

**Final Report**  
to the  
**2004-2009**  
**College of Engineering Diversity Strategic Plan**

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CURRENT INITIATIVES, TRENDS, AND  
REFINED STRATEGIES FOR ENHANCEMENT  
OF DIVERSITY AND CLIMATE IN THE COLLEGE



*December 21, 2009*

## EXECUTIVE SUMMARY

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*The vision of the College of Engineering is to have a partnership of faculty, students, staff, alumni and government and corporate leaders working together to provide the highest quality education and to continue building one of the nation's best engineering institutions.*

*Further, our vision for the college is to create a climate that attracts and supports a diverse group of students, faculty and staff and in which effective learning, research and service are accomplished by working together.*

College of Engineering  
Strategic Plan, 2005-2009

The major documents and processes that shaped the 2004-2009 College of Engineering Diversity Plan continued to have an impact through its implementation. Specifically, *A Framework to Foster Diversity at Penn State*, the Diversity Strategic Planning process in 2004, the college's strategic planning process in 2005 and again in 2008 have provided opportunities for the College of Engineering to identify and articulate specific college goals related to diversity. The efforts were also influenced by significant external forces. During this period of time, the nation's engineering fields saw significant declining interest (particularly by underrepresented populations), and now rebounding interest in engineering majors. The decrease prompted the development, by the National Academies to release reports that summarized findings over the past decade and provided direction for the future. During the same period, the University and college increased significantly the attention and activities directed toward internationalizing the curriculum. While this final report for this cycle provides a summary of the progress made toward the goals, it also lays the foundation for the next planning cycle.

The report provides a brief history relevant to the development and implementation of the plan, noting significant organizational changes or planning processes that have influenced our activities and contributed to our successes. The original reporting style which organized the actions and accomplishments in the four dimensions: Campus Climate and Intergroup Relations, Representation (Access and Success), Education and Scholarship, and Institutional Visibility and Vitality, is maintained; however, particular accomplishments that uniquely meet the expectations in the 7 Challenges are noted. Input for the report is drawn from summaries of program information and participation rates from the college's Office of Engineering Diversity, the Advising Center, and Human Resources Group. Selected results from our participation in the Program to Address Climate in Engineering (PACE), the National Survey of Student Engagement, and the Faculty/Staff Survey is limited, but is included to demonstrate how this report serves as a foundation to our continued and expanded efforts in the plan to follow.

As in the midpoint update, the college recognizes considerable progress has been made, particularly as follows:

- increasing the representation of women and minorities on the faculty
- achieving greater diversity in the college leadership and the staff
- creating educational experiences that internationalize the curriculum for undergraduate students
- establishing processes to recognize exceptional performance among the staff.
- attracting underrepresented minority students for undergraduate study
- re-establishing percentages of women undergraduate enrollments to earlier
- integrating diversity planning and goals into the strategic planning and goals for the college

Areas that require attention include increasing the enrollment of underrepresented minority students, particularly graduate students, fostering broader participation by faculty, staff, and students in addressing the Challenges, thus fostering a more inclusive climate and engaged community. The next plan will focus on these activities by increasing visibility of the individuals enhancing the climate, more effective use of data in decision making and planning due to systematic reporting, increasing student opportunities to develop intercultural and international competencies, and broadening the reach of successful activities to assist others and improve access.

The report is structured in the style of the 2004-2009 plan and includes an update on the status of the Continuing Actions and Planned Activities [shown in bracketed blue text] in each of the four framework dimensions: Campus Climate and Intergroup Relations, Access and Success, Education and

Scholarship, Institutional Viability and Vitality. Additionally, the report addresses the questions identified in *A Framework to Foster Diversity 2004-2009* and concludes with a summary of accomplishments and recommendations for directed efforts in the next cycle, 2010-2015.

## **INTRODUCTION – HISTORICAL PERSPECTIVE**

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In 1993, the College of Engineering published its first formal Strategic Diversity Plan. With that plan, the college embarked on systematic approaches to identify meaningful goals, processes to achieve those goals, methods to measure achievement, and opportunities to discuss the outcomes and next steps. In response to the University's *Framework to Foster Diversity at Penn State: 1998-2003*, the college formulated in April 2002 a plan titled "Progress and Strategic Initiatives in Fostering Diversity." The plan was based on an in-depth inventory of college activities and needs. Initially developed by a Task Force of faculty, staff, students and administrators, the plan was presented to, and discussed by, the Dean's Academic Council. Their input shaped the final report which captured a number of themes that served as an effective guide for continued progress. Throughout the process, the college developed a broad set of initiatives and processes, a solid organizational structure and investment for its diversity efforts. While these activities have been driven in large part by the particular challenges of an engineering community, they were congruent with the University's goals.

