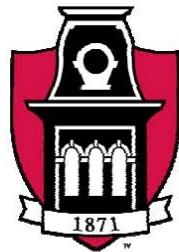


# Engineering the Future - Today Strategic Plan



UNIVERSITY OF  
ARKANSAS

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COLLEGE OF  
ENGINEERING

## **Executive Summary**

### **College of Engineering Strategic Plan**

#### **Engineering the Future – Today**

For more than 100 years, the College of Engineering has successfully fulfilled its primary mission: to provide an excellent engineering education to undergraduate and graduate students at the University of Arkansas. Our distinguished alumni stand as a testament to our success.

Without a doubt, our primary mission will never change as we continually create better ways to serve our students and prepare them for leadership. But in the words of the poet Robert Browning: "Man's reach should exceed his grasp – or what's a heaven for?"

The College of Engineering is at a crossroad and our faculty, staff, alumni and students face a choice: to remain the same and accept incremental change or to challenge ourselves to become the best we can. Our faculty and staff have chosen the more ambitious and rigorous path. Specifically, our goal is:

To become and be recognized as one of the top tier graduate and undergraduate engineering programs in the U.S.

By successfully accomplishing this objective, the College of Engineering will contribute to the University of Arkansas goal of becoming a nationally-competitive, student-centered research institution serving Arkansas and the world.

But no journey should be undertaken without a road map. So, a group of our faculty, staff and students developed the first version of our new strategic plan in the spring of 2004, which outlines six main goals to advance our institution and achieve our objective. The original version was revised in the spring of 2007. The five primary goals in the new plan are essentially the same as in the previous version with some consolidation and some changes in the specific goals for 2010 based on progress in the previous three years.

#### **Five Strategic Goals**

##### **1. Implementing the Student-Centered Educational Experience**

Provide a student-centered educational experience that attracts diverse, high-quality students, enables them to realize their potential, inspires them to pursue excellence at all degree levels and grooms them to become leaders in their profession.

##### **2. Implementing an Enabling Research Environment**

Create a research environment that enables, enhances and recognizes scholarship, while stimulating entrepreneurship and economic development within our state, nation and world.

### **3. Implementing the Vision as it Relates to Faculty**

Recruit, mentor and retain high-quality and diverse faculty members who value and promote world-class scholarship.

### **4. Implementing the Vision as it Relates to Staff**

Attract, develop and retain well-qualified, diverse and skilled staff members who are equipped to support the growth and potential of the College of Engineering.

### **5. Implementing the Service and Economic Development Outreach Plan**

Enhance the impact of the College of Engineering both within and outside the university through service and outreach.

## Implementing a Student-Centered Educational Experience

***Provide a student-centered educational experience that attracts diverse, high quality students, enables them to realize their potential, inspires them to pursue excellence at all degree levels, and grooms them to become leaders in their profession.***

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One of the strengths of the College of Engineering is the vibrancy of our undergraduate and graduate programs. We are the only comprehensive engineering program in the state; offering 9 BS degrees, 14 MS degrees, and doctoral degrees in all the major fields of engineering. Engineering graduates of the University of Arkansas have a proven record of excellence in all arenas, including academia, entrepreneurship, and industry. Our challenge is to sustain and further build on this record of success. We must continue to communicate our program successes, aiming to increase the visibility of the College and further enhance its stature. Integral to meeting our education-related vision is the challenge to further grow our undergraduate and graduate student body in terms of quantity, diversity, and overall quality. The Freshman Engineering program, implemented in fall 2007, seeks to improve student retention from the freshman year and beyond by building collaborative learning communities in a structured environment. The Engineering Career Awareness Program (ECAP) implemented in fall 2007 is an engineering diversity recruitment-to-graduation opportunity for students that incorporates real-life experiences through paid co-op positions with scholarships and mentoring.

Traditional classroom instruction remains a strong emphasis in the College, however, fully preparing students to become professionals in a global economy requires us to provide a variety of opportunities at the graduate and undergraduate levels. The Engineering Honors program offers unique opportunities for highly-qualified students, and we are enhancing our Honors program offerings and expanding our undergraduate research activities. Cooperative education and internship programs offer students practical work experiences and will be further strengthened through increased student and corporate participation. Students have opportunities to participate in the development of commercial products through entities such as the GENESIS business incubator, and students can use their knowledge for the good of society through service learning projects with local, national and international organizations such as Engineers Without Borders. Increasing study abroad opportunities allows students to learn and experience a variety of cultures and appreciate the global impact of engineering solutions. Recognition of outstanding graduate students through programs such as NSF graduate fellowships, DoD and NASA Fellowships, GEM Fellowships, Distinguished Doctoral Fellowships, and Doctoral Academy Fellowships are being actively pursued with considerable success.

