Computer Science

Gerhard Fischer, ACM Computer-Human Interaction Academy Award

Electrical and Computer Engineering

Frank Barnes, IEEE Education Society Achievement Award, International Telecommunications Education and Research Association (ITERA) Distinguished Researcher Award, NAE Gordon Prize

Tim Brown, Global Wireless Education Consortium Educator of the Year

Al Gasiewski, NOAA Bronze Medal

Regan Zane, IEEE Richard M. Bass Outstanding Young Power Electronics Engineer Award

Zoya Popovic & Regan Zane, IEEE Microwave Theory and Techniques Society Microwave Prize

Mechanical Engineering

Ken Gall, ASM Bradley Stoughton Award, ASME Pi Tau Sigma Gold Medal

YC Lee, ASME Electronics Packaging Applied Mechanics Award

Roop Mahajan, ASME Charles Russ Richards Memorial Award

Robin Shandas, Inst. Physics & Eng. in Medicine Nightingale Prize

Integrated Teaching and Learning Program

Larry Carlson and Jackie Sullivan, NAE Gordon Prize

Action Planned and Assessed: *Form an Engineering Awards Committee, in addition to departmental awards committees, and actively nominate top faculty for campus and national awards.* In FY04, awards liaisons were identified for each department, and the Dean's office provided information on various opportunities to these liaisons. Starting in FY05, the Faculty Research Council has served in the role of an awards committee. However, nomination of faculty for appropriate awards remains non-uniform across the departments.

Action Planned and Assessed: *Develop a culture of excellence through high standards in hiring, annual reviews, reappointment/promotion/tenure reviews, and post-tenure reviews, and by establishing a New Faculty Program.* Faculty search committees and the Dean's office carefully review all finalists for faculty openings, with offers made only to those showing excellent potential in both teaching and research. The performance standards for annual faculty reviews were revised in FY04 by the Administrative Council. The updated document on *Policies, Procedures and Criteria for Reappointment, Promotion and Tenure* was approved by the Administrative Council in Fall 2003, and in revised form in Fall 2005, and a new document on *Advice for Reappointment, Promotion and Tenure* was issued by the Dean's office in Spring 2004. A New Faculty Program was also established in FY04 and includes workshops on career planning mentoring, research, teaching, and reappointment, promotion and tenure.

IV.2 Facility Resources

Goal: *Expansion of the Engineering Center by 40,000-60,000 square feet by FY08.*

Result: Feasibility studies for two wing expansions (CS and ChBE) were completed in FY04, but funding and approval to proceed were not secured. A feasibility study for expansion of the AES wing was submitted in FY08 and has been approved by the campus. As noted below, a biotechnology building on east campus has been proposed and would include at least one department in our college.

Goal: *More effective use of current building, with at least \$500K per year spent on renovations.*

Result: \$1.5M in FY04, \$1.4M in FY05, \$1.0M in FY06, \$1.1M in FY07, and \$1.4M in FY08 were allocated for renovations of the current building. These expenditures exceed the goal due to the decision by college leadership to invest in making more effective use of available space while expansion plans are delayed by the lack of state funding, and they are bolstered by partial funding of these renovations by campus.

Goal: *At least two college research facilities established by FY08.*

Result: Renovations have been completed to establish a Nanomaterials Characterization Facility. However, only about half of the \$5 million goal for nanotechnology equipment was raised. Plans were made for a High-performance Computing Facility, but they were set aside when a campus-wide computing facility was planned.

Action Planned and Assessed: *Develop feasibility assessments, program plans, and fundraising efforts to expand at least three wings of the Engineering Center by 10,000-30,000 sq. ft. each.* Formal feasibility studies were done in cooperation with Facilities Management in FY04 for two wing expansions (CS and ChBE). The cost estimates are much higher (\$400-\$500 per square foot) than expected. An alternative of building on the east campus (about a half mile away) at about 25% less cost per square foot was proposed. The CS Department expressed a strong preference to stay on the main campus, while the ChBE Department expressed a desire to move to the east campus along with the campus biotechnology initiative. In FY06, a feasibility study and a program plan were approved for an interdisciplinary biotechnology building on the east campus. This building has been approved by the State of Colorado, and the architectural design began in Summer 2008. A feasibility study and program plan for expansion of the AES wing were approved in FY08. This expansion would connect with the Discovery Learning Center and also include a renewable energy lab.