The 2004-2009 College of Engineering Diversity Strategic Plan continued that tradition by identifying for each Framework Dimension: Climate, Access, Education, and Visibility, a list of Continuing Activities Addressing the Framework for Diversity and new initiatives and enhancements as Planned Actions for 2004-2009. Later during the strategic planning process, the diversity goals were positioned within the broader context of the other facets of the university's strategic goals. Furthermore, the College of Engineering integrated diversity strategic initiatives into its strategic planning processes and designed them to complement the University's *A Framework to Foster Diversity*. In the strategic plan, the College of Engineering reiterated its goals and its commitment to create a climate that is welcoming, inclusive and diverse. From 2006 through 2008, a new diversity committee was charged to review the college's current activities related to its strategic plan objectives of attracting and developing a diverse student body, faculty and staff and to identify actions to further the college's strategic objectives. As part of the Diversity Committee's overall effort, it had primary responsibility for drafting the college midpoint update. The committee summarized the input from academic leaders, faculty, staff and students, and college and university resources to reflect the activity and progress toward the college and university goals. The 2006 Midpoint Update was used to inform internal and external audiences that had interest in particular challenge areas. For example, the Civil and Environmental Engineering Department's Industrial and Professional Advisory Council (IPAC) was interested in learning more about the pipeline issues and to discuss strategies to reverse the declining trend of women interested in the major. The Engineering Diversity Advisory Board was interested in understanding the flow of students and to consider the recommendations when advising the Women in Engineering and Multicultural Engineering Programs on improving access and success. And the college's Advancement (Development) Committee had the opportunity to learn more about the innovative programs and support to students.

Gradually, much of the work of the Diversity Committee shifted to task-oriented committees, such as the college's First-Year Engagement Plan Committee, the task team to implement the college's goal to internationalize the curriculum, and a Recruiting Revision committee. The new committees and their associated activities have been very effective in achieving desired outcomes that address the goals; however, there is value in regaining the benefits of the coordinated approach that was present in a single Diversity Committee. In an effort to reconcile these competing factors and in light of the next evolution of the Framework to Foster Diversity, a revised structure for the college's Diversity Committee is being implemented. The redefinition was tested during the development of the 2010-2015 Plan. Diverse groups of 3-5 people, consisting of faculty, staff, students, and administrators were assembled to discuss each one of the Framework challenges. In all, 30 individuals met to provide input, which was later culled, organized, and merged with the college's strategic planning goals to create the action plan for the 2010-2015 Plan. To carry out the action plan, task teams organized around each Challenge will be charged in January 2010. The leaders of each Challenge Task Team will form a Steering Team to guide, and coordinate the implementation of the actions, communicate the outcomes, and advise the college leadership on future directions to achieve the college's vision expressed in the Executive Summary.

## **CAMPUS CLIMATE AND INTERGROUP RELATIONS**

### **Challenge 1: Developing a Shared and Inclusive Understanding of Diversity**

### **Challenge 2: Creating a Welcoming Campus Climate**

The College of Engineering developed a clear and consistent description of Penn State's diversity objectives and initiatives, and integrated diversity specifically into its vision and the strategic goals. Since the midpoint update, the college has participated in several studies which have helped the college understand the climate for its faculty, staff, and students. The information is abundant and when coupled with other pieces of data, can be valuable through the next planning process and also as a benchmark for measuring progress. Progress toward achieving Challenges 1 and 2 has been in continuing to utilize the programs and practices established in earlier years, and to identify, using input from faculty, staff, and students, ways to strengthen units and organizational structures that support diversity and an inclusive environment in the college.

In 2003, the college Diversity Committee, along with the Social Science Research Institute's Survey Research Center, designed a Climate Survey of faculty, staff and students. Response rates for each group varied: 40.9% faculty, 58.2% staff, and 32.7% students. Results were generally positive, e.g., 82% of staff, 80% of faculty and 72% of students felt that their units provided a welcoming environment; however, they were not able to be disaggregated to the extent that would be valuable to units. The Diversity Committee provided recommendations for future college surveys; however, with the 2004 and 2008 administration of the university survey the college is no longer pursuing efforts to recreate a college survey. The preliminary results from the university faculty/staff survey show:

- Disaggregated results were limited to gender and race (White, Asian American)
- When rating the workplace climate, 76% of the 2008 respondents were favorable compared to 70% in 2004; 7% of the 2008 respondents were unfavorable compared to 9% in 2004.
- When rating Penn State as a place to work, 78% in 2008 indicated one of the best or above average, whereas 73% in 2004 indicated it as one of the best or above average; likewise 16% rated it as "worse" or "much worse" relative to three years earlier—an improvement over the 2004 response of 24% thinking it was "worse" or "much worse" relative to three years earlier.
- Women tended to rate more favorably than men the working environment, loyalty and commitment, extra effort and initiation, department outcomes and goals and diversity.
- White responses were more favorable than Asian American responses in working environment, department outcomes and goals and diversity, and about the same in loyalty and commitment, extra effort and initiation.