Perhaps the most significant contributor to a quality educational experience is the faculty. A faculty mentoring system fosters quality in education. The College seeks to develop faculty as “integrated scholars” – those individuals who incorporate and balance all three facets of academic excellence at a land-grant institution: research, teaching, and service. Building a community of integrated scholars is vital to maintaining and strengthening a high quality student-centered educational environment within the College of Engineering.

The educational experience we provide attracts and excites undergraduate and graduate students, inspires them to seek higher levels of excellence and accomplishment, and provides the tools

necessary for success. We have expanded research opportunities at both the graduate and undergraduate levels; we continue to promote and reward high-quality instruction in the classroom and the laboratory; and we encourage students to seek avenues for applying their experiences to business and technological advancement of Arkansas and the world.

#### **OUTCOMES**

- Gain recognition as an outstanding U.S. Top 80 engineering program
- Increase student enrollment at the undergraduate and doctoral degree levels while sustaining enrollments in our masters programs
- Increase the undergraduate student retention and graduation rate
- Increase the number of graduates having an undergraduate research experience
- Increase the diversity of the engineering student body
- Produce graduates that are aggressively recruited by industry, academia, graduate and professional programs

#### **Implementation Plan Details**

The Strategic Plan for the College of Engineering envisions a continued strong commitment to providing a high quality, student-centered educational experience at all degree levels. Achieving the vision set forth involves developing and enhancing initiatives which require careful planning, timely execution, and consistent accountability. The following list provides actions necessary for successful implementation of the Strategic Plan. Table 1a summarizes the metrics (measurable outcomes) used to assess our progress. Tables 1b and 1c provide those metrics used in computing national program/school rankings.

#### ***Implementation Actions***

- Continue the aggressive marketing campaign for student recruitment and begin an aggressive national press campaign to highlight College of Engineering programs
- Fully implement, support, assess, and improve the Freshman Engineering Program in the College of Engineering
- Expand the active recruitment of diverse, upper tier engineering talent to our programs with competitive scholarships, fellowships, and aggressive recruitment and hiring plans
- Further develop and expand the thriving Engineering Honors program through increased course offerings, additional undergraduate research and study abroad opportunities, and increased program completion rates.
- Encourage graduate students to participate in the Entrepreneurship Certificate Program developed by the Walton College of Business
- Create more partnerships with industry and organizations to promote and implement service-based learning opportunities for students both domestically and abroad
- Strengthen the cooperative education and internship program through increased recruitment and opportunities
- Balance faculty teaching/research/service loads commensurate with enrollment
- Recruit a diverse body of undergraduate students through increased and targeted k-12 outreach and the Engineering Career Awareness Program (ECAP)
- Enhance and expand job placement opportunities for graduates by expanding our network of quality employers, while also increasing job placement rates

**Table 1a. Education-Related Metrics for Implementation**

Metric Description	Unit	Fall'03	Fall'04	Fall'05	Fall'06	Fall'07	Fall'08	COE Strategic Plan Goal/Target
Numbers of Tenure-track/tenured faculty	Total COE	91	98	101	98	102	103	100
UG Enrollment	Total COE	1600	1600	1561	1573	1556	1650	1800
M.S. Enrollment	Total COE	401	438	485	503	596	578	500
Ph.D. Enrollment	Total COE	112	121	130	152	156	149	200
ACT for entering freshmen	Avg. COE	27.6	27.6	27.2	27.6	27.7	27.4	28.0
Freshman Retention	% within UofA	81.9	84.4	77.5	83.3	83.3	81.0	90.0
Freshman Retention	% within COE	57.2	66.8	53.7	61.3	58.6	59.8	75.0
Entering H.S. GPA	Avg. COE	3.69	3.70	3.64	3.71	3.73	3.71	3.70
U.G. student 6-year graduation rate	% (COE)	34.9	44.1	41.1	34.8	35.7	34.2	50
Graduate acceptance rate	% (COE)	53.8	48.8	48.7	43.2	36.8	53.1	40
Graduate stipend MS	\$/month	\$1,000	\$1,000	\$1,000	\$1,153	\$1,209	\$1,206	\$1,500
Graduate stipend PhD	\$/month	\$1,000	\$1,500	\$1,500	\$1,705	\$1,777	\$1,823	\$2,000
Student diversity: % women (graduate)	% of total COE enrollment	21.4	22.7	20.6	25.5	29.2	27.4	25.0
Student diversity: % minority (graduate)	% of total COE US enrollment	14.2	19.0	28.8	23.3	24.4	23.8	25.0
Student diversity: % women (undergraduate)	% of total COE enrollment	15.0	13.5	14.9	14.4	15.7	17.2	18.0
Student diversity: % minority (undergraduate)	% of total COE enrollment	13.3	13.3	12.4	13.0	14.3	15.6	15.0
UG students obtaining research experience - In Fall 2009, we can add Colloquium students.	No. of COE Students	< 5	62	90	111	78	132	150
Students participating in cooperative education or internships during UG tenure	No. of COE Students	61	59	42	62	63	66	150
Student-to-faculty ratio	UG Students-to-Tenure-track faculty	17.3	16.3	14.7	16.05	15.25	16.02	18
Student-to-faculty ratio	UG Students-to-teaching faculty	14.1	14.8	13.7	12.23	12.97	13.98	16
UG GPA of new (entering) Graduate Students	Avg. COE	3.2	3.3	3.2	3.4	3.4	3.5	3.5
	Quant. - Avg. Writing Score	747	730	729	726	687	732	750
	Analyt. - Avg. Writing Score	655	624	3.84	3.73	3.76	3.92	4
Student Appointments (fellowships, TA, RA, Other)	No. of Grad students receiving GRA/GTA support	239	240	255	237	206	216	300
	Total COE	175	183	210	236	226	288	230
	% International	26.01	28.9	10.9	24.5	24.8%	21.5%	25
	% Women	24.85	24	20.9	20.9	24.3%	24.7%	25
Number of MS degrees awarded	% Minority	20.8	18	17.1	17.1	20.4%	17.4%	25
	Total COE	8	19	27	20	17	18	35
	% International	75	57.8	25.9	50	70.6%	77.8%	50
	% Women	0	26.3	18.5	15	5.9%	22.2%	25
Number of PhD Degrees Awarded	% Minority	12.5	15.7	18.5	15	5.9%	5.6%	25