Action Planned and Assessed: *Request proposals and allocate funds annually to renovate research and educational space in the Engineering Center for more effective use.* Proposals for renovation projects have been requested each year, and \$6.4M were allocated in the past five years by the College (including campus and departmental matching funds) for a total of 94 remodeling and renovation projects. Example projects over the past five years include

- Additional cooling capacity for an AES computational laboratory
- Remodeling of office space formerly occupied by CADSWES to an integrated area for our MEP and WIEP student programs
- Remodeling of space formerly occupied by UNIX Ops to create office space for ChBE faculty, staff and postdocs

- Completion of an infill in ChBE and remodeling to create a tissue-engineering laboratory
- Completion of a clean room in the ME wing for nanotechnology research
- Reassignment and renovation of laboratories for AES research on unmanned vehicles
- Upgrades to the CEAE fluids and computing laboratories
- Remodeling of CS common areas
- Remodeling the college lobby, with new furniture to promote study and teamwork
- Development of AES microfluidics and satellite navigation labs
- Establishment of molecular biotechnology labs for new ChBE faculty
- Expansion of the lighting laboratory in CEAE
- Systems lab remodel in CS
- Upgrade of the ECE transmission & fields teaching lab
- Development of a materials research lab for new ME faculty
- Mobile lidar laboratory for AES
- Active learning classroom for CEAE/MEP/WIEP
- CS numerical lab remodeling and furniture
- ECE Center for Environmental Technology lab
- ME Durning teaching lab
- ITLL manufacturing center
- AES lab expansion and graduate projects space
- Renovation of environmental engineering labs
- New A/C unit for CS computer lab
- ME laboratory for materials research
- CCAR remote sensing labs and offices
- Nanofabrication user facility
- Repurposing 'Real McCoy' for offices and student space

Action Planned and Assessed: Complete needs assessment and plans for at least two college research facilities. Assessment and progress were made on two college research facilities:

- *Nanomaterials and Characterization Facility (NCF)*--Construction of the Nanomaterials Characterization Facility in the DLC sub-basement was completed in FY06, and several new pieces of equipment are in operation and being used by university personnel. \$1.6M in federal earmarking and \$1.5M in university costsharing were received during FY04-FY07 for this facility. The equipment includes a low-vacuum scanning electron microscope (LVSEM) used for general high-resolution imaging and for imaging biological samples, a field-emission scanning electron microscope (FESEM) used for very high resolution imaging and advanced materials analysis, and a scanning laser confocal microscope (SLCM) used for fluorescent imaging of biological samples. As of Fall 2007, the LVSEM has 69 certified users, the FESEM had 20 certified users, and the SLCM had 20 certified users. Researchers from 13 CU departments and eight companies have used the facility. A focused-ion beam (FIB) has also been added.

- *High-Performance Computing Facility* –Plans were made to remodel 1400 sq. ft. of the ECE sub-basement (ECEE 2B80) as a college research computing facility, with the necessary power, cooling and security. \$200K for remodeling was set aside by the college and campus. This facility has been delayed due to a campus decision process regarding computer facilities and it appears that a campus-wide computing facility will be established instead.

Action Planned and Assessed: *Move two college tenants to the nearby Exabyte building.* In June 2004, the Center for Advanced Decision Support for Water & Environmental Systems (CADSWES) and the Hydroclimate Laboratory from CEAE moved to 7000 sq. ft. of remodeled space in the Exabyte building (about one mile northeast of the main campus). The Hydroclimate laboratory has since closed shop, and CADSWES has expanded into the vacated space. In addition, Unix Ops was moved from the Engineering Center to 1500 sq. ft. of remodeled space in the Stadium.