To assess the climate for students, two primary sources are used: NSSE (National Survey of Student Engagement) and PACE (Program to Assess the Climate in Engineering). Both are national instruments and have the benefit of reports that include unit level data with the ability to disaggregate further within the unit, and results from comparison groups as aggregated results. We recognize that practices and opportunities to identify and address climate issues are most effective when they are targeted to known challenges. Therefore, analysis of the data and making sense of the various pieces of information will be an important next step toward meeting our goals. NSSE reports student perception of level of engagement and captures their experiences with and attitudes about the institution. The purpose of PACE is to identify issues that affect persistence among engineering undergraduates while paying attention to race, gender, and academic experience. The level of participation and response rates for each were good. The implementation for PACE included oversampling from underrepresented groups so results across most populations can be utilized. Penn State's College of Engineering was one of twenty-two universities that participated. One meeting was held at the American Associate for the Advancement of Sciences (AAAS) was held to discuss the result with the researchers, and a second meeting will be held in March 2010 to discuss next steps.

Generally students are satisfied with their experience at Penn State as evident by the responses in the 2008 National Survey of Student Engagement (NSSE). When responding to the question "If you could start over again, would you go to the same institution you are now attending?", 93% of first-year respondents, and 91% of senior respondents selected "yes" or "definitely yes". Also related to the climate issue is the interaction students have with their peers, and the faculty and staff with whom they interact as shown in Table 1. Further analysis will be conducted in the next cycle to disaggregate the data for use in program enhancement and student support.

Table 1: Select College of Engineering responses from the NSSE

Quality of the relationship with people at your institution 1= unfriendly, unsupportive, sense of alienation 7= friendly, supportive, sense of belonging	First-year	Seniors
8.a. Relationships with other students	5.70	5.63
8.b. Relationships with faculty members	4.95	4.94
8.c. Relationships with administrative personnel and offices	4.48	4.60

The Program to Assess the Climate in Engineering (PACE) survey results also depict a healthy climate. Two questions that speak to the issues of faculty-student interaction and student-student interaction are summarized below. Like NSSE, the PACE results will be analyzed further during the next cycle.

Table 2: Select College of Engineering responses from the PACE survey

Responses 1=Never, 2=Rarely, 3=Sometimes, 4=Usually, 5=All the Time	Gender		Race/Ethnicity	
	Men	Women	Majority	Minority
Professors treat you with respect	4.2	4.2	4.3	4.2
I fell like I am part of a community	3.4	3.4	3.5	3.5

Not surprisingly, the generally positive response is likely to be linked to particular and intentional efforts throughout the college to improve the learning and work environment. Some highlights of those are as follows:

- An NSF-funded project exploring student perceptions of activities in engineering classrooms provided opportunities for faculty in the Departments of Mechanical and Nuclear Engineering, Industrial and Manufacturing Engineering, and Engineering Science and Mechanics to discuss climate issues and active-learning.
- The Multicultural Engineering Program (MEP) and the Women in Engineering Program (WEP) were placed under the purview of the newly formed Office of Engineering Diversity, headed by an assistant dean. The external Engineering Diversity Advisory Board is available for counsel throughout the year, and they focus their efforts in two meetings which have been instrumental in providing feedback to the unit and the college. Diversity Showcase, the two orientation programs for women and multicultural engineering students, have benefited from the synergy resulting from the creation of the Engineering Diversity Office.
- The college continues its strong support of student organizations, recognizing that they enrich our community, and provide valuable leadership development for students. Over 50 student organizations are active in the college. The majority are discipline specific, such as the American Society of Mechanical Engineers and the Institute of Electrical and Electronics Engineers. Departments with strong support from the associated department. Organizations that include students from all engineering disciplines, such as the Society of Hispanic Professional Engineers, National Society of Black Engineers, Society of Women Engineers, Engineering Undergraduate and Graduate Student Council, oSTEM (Out in Science Technology Engineering and Mathematics) an LGBTQ (lesbian, gay, bisexual, transgender, queer-affirming organization), and newly formed Engineers without Borders are provided space in Student Suite in Hammond Building. The college has strengthened its commitment to the students by providing an internship position to assist with cross-organization opportunities, and the college has worked with development officers to acquire corporate support for student organization activities. The money is awarded through a proposal and award process managed by the students. Collectively, these programs enrich the climate for students with leadership and outreach opportunities, and strengthen alumni relationships.
- The Council of Senior Faculty Women, which reports to the Dean, has provided guidance in activities, leadership development, and networking support to new faculty.

The following list which is excerpted from pages 3 and 4 from the original report in reference to **Challenges 1 and 2** identifies activities proposed in 2004. [The status is shown in brackets].

### **Continuing Activities Addressing the Framework for Diversity**

- Implementation and continued support for a network of Diversity/Climate Committees within almost all engineering departments with diverse memberships that include students, faculty, staff, administrators as well as gender and ethnic diversity. See Appendix I [not included in this report] for a list of current committees and chairs. [Modified structure to create Challenge Task Teams]
- Implementation in December 2003, of an online climate survey disseminated to all members of the engineering community including faculty, technical and clerical staff, administrators and students. The survey is designed to assess the overall working and learning climate and respondents' individual experiences, with particular emphasis on the experience of underrepresented groups. See Appendix II [not included in this report] for copies of the surveys