<sup>1</sup> Retention is calculated based on % students from the previous year that return and are enrolled in the captioned year.

<sup>2</sup> The numbers are for coop students only. A significant number of students who have non-coop internship experience have not been tracked. This information will be captured in the future.

<sup>3</sup> Teaching faculty includes tenured/tenure-track, teaching-related adjunct faculty and instructors.

**Table 1b. Graduate Rankings -Related Metrics**

<b>Metric Description</b>	<b>Unit</b>	<b>Fall'03</b>	<b>Fall'04</b>	<b>Fall'05</b>	<b>Fall'06</b>	<b>Fall'07</b>	<b>Fall'08</b>	<b>COE Strategic Plan Goal/Target</b>
Number of Tenured/Tenure-Track Faculty	Total COE	91	98	101	98	102	103	100
Graduate Reputation Score - Academic	Out of a max of 5.0/Rank	2.1/122	2.3/114	2.3/114	2.3/106	2.3/99	2.2/112	2.5/100
Graduate Reputation Score - Non-academic	Out of a max of 5.0/Rank	2.3/143	2.6/129	2.7/129	2.7/121	2.5/137	2.5/133	3.0/100
Overall Graduate Score/ Rank	Normalized by the score of the highest ranked programX100	12/123	17/113	19/113	20/112	18/121	23/114	28/80
Mean Quantitative GRE Score/ Rank	Out of approximately 190 to 200 PhD granting institutions	747/NA	730/NA	730/88	726/106	687/181	732/44	750/80
% Graduate Acceptance Rate/ Rank	"	53.8/86	48.8/90	47.7/82	46.0/94	36.8/69	53.1/122	45/80
PhD Students/Faculty Ratio/ Rank	"	0.96/NA	1.0/NA	1.33/118	1.55/118	1.53/107	1.45/114	2.0/80
MS Student/Faculty Ratio/ Rank	"	4.4/NA	4.47/NA	4.8/40	5.24/39	5.84/38	5.61/46	5.0/40
Percent of Faculty in NAE/ Rank	"	1.0/NA	1.0/NA	1.0/77	1.0/81	1.0/87	1.0/86	3.0/50
PhD Degrees Granted/ Rank	"	8/NA	19/NA	27/82	20/108	17/103	18/111	35/75
Research Expenditures (\$M)/ Rank	"	9.9/NA	12.5/NA	14.8/95	15.1/101	16.7/94	18.5/89	22.5/80
Research Expenditures per Faculty (\$K) /Rank	"	108K/NA	128K/NA	140K/110	154K/117	163K/117	180K/110	225K/75

**Table 1c. Undergraduate Rankings -Related Metrics**

<b>Metric Description</b>	<b>Unit</b>	<b>Fall'03</b>	<b>Fall'04</b>	<b>Fall'05</b>	<b>Fall'06</b>	<b>Fall'07</b>	<b>Fall'08</b>	<b>COE Strategic Plan Goal/Target</b>
Undergraduate Peer Assessment-Score /Rank	Out of max of 5.0/ Rank	NA/111	2.4/117	2.4/106	2.3/114	2.4/104	N/A	2.6/80