IV.3 Institutional Financial Resources

Goal: *Increased continuing annual institutional support to the College by \$7M by FY08 (from \$23M in FY03, after a 6% cut), requiring 5-6% growth per year.*

Result: As seen in the table below, we met this goal, though the future outlook is unclear because of uncertainties in state funding of higher education and in future tuition increases. The state appropriation to CU-Boulder was flat for FY04-FY06, after being cut by approximately one third in FY03. However, the college general-fund budget increased by the 5-6% annual goal during this period, primarily due to large increases in tuition and fees – including an engineering tuition differential starting in FY05 and a suite of engineering course fees in FY06. An even larger budget increase occurred in FY08, due to increased tuition and enrollments and a voter referendum that set aside some state spending limits for five years starting in FY07. The net increase in FY07 is relatively small because \$0.8M in nonresident tuition budget for graduate teaching assistants was swept due to a policy change to charge these appointments at the resident tuition rate.

FY03:	\$23,179,295 (baseline, after cuts) continuing institutional support
FY04:	\$24,499,249 (+5.7%) continuing institutional support
FY05:	\$25,896,905 (+5.7%) continuing institutional support
FY06:	\$27,420,397 (+5.9%) continuing institutional support
FY07:	\$27,651,733 (+0.9%) continuing institutional support
FY08:	\$30,157,472 (+9.1%) continuing institutional support

Goal: *\$1.0M in new continuing annual institutional funds by FY08 for an average of two faculty growth lines per year during FY04-FY08.*

Result: This goal was met using a combination of new funding from the campus and reallocation of funds within the College. One faculty growth line was added starting in FY04 (in AES). For FY05, three growth positions were added (one in ChBE, one in CS @ 50%, and one in Herbst). For FY06, two growth lines were added in the Mechanical Engineering

Department. There were no growth positions in FY07, but there were four growth lines starting in FY08 (one in AES, one in ChBE, one in ECE and one in ME).

Goal: \$1.5M in new continuing annual institutional funds by FY08 for faculty startup support.

Result: As shown in the table below, the requirement for startup support per new faculty member for equipment, research student support, etc. is rising. Campus funding for startups has declined, and so the additional burden has fallen on the College and departments. To help meet the need, the College has more than doubled the amount it provides per new faculty member, and \$155K in new continuing institutional funds were allocated by the College in FY05-FY08 for startup support (\$105K from the engineering differential tuition, and \$50K from internal reallocation of operating funds). However, this amount is far short of the goal.

Year Started	# New Faculty	New Startup Required	Amount from Campus	Amount from College	Amount Req'd by Departments
FY03	14	\$2,240,518	\$532,378	\$207,622	\$1,500,518
FY04	3	\$663,000	\$400,000	\$204,405	\$58,595
FY05	11	\$2,390,000	\$406,008	\$878,694	\$1,105,298
FY06	7	\$2,449,834	\$503,089	\$811,200	\$1,135,545
FY07	1	\$279,000	\$360,127	(\$240,127) ¹	\$159,000
FY08	14	\$4,759,500	\$223,549	\$1,664,784	\$2,871,167

¹The negative value appears because of campus payments on prior commitments

Goal: \$1.0M in new continuing annual funds (post inflation) by FY08, to provide for competitive faculty salaries, requiring annual raise pools of inflation plus 1.5%.

Result: As seen in the table below for tenure-track faculty, the annual raise pools in FY04-FY07 (for faculty raises effective at the start of the following fiscal year) exceed inflation by at least the 1.5% goal. Despite tight budgets, the campus leadership and the College are making long-term investments in faculty quality.

Year	FY03	FY04	FY05	FY06	FY07	FY08
Base \$	\$15.1M	\$15.1M	\$15.9M	\$16.1M	\$16.2M	\$16.9M
Raise %	2.6%	2.8%	3.3%	3.6%	5.1%	5.3%
Inflation %	1.9%	1.1%	0.1%	2.1%	3.6%	2.2%
Gross Increase	\$390K	\$420K	\$520K	\$580K	\$825K	\$895K
Net Increase	\$110K	\$260K	\$510K	\$240K	\$240K	\$525K

Goal: \$300K in new continuing annual institutional funds by FY08, to provide a doubling of matching funds for research equipment and proposals.

Result: No new continuing funds have been obtained for this purpose. Nevertheless, the college changed in FY04 its policy on providing equipment matching funds to ¼ college, ¼ department, ½ graduate school (from 1/6 college, 1/3 department, ½ graduate school). The amount of college matching funds provided from temporary funds is given below.