## Implementing an Enabling Research Environment

***Create a research environment that enables, enhances, and recognizes scholarship, and stimulates entrepreneurship and economic development within our state, our nation, and the world.***

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The University of Arkansas' College of Engineering has a long history of being an integral part of the state's flagship research university. Over the years, the College has moved forward to meet the needs of our community, our state and the world through traditional basic and applied research, economic and technology development, and non-traditional interdisciplinary research. This is evidenced by the success of its students, faculty, and staff in well-established research laboratories and centers in all engineering departments, and by the success of its alumni who are in leadership positions in academia, industry, and the government. College-wide productivity currently includes annual research expenditures from external sources of over \$15 million and the annual dissemination of research findings through refereed publications. To achieve its goals, these and other such numbers must continue to grow significantly, as they have in the recent past. Catalysts for this growth include a collaborative research environment, high-achieving graduate and undergraduate students, excellent facilities, active pursuit of economic development in addition to cutting-edge research. Our ability to adapt and compete nationally in emerging research areas (i.e. biomedical engineering, nanotechnology, alternative energy, sustainability, to name a few) is crucial to attaining high recognition and a ranking among the nation's top research institutions.

Today, research involves teamwork, multi-disciplinary approaches involving individuals, departments, colleges, and universities, collaborative partnerships among faculty and students with industry and there are expectations of entrepreneurial pursuits. To support this broad spectrum of research, it is of vital importance to create an enabling environment in which such activities are promoted and rewarded. The college will champion the idea that collaborative successes are as important as individual successes and to attract and retain the very best faculty, the College will ensure that it's faculty salaries and support become and remain competitive with top-80 doctoral degree awarding engineering programs and that teaching loads are commensurate with research output, and that intellectual property is easily protected and commercialized.

We intend to build on our historical strength and heritage of mentoring students through small classes and hands-on learning in the arena of undergraduate engineering education programs. Preparing students to meet the demands of the engineering profession requires highly integrated research and technology experience, from the freshman year through the doctoral degree. Students in the College gain experience with project design, management, and the technologies employed in their respective fields through design-based curricula and through research experiences with faculty mentors. We will enhance this linkage between teaching and research in the College by providing more undergraduate students the opportunity of research experiences, by supporting innovative design-instruction methods and facilities, and by recognizing the role of faculty mentorship as first-tier scholarship. Graduate research and education is a part of this continuum and a nationally recognized graduate research program is the culmination of a successful student-centered research and education program. In order to recruit nationally competitive students for MS and PhD programs, we will continue to provide a robust research environment, promote the

accomplishments of our students and faculty, and provide competitive stipend support. We will also encourage the exchange of faculty and students as ambassadors for our program by supporting international experience for our students and by being hosts to students from other countries.

Finally, research within the College provides a foundation for expanding economic growth within the state by fostering knowledge-based industry. We educate engineering professionals that are in high demand in a technology and knowledge-based economy and develop the knowledge, the tools, and the engineering solutions needed within such an economy. In order to enhance our research mission, we will continue to develop streamlined methods for capturing and protecting intellectual capital, which facilitate agreements between industry and research sponsors. In addition, we will strive to increase the recognition of researchers engaged in developing the commercial potential of the products resulting from research activities. The College will develop mechanisms to identify and actively pursue high-demand research areas with significant potential for impacting economic development in Arkansas, including competing for national centers within targeted areas. We view the communication of our research innovations as a critical component of our research mission; to that end, we will increase the awareness of our efforts within the community. The technology transfer activities of our faculty, staff, and students will be an integral part of enabling our research efforts to serve Arkansas and the world.

#### **OUTCOMES**

- Gain recognition as an outstanding top 80 engineering educational institution.
- Continue to increase the number and quality of our PhD students.
- Continue to increase the number of undergraduate students engaged in research.
- Continue to increase the number of peer-reviewed publications.
- Continue to increase the number of proposals submitted to and the total annual research funding from nationally competitive research sponsors.
- Continue to increase the number of high quality undergraduates entering our graduate program, the number of MS students pursuing PhD studies, and the number of PhD graduates entering academia, research institutions and industry.
- Further enhance the diversity of faculty, staff and student populations.
- Continue the development of national research centers and enhance our current infrastructure to support multi-disciplinary and multi-university research.
- Develop an effective seminar program to bring more internationally renowned scholars to the campus.
- Create a flexible technology transfer program that encourages faculty risk taking.

### **Implementation Plan Details**

The Strategic Plan envisions providing competitive faculty and staff salaries in line with top-80 Ph.D. granting engineering programs and promoting the awareness of this issue with the administration, alumni, industry, and the public. The list that follows provides actions identified as necessary to the successful implementation of the Strategic Plan. Table 2 summarizes the *metrics* (measurable outcomes) that will be used to assess our progress in meeting our goals.

#### ***Implementation Actions***

- Continue to offer competitive faculty startup packages commensurate with expectations in research and teaching excellence.

- Strengthen the mentor system for new faculty that will facilitate their development in research and teaching, and reward them for their contributions.
- Develop and execute a plan to ensure that there is adequate support for faculty members to enable balance between family and career.
- Increase the percentage of outstanding women and minority faculty above national averages across engineering departments to augment diversity and provide role models for our women and minority engineering students.
- Increase campus and public awareness of our accomplishments through more active communication.

The Strategic Plan recognizes the necessity for developing mechanisms by which initiatives in multi-disciplinary and collaborative research in priority areas within the College and the University can be nurtured, grown, and valued. Specific implementation issues related to this effort are given in the list that follows.

- Recognize and reward teamwork, interdisciplinary research, entrepreneurial activities, and teaching innovation within the promotion and tenure process.
- Identify and target high-demand research areas with significant potential for impacting economic development in Arkansas, and compete for national centers within targeted areas.
- Assist College researchers in recognizing / developing the commercial potential of products resulting from research activities.
- Develop a streamlined method for capturing, protecting and transferring intellectual properties through patenting and licensing of technological innovations.
- Create a mechanism whereby faculty investigators (a) can easily engage and craft memoranda of agreement between industries and institutions, or (b) can pursue entrepreneurship goals without adverse impact on their careers.
- Continue to promote undergraduate research throughout the undergraduate curriculum in support of the Honors College.
- Realization of the research-related goals contained in the Strategic Plan will require growth in physical plant/infrastructure to provide high quality research space comparable to peer institutions.

**Table 2. Research-Related Metrics for Implementation**

<b>Metric Description</b>	<b>Unit</b>	<b>Fall'03</b>	<b>Fall'04</b>	<b>Fall'05</b>	<b>Fall'06</b>	<b>Fall'07</b>	<b>Fall'08</b>	<b>COE Strategic Plan Goal/Target</b>
Faculty startup package	Avg. COE	\$75,000	\$140,500 <sup>5</sup>	\$205,925	\$390,391	\$401,820	\$499,813	\$400,000
Total number of endowed chairs/ professorships	Total COE	7	9	16	28	29	31	30
Research space	Avg. ft <sup>2</sup> per faculty Total COE	1200	1200	1300	1367	1045	1022	2,000ft <sup>2</sup>
Business staff, technical support staff and post-docs	Avg. per faculty member	0.77	0.79	0.95	1.00	1.05	1.1	1.5
PhD student / tenure-track faculty	Avg. per faculty Total COE	1	1.235	1.226	1.61	1.53	1.45	2
MS student / tenure-track faculty	Avg. per faculty	4.2	4.47	4.8	5.24	5.84	5.61	5
Annual UG Honors theses produced	Total COE	none	none	13	15	24	43	35
Externally sponsored research expenditure	Total COE annual research expenditures	\$9.9M	\$12.5M	\$14.8M	\$15.1M	\$16.7M	\$18.5M	\$22.5M
Total Annual Research Expenditure	COE	\$12.8M	\$14.5M	\$18.1M	\$18.4M	\$20.4M	\$23.7M	\$25.0M
Proposals to Nationally competitive sponsored research (i.e. NSF, NIH, DOD, DOE, etc.)	Avg. annual submittals per faculty Total COE	1	2.1	1.9	1.85	1.75	1.84	2
Total refereed publications (books, book chapters, refereed articles, etc.)	Annual total, COE	NA	317	421	277	344	291	300
Conference Publications	Annual total, COE	62	99	108	158	128	125	200
Patents Awarded	Annual total, COE	6	3	2	3	3	0	5
Average research expenditures per faculty	Avg. annual expenditures per faculty Total COE	\$108,000	\$128,000	\$140,000	\$157,300	\$200,000	\$230,097	\$225,000

<sup>4</sup>Faculty start-up packages are university provided resources during early years of a faculty career. The start-up package varies considerably between areas of research. The number of \$400,000 represents an average over several disciplines of engineering.

<sup>5</sup>Does not include the start up costs of two senior faculty hired in that year which would skew the overall numbers. These numbers reported are indicative of the start-up costs provided to junior faculty.

## Implementing the Vision as it Relates to Faculty

***Recruit, mentor, and retain high quality and diverse faculty who value and promote world-class scholarship.***

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The faculty of the College of Engineering has long been the stable, reliable force behind the quality education that has been the cornerstone for engineering in the State of Arkansas. In addition, this faculty has grown its research expenditures and scholarly publications over the past two decades to the point that topical areas and individuals have become internationally recognized. Concurrently, this same faculty has continued to grow and evolve its overall educational offerings, becoming one of the first programs to be accredited and recertified under ABET EC 2000 criteria.