FY03: \$290,464 matching funds
FY04: \$286,075 matching funds (includes \$75,000 for nanotech lab)
FY05: \$408,450 matching funds (includes \$116,667 for nanotech lab)
FY06: \$294,557 matching funds (includes \$100,000 for nanotech lab)
FY07: \$395,500 matching funds (includes \$200,000 for nanotech lab)
FY08: \$300,733 matching funds

Goal: \$800K in new continuing annual institutional funds for FY08 for curriculum-based program enhancements, including support for instructional faculty and teaching assistants (\$400K), laboratory equipment and materials (\$300K), Engineering Honors Program (\$25K), and Engineering Advising Program (\$75K).

Result: In FY04, \$225K in new continuing annual funds were provided toward this goal for teaching assistants (\$75K stipend, \$150K tuition). In FY05, \$296K in new continuing annual funds were provided for teaching assistants (\$183K), lab equipment and materials (\$70K), and instructors (\$43K). In FY06, \$465K in new continuing annual funds were allocated from course fees for lab equipment and materials, and \$14K were reallocated for the Engineering Honors Program. In FY07-FY08, \$345K in new continuing annual funds were allocated from differential tuition for teaching assistants (\$154K), lab materials and equipment (\$136K), the Engineering Honors Program (\$7K), and instructors (\$48K). An additional \$56K for teaching assistants was provided by campus funds. Thus, the goal has been exceeded.

Goal: \$700K in new, continuing annual institutional funds by FY08 for extracurricular student programs, including Discovery Learning (\$325K), Service Learning (\$175K), Professional Learning (\$50K) and Outreach (\$150K).

Result: In FY04, \$120K were reallocated within the College to hire directors to lead these programs. In FY05, new continuing annual funds were provided from differential tuition for discovery learning (\$9K) and service learning (\$39K). In FY08, additional continuing annual funds from differential tuition were added for discovery learning (\$26K) and service learning (\$26K). An additional \$115K in continuing funds were provided for outreach in FY08. The total is about one half of the goal.

Goal: \$300K in new continuing annual institutional capital funds to combine with existing funds to invest a total of \$2M by FY08 for renovations of teaching and research space.

Result: While no new continuing funds were received from campus for this purpose, \$1.5M in existing and temporary funds were allocated for college space renovations in FY04. Another \$1.4M, \$1.0M, \$1.1M and \$1.4M were allocated in FY05, FY06, FY07, and FY08, respectively. Also, in FY05, \$36K of new continuing annual funds from differential tuition were budgeted for renovations of teaching space, and another \$100K in new continuing annual funds from differential tuition were budgeted for future major building projects. In FY08, additional continuing annual funds of \$78K and \$130K were provided from differential tuition for these two purposes, respectively. Thus, the goal was exceeded.

Action Planned and Assessed: Request an engineering differential tuition and course-specific lab fees, in addition to promoting Quality for Colorado and other campus initiatives for

additional institutional resources. The first (and apparently only) installment of Quality for Colorado was approved for FY04, representing a campus-wide tuition increase of \$140 (per year) for each resident student and \$300 for each nonresident student. The University of Colorado was also granted enterprise status, starting in FY05, so that its tuition increases are no longer subject to the state spending limits (though tuition increases are still negotiated with state officials). Two steps (in FY05 and FY08) of engineering tuition differential were approved, each of \$300 per student per year. A suite of engineering course fees, averaging about \$200 per student per year, was approved starting FY05.

IV.4 Private Giving

Goal: *Increase private gift support to \$12M per year (not including in-kind donations), a 50% increase from the prior campaign.*

Result: This goal has proven to be too ambitious, during the current period of economic uncertainty and with a 3-year delay in starting a new campaign. The total new commitments have averaged about \$5M per year. These numbers do not include in-kind donations of ~\$5M/yr or gifts not processed via the CU Foundation (\$708K in FY08).