The College of Engineering has set a goal of achieving top-80 ranking. This has required change. The College has pursued new areas of research that are at the cutting-edge of technology while retaining its traditional strengths. New faculty have been hired who have extended the expertise of existing faculty and staff. Faculty have sought new ways to integrate teaching, research, and service demands. We recognize that it is not likely that each individual faculty member will perfectly balance teaching, research, and service because faculty skills and interests differ; in addition, significant differences exist in funding opportunities within various engineering disciplines and interests of the faculty evolve over long academic careers. Keeping these constraints in mind, the College has sought to achieve a balance among its teaching, research, and service missions only with respect to the overall faculty. This is reflected in the newly developed personnel procedures.

In order to achieve top-80 ranking, the College must continue to graduate doctoral students in significantly greater numbers and also increase research expenditures by significant amounts. All faculty have a role to play in contributing towards that goal. It is not merely the responsibility of a select few that have heavy emphasis on research. Faculty take the lead role in developing and teaching graduate courses, obtaining research funding, recruiting students, establishing and maintaining laboratory facilities, and conducting research. Thus, the success of the College of Engineering depends on the faculty of the College of Engineering contributing, each in his/her unique ways, to the overall mission. The faculty must be rewarded, personally and professionally, and recognized for their contributions toward these goals.

### ***OUTCOMES***

- Continue to offer enhanced faculty startup packages competitive with top research institutions.
- Improve faculty salaries in all ranks, and make them competitive with peer institutions.
- Develop a mentor system for new faculty that will facilitate their development in research and teaching, and reward mentors for their contribution.
- Develop a support system to retain faculty members who require balance between family and career.
- Enhance the diversity of the faculty.
- Continue the use of endowed professorships and chairs to reward excellence in research, teaching, and service.

The Strategic Plan emphasizes the importance of a committed faculty to the ultimate success of the College of Engineering. The listing that follows provides actions necessary to successfully implement faculty-related initiatives. Table 3 summarizes the *metrics* (measurable outcomes) that will be used to assess our progress in meeting our goals.

**Implementation Actions**

- Increase the percentage of outstanding women and minority faculty across engineering departments to augment diversity and provide role models for our women and minority engineering students.
- Provide facilities which enable faculty to become more successful and prominent in both national and international arenas of their expertise.
- Recognize, reward, and promote faculty which maintain consistent levels of excellence in research, teaching, and public service.

**Table 3. Faculty-Related Metrics for Implementation**

<b>Metric Description</b>	<b>Unit</b>	<b>Fall'03</b>	<b>Fall'04</b>	<b>Fall'05</b>	<b>Fall'06</b>	<b>Fall'07</b>	<b>Fall'08</b>	<b>2010 Goal</b>
Faculty in National Academy of Engineering	% of total COE faculty	1.80%	1%	1%	1%	1%	1%	4%
Faculty diversity: women	% of total COE	11%	11.20%	11.50%	10.02%	12.7%	12.6%	15%
Faculty diversity: minorities	% of total COE	19.80%	28.50%	24.50%	25.50%	22.5%	22.3%	25%
Funding for conference travel on research contracts	Total COE (annual)	\$128.4K	\$116.5K	\$111.6K	\$155.7K	\$117.9K	\$119.6K	\$200,000
Funding for conference-related travel <sup>6</sup>	Total COE (annual)	\$136.7K	\$136.1K	\$155.5K	\$167.7K	\$257K	\$284.5K	\$200,000
Post-doctoral fellows	Total COE (annual)	6	14	4	32	9	13	35%
Total number of endowed chairs/ professorships	Total COE	7	9	27	28	29	31	30%
Fellows of national professional societies <sup>7</sup>	Total COE	11	16	20	21	22	22	30%
NSF CAREER Awardees and Young Investigator Program for the faculty	Total COE <sup>8</sup>	2	2	2	3	8	1	3

<sup>6</sup>These are funds through the departmental resources and the Dean's Office. The travel expenses for attending conferences on research contracts and individual faculty RIF accounts were an additional \$148,738.

<sup>7</sup>These are the numbers of faculty that are fellows of at least one national society. Several are fellows of more than one society but are counted as one.

<sup>8</sup>This is the cumulative number of CAREER awardees (past and present) on the COE faculty in the fall semester of the fiscal year.

## Implementation Plan for Staff

***Attract, develop and retain a well-qualified, diverse, and skilled staff that is equipped to support the growth and potential of the College of Engineering.***

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It is widely recognized that high quality staff support is crucial to the achievement of College of Engineering's goals. Staff members are facilitators that allow faculty and administration to focus on research, teaching, granting and other scholarly activities. Staff members provide a familiar and welcoming environment to students and play an integral part in college-wide day-to-day operations.

As the College has increased its research programs over the past 20 years, the number of staff positions has not kept pace with the growing needs. Staff functions have also evolved due to changes in technology underscoring the importance of retraining opportunities for staff members. Compartmentalized duties for staff are disappearing; job titles and salaries should reflect and appropriately compensate the broadened scope of their duties. Increased staff workload and changing priorities will be a natural outgrowth as the College pursues this strategic plan. College of Engineering administration will work with UA administration to develop plans for growth of staff consistent with the growth in faculty and programs. The College will focus its efforts on empowering its staff to obtain their full potential by evaluating staff workload issues and developing workload models that allow our staff to effectively perform their job functions. The College will provide attractive career paths and opportunities for professional development for staff. Additionally, better rewards will be provided for highly productive staff including financial incentives and other forms of recognition such as awards.

### **OUTCOMES**

- Increase the staff size in direct proportion to the College's growth in faculty positions and student enrollment, commensurate with peer institutions
- Maintain a college-level staff council to assist in addressing the needs of college staff
- Encourage and support staff development
- Promote staff recognition and advancement
- Enhance the diversity of the staff
- Promote and finance opportunities for staff networking and professional growth
- Develop a mentoring system that facilitates staff development and encourages retention
- Develop and implement a staff reward program for value-added contributions and/or service
- Obtain/create new non-classified position titles & descriptions as appropriate for uniquely skilled positions
- Provide competitive staff salaries and career opportunities

## **Implementation Plan Details**

The Strategic Plan recognizes the importance of a diverse, well-trained staff to the ultimate success of the College of Engineering. The listing that follows provides actions necessary to successfully implement staff-related initiatives. Table 5 summarizes the *metrics* (measurable outcomes) that will be used to assess our progress in meeting our goals.

### ***Implementation Actions***

- Establish the staff/faculty ratio consistent with peer institutions and develop the hiring plans to realize this goal concurrent with faculty hiring plans
- Insure the distribution of staff positions (i.e., administrative assistants, secretarial, accounting, technician, etc.) meets the needs of each department.
- Provide competitive staff salaries in line with peer institutions and promote awareness of this issue with legislators, faculty, the administration and alumni. Special emphasis must be given to:
  - Developing and executing a plan to ensure there is adequate support system to retain staff members who have a need to balance between family and career. Examples of such support include telecommuting to the extent possible and part-time employment opportunities.
  - Review staff job descriptions to assure the title matches the actual duties and responsibilities of the position
  - Encourage and support staff development by providing them opportunities to continue their education and by providing support such as flexible hours and tuition support for on-campus and off-campus courses, on-line training, and certification programs.
- Develop a College orientation program and mentoring system for new staff that will facilitate their development relative to administrative, research and teaching support as well as reward mentors for their contributions
- Establish a system that rewards and recognizes staff contributions and achievements
  - Develop a staff reward program for value-added contributions and/or service.
  - Include staff representatives in advisory roles on important college committees and encourage nominations to campus committees.
- Establish a non-classified staff performance evaluation system for the College

**Table 5. Staff-Related Metrics for Implementation**

<b>Metric Description</b>	<b>Unit</b>	<b>Fall'03</b>	<b>Fall'04</b>	<b>Fall'05</b>	<b>Fall'06</b>	<b>Fall'07</b>	<b>Fall'08</b>	<b>2010 Goal</b>
Support Staff to Faculty ratio including technical and post docs and business/clerical	Avg. per faculty member	N/A	N/A	N/A	1	1.1	1.1	2
Staff diversity: minority	% COE	N/A	N/A	N/A	14%	14%	12%	20%
Staff diversity: women	% COE	N/A	N/A	N/A	45%	49%	50%	50%
Participation in college orientation program for new employees	% COE	N/A	N/A	N/A	0%	0%	0%	100%
Participation in professional development	No. hours/year for each staff member	N/A	N/A	N/A	N/A	56	76	10 hours
Number of national, state, campus, college awards received	% COE	N/A	N/A	N/A	2%	2%	6%	5%
Participation on campus, college or departmental committees	% COE	N/A	N/A	N/A	N/A	47%	34%	25%

## **Implementation of Outreach, Economic Development, and Service Plan**

***Enhance the impact of the College both within and outside the university through service, outreach, and economic development.***

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A critical component of our vision is reaching beyond the physical walls of the College with research, education, and service. We have an obligation to share our knowledge and expertise with the campus community, the profession, the state, and the world. The areas of focus for outreach will be distance and continuing education, increased interaction with our stakeholders, enhanced entrepreneurial activities by the faculty, and service to the campus.