Year	Support from Prior Pledges	New Support	Total Received	New Pledges	Total New Commitment
FY03	\$1,045,396	\$2,856,032	\$3,901,428	\$215,000	\$3,071,032
FY04	\$83,260	\$3,576,168	\$3,659,428	\$1,907,159	\$5,051,838
FY05	\$1,331,822	\$3,412,450	\$4,744,272	\$761,511	\$4,173,761
FY06	\$768,571	\$4,891,729 ¹	\$5,660,300 ¹	\$1,571,725	\$6,463,454 ¹
FY07	\$434,543	\$2,493,319 ²	\$2,927,862 ²	\$2,700,105	\$5,193,424 ²
FY08	\$824,125	\$4,134,645	\$4,958,770	\$1,782,570	\$5,917,215

¹Includes \$50,404 (Burger) and \$1,682,820 (Schelke) through CU Treasury

²Includes \$336,185 (Stevens) through CU Treasury

Goal: *\$20M in additional faculty endowment gift funds by FY08, including two full chairs @ \$4M, four partial chairs @ \$1.5M, eight professorships @ \$500K, and eight faculty fellowships @ \$250K, with at least half of these funds received by FY08 versus pending as bequests or pledges.*

Result: About \$5M in new funds were received toward endowed chairs or professorships during the past five years. These funds plus current funds given by donors who have endowed bequests have allowed the College to award five new chairs and professorships starting in FY06, four new chairs and professorships starting in FY07, and four new chairs and professorships starting in FY08 or FY09. Thus, the number of new chairs and professorships essentially met the goal, but the total of new funds raised is well short of the goal. With respect to faculty fellowships, a decision was made to seek current (nonendowed) funds for three-year fellowships to recruit and support top junior faculty. Over the past two years, funds were raised to award 10 named faculty fellowships.

Goal: *\$10M in new endowed student gift support by FY08, for undergraduate scholarships (\$6M), graduate fellowships (\$2M), and earn-learn apprenticeships (\$2M).*

Result: Over the past five years, approximately \$6M in new endowment gifts were received for student support.

Goal: *Doubling of the annual giving support for the Dean's Fund for Excellence, to \$500K in FY08.*

Result: Annual giving to the College for the Dean's Fund for Excellence increased by 25% in the past five years, though is still well short of the \$500K annual goal:

FY03 Annual Giving: \$232,155

FY04 Annual Giving: \$296,769

FY05 Annual Giving: \$297,189

FY06 Annual Giving: \$361,230

FY07 Annual Giving: \$351,964

FY08 Annual Giving: \$290,827

Goal: *\$10M in current and endowment gifts over the next five years for educational and research support.*

Result: Not including the Dean's Fund for Excellence and the endowed faculty and student support noted above, approximately \$10M in gifts for educational and research support of departments and programs were received over the past five years, and so this goal was met.

Goal: *10% increase per year in number of alumni or friends donating time or funds to the college.*

Result: The number of donors increased by 23%, from 2554 to 3144, during FY03 to FY07, at least in part due to expanded efforts in the annual fund campaign. The number of volunteers remained at about 600 each year, but has proved difficult to monitor in a reproducible way.

Action Planned and Assessed: *Intensify private fundraising efforts by adding three development staff, making 1500 face-to-face contacts, 40 dean/leadership visits to donors, and 12,000 mail/email/phone contacts with alumni each year, targeting efforts toward foundation and corporations, and assigning a development officer and setting fundraising goals for each department and program.* Vacancies and turnover in the development staff have hindered fundraising efforts over the past five years. A new Senior Director of Development, Jessica Wright Bowen, started in FY08 and is rebuilding the team. The number of professional fundraisers for the College increased from four to six in Summer 2008, and an additional position has been budgeted starting in 2009, which will meet the goal of three additional development staff. The face-to-face contacts with prospect donors by development staff has increased, from 201 in FY04 to 601 in FY08. The Dean's visits with donors have also increased, from 70 face-to-face visits in FY04 to 230 in FY08. 963 individual email/phone/mail contacts with alumni and donors were made by development staff in FY08, not including mass mailings to about 28,000 alumni and phone calls by the CU Annual Fund to about 17,000 alumni.