The College must prepare to meet the increasing demand for access to its courses, programs, and resources for citizens beyond the Fayetteville campus. We must be ready to meet the growing need for professional short courses and certificate programs, as well as access to basic and advanced course for academic credit. Improving the education and skills of the existing workforce will have a direct impact on the state's economic success. A shining example of such a program is the MS degree in Operations Management offered by the Department of Industrial Engineering that has awarded over a hundred degrees per year for the past several years and has provided access to relevant advanced education to working professionals. This program can be replicated in other areas of engineering and can also be expanded to include international locations.

The College must continue to increase opportunities for interaction between the College and its stakeholders, particularly the industries, agencies, and other interested and affected parties we serve. This dialogue will allow us to share our vision with others and will give us the feedback we need to better focus our efforts. The closer interactions between the College and its stakeholders will strengthen all aspects of the mission of the College. Towards that end the College will develop a conference series on technology and innovation, to be held annually, to engage the local, state, national, and international communities in discussions about technological challenges and opportunities for economic development.

The College of Engineering occupies a pivotal position in the economic success of the state. The growing consensus is that the emerging economy in the US will be based upon innovation; thus increased prosperity is dependent upon innovation, invention, and the creation and development of intellectual property. As the pace of technological change accelerates it is critical that our graduates provide the knowledge and skills necessary for business and industry to thrive. The quality of the faculty and the educational opportunities presented to our students create the knowledge-based workforce to feed an innovation-based industry that will serve the State of Arkansas.

An entrepreneurial environment that encourages risk-taking and research innovation is necessary for students and faculty to attain new levels of discovery and insight. The existing policies of the College are supporting this strategy, and the outcomes have been significant. The GENESIS Technology Incubator was established by the College to form a platform for such discovery and insight. The management of this program was transferred to the Arkansas Research and Technology Park in 2004 but the College of Engineering will continue to play a critical role in the success of the Park. We will continue to encourage faculty and students to become entrepreneurs

and to actively engage in technology transfer of their innovations to generate wealth for Arkansas and to create high value jobs in the state.

Moreover, the College and the University depend upon faculty to serve in various roles and on numerous committees to assist in governance of and service to the institution. These range from management of the curricula to accreditation efforts and internal review committees. Without the participation of faculty, these processes do not benefit from their collective experience, knowledge, and points of view. Encouraging and rewarding faculty for participation in College and University governance is important to achieving the goals of the College.

#### **OUTCOMES**

- Working through the UA Distance Education Center, the College will utilize appropriate technology to increase access to courses, programs, and resources for citizens beyond the classroom.
- Increase opportunities for interaction between the College and its stakeholders, including:
  - Communication with the larger technology community through an annual Technology and Innovation Conference
  - Service-based learning
  - Lifelong learning
  - Technology transfer
- Develop Memoranda of Agreement between key industries to leverage resources and opportunities for enhancing prosperity for Arkansans.
- Encourage and reward faculty entrepreneurship as scholarship, including patents and start-up companies.
- Encourage collaboration between faculty and industry to solve complex problems and provide innovation-based economic development for Arkansas.
- Encourage faculty and staff to seek positions of leadership in their professional societies to broaden the influence of the College of Engineering.
- Encourage faculty to participate in faculty governance and service to the College and University.

#### **Implementation Plan Details**

The following actions are necessary to successfully implement the Outreach, Economic Development and Service Plan. Table 6 summarizes the *metrics* (measurable outcomes) that will be used to assess our progress in meeting our goals.

#### ***Implementation Actions***

- Increase the professional development programs available at a distance
- Develop a common internet site listing the programs and courses offered through distance education by the College
- Establish a faculty learning technology training program and standard format for conversion of courses to distance-delivery
- Establish a classroom technology upgrade plan for making technology delivery accessible
- Develop a conference series on University of Arkansas College of Engineering Technology and Innovation Opportunities
- Establish a system that rewards and recognizes entrepreneurial efforts and industry partnership
- Establish a system that rewards and recognizes service to the College and University

**Table 6: Metrics for Implementing the Outreach, Economic Development and Service Plan**

<b>Metric Description</b>	<b>Unit</b>	<b>Fall'03</b>	<b>Fall'04</b>	<b>Fall'05</b>	<b>Fall'06</b>	<b>Fall'07</b>	<b>Fall'08</b>	<b>COE Strategic Plan Goal/Target</b>
Innovation and Invention	# of utility patents issued to faculty per year	N/A	N/A	N/A	2	3	0	6
Economic Development	Number of SBIR/STTR proposals submitted by College faculty per year	N/A	N/A	N/A	27	20	18	35
Technology and Innovation Transfer	Number of hours spent on consulting by COE faculty	N/A	N/A	N/A	3239	9907	8984	4000
Faculty participation in University/College /External service	Number of faculty per year	N/A	N/A	N/A	71	64	64	90