Action Planned and Assessed: *Cultivate alumni involvement through advisory boards, development visits, alumni events, project and seminar courses, and professional-learning opportunities.* The College has 17 advisory boards, with a total of about 250 members. Alumni events in FY07 included:

- High School Honors Institute Dinner (7/25/06, Boulder, 6 alumni, 58 total)
- Retirement party for Jim Sherman (9/1/06, 10 alumni, 120 total)
- ITP's 35th anniversary symposium and reception (9/7/06, 15 alumni, 75 total)
- Scholarship Dinner (9/15/06, Boulder, 35 alumni, 199 total)
- Dessert reception for EAC & RDC members at Davis home (9/29/06, Boulder, 10 alumni, 46 total)
- Dean's football box with ME advisory committee (10/7/06, 5 alumni, 24 total)
- Herbst Opera Outing (10/27/06, 5 alumni, 250 total)
- Lunch with Dean (11/6/06, SF, 6 alumni, 7 total)
- AIChE Annual Meeting hospitality suite (11/13/06, SF, 20 alumni, 120 total)
- ChBE alumni dinner (11/14/06, SF, 25 alumni, 40 total)
- College's Holiday Party (12/08/06, 10 alumni, 178 total)
- Holiday Music Festival (12/08/06, 8 alumni, 26 total)
- ChBE Graduation Banquet (12/14/07, Boulder, 2 alumni, 50 total)
- Retirement symposium and reception for Fred Ramirez (1/19/07, 20 alumni, 80 total)
- Applied Math Peter Teets Lecture (3/16/07, 10 alumni, 100 total)
- Applied Math 100 Year Anniversary (3/21/07, 5 alumni, 50 total)
- MEP Awards Banquet (4/13/07, 12 alumni, 225 total)
- Sigma Gamma Tau Alumni Event (4/18/07, 10 alumni, 25 total)
- Dessert reception for EAC & RDC members at Davis home (4/19/07, Boulder, 10 alumni, 30 total)
- Engineering Awards Banquet (4/20/07, Boulder, 50 alumni, 170 total)
- CS celebration to honor distinguished CS alumni and faculty (4/21/07, Boulder, 10 alumni, 50 total)
- ChBE Graduation Reception (5/10/07, Boulder, 5 alumni, 200 total)
- Golden Reunion Lunch (5/10/07, 11 alumni, 40 total)
- LA alumni lunch (6/5/07, LA, 5 alumni, 8 total)
- Biotech NYC Event (6/13/07, NY, 4 alumni, 6 total)

Totals: 309 alumni, 2177 total

IV.5 Discussion of Resource Progress and Outlook

Faculty hiring was successful in the past five years, with both high quality and diversity, though some positions remain unfilled. A culture of excellence is being promoted through a New Faculty Program established in FY04. A Faculty Excellence Program (aimed at helping faculty at all levels with teaching, research, and leadership) was started in FY05. New resources were provided for faculty startup funds, equipment matching, seed grants, travel to funding agencies, and performance awards. In addition, Dean's discretionary funds and differential tuition were used to establish graduate fellowships and assistantships. Nevertheless, research infrastructural support for faculty startup, graduate fellowships,

equipment, and specialized facilities remains low, and new investment by the campus will be needed for the College to be competitive with top research schools. Significantly, 13 new endowed chairs and professorships were established in FY05-FY08, which have helped in the retention of outstanding faculty. Other faculty highlights of the past five years include three college faculty members elected to the National Academy of Engineering and college faculty members receiving the prestigious NAE Gordon Prize (twice, the only school so honored) and NSF Waterman Award. On the other hand, several outstanding faculty members have left for other academic institutions.

Good progress has been made in the past four years on improved use of the current building, by undertaking 94 remodeling projects totaling \$6.4 million, initiating shared research facilities in computing and nanotechnology, and moving three programs to space outside of the main Engineering Center. Moreover, the State of Colorado has started again to fund capital projects, which is expected to include college building projects in the near future.

Progress during the past five years on increasing the financial resources of the College has been mixed. Approval of the first year of the campus-wide Quality for Colorado tuition increase for FY04, of enterprise status and the first year of an engineering differential tuition increase for FY05, and of engineering course fees starting in FY06, represents the important first steps in increased institutional funding to enhance quality of our educational and research programs. However, state funding was flat during FY04-FY06, after experiencing a major cut in FY03. Together with a decline in nonresident enrollments for the campus, a large increase in the base resident tuition (28%) was needed to meet the campus budget in FY06, and so a second step in engineering differential tuition was postponed until FY08. Thankfully, the voters approved a referendum to relax prior constraints on state tax spending, and increases in funding for higher education were received for FY07 and FY08. As a result, the campus asked the schools and colleges to make new budget requests for the first time in five years, leading to the allocation of new faculty lines and some staff and graduate-student support. In preparation, the College put in place *Investment in CU-Engineering (I-CUE)*, to reallocate college funds and raise private funds as matching for new educational, research and outreach initiatives that were proposed to campus. The private fundraising goal has proven too ambitious for the past five years, but planning is underway for a much-needed capital campaign and for further building the engineering development team.

V. RESTATED GOALS

Our experiences during the first half of the five-year strategic plan, along with the challenges and new opportunities listed in the Executive Summary, led to midcourse adjustment in the strategic plan. In particular, the following are restated goals from September 2006 and focus on leading-edge indicators (e.g., demographics of the entering class instead of all students). Results obtained are given in *italics* (Fall 2008 census data are not yet available).

1. Research

- 1.1 – Three new research centers established in FY07-FY08, in areas such as energy, environmental technology and micro/nanotechnology. *Two research centers (micro/nanotechnology; earthquake simulation) were formally approved in FY07, and one center (biorefining & biofuels) was approved in FY08.*

- 1.2 – Increased submissions of grant proposals by 10% per year, to 525 in FY07 and 575 in FY08. *507 proposals were submitted in FY07 and 526 were submitted in FY08.*
- 1.3 – Increased grant awards by 10% per year, to \$38M in FY07 and \$42M in FY08. *\$40M were received in FY07 and \$43M were received in FY08.*

2. Education

- 2.1 – New BS degree in Chemical & Biological Engineering started in FY07, with enrollment of 60 majors by Fall 2008, and an increase in the number of Environmental Engineering majors to 60 by Fall 2008 from 39 in Fall 2006. *In Fall 2007, 89 students were enrolled in Chemical and Biological Engineering and 72 students were enrolled in Environmental Engineering.*
- 2.2 – Outreach efforts targeted to Denver and Lafayette focus schools of high enrollments of underrepresented minorities (URMs), and the numbers of women and URMs in the new freshman class increased by 10% in Fall 2008 over Fall 2006. *The number of female freshmen increased from 104 in Fall 2006 to 143 in Fall 2007 (+38%), and the number of URM freshmen increased from 49 in Fall 2006 to 58 in Fall 2007 (+18%).*
- 2.3 – Improved third-semester retention rate, from 81% to 85% for freshman entering in Fall 2007. *The third-semester retention rate for freshmen entering in Fall 2006 increased to 83%.*
- 2.4 – Approval in FY08 of a new PhD degree in Materials Science and Engineering, and overall PhD enrollments increased by 12% to 550 in Fall 2008 over Fall 2006. *PhD enrollments increased from 488 in Fall 2006 to 493 in Fall 2007. The new PhD degree proposal has not yet been submitted for approval.*

3. Resources

- 3.1 – Second step of engineering tuition differential approved for FY08. *Approved.*
- 3.2 – Investment in CU-Engineering (I-CUE) process undertaken to stimulate campus and college investment and private giving for strategic needs, with \$500K in new continuing funding received starting FY08. *The College invested \$1.5M over two years (FY07 and FY08) for I-CUE in four areas (energy, materials, space, and K-12 outreach). Private gifts to I-CUE totaled \$1.6M in FY07-FY08. The campus awarded \$250K in continuing funds in these areas starting FY08, and another \$450K has been approved for FY09.*
- 3.3 – State approval of new biotechnology building in FY07, and sufficient funding received to start design in summer 2007 and construction in summer 2008. *The biotechnology building received state approval in FY08 and so the schedule has been delayed one year. A lead gift of \$20M has been made and the design phase is underway.*
- 3.4 – Named chairs and professorships awarded increased to 22 by FY08 from 17 in FY06. *23 endowed chairs and professorships were awarded in FY08.*

In addition, the College of Engineering and Applied Science prepared a Diversity Plan in Summer 2006, with actions and goals related to expanding the pipeline of students, creating a climate of success, and engaging the faculty and staff. It may be found at <http://engineering.colorado.edu/downloads/DiversityPlan2006.pdf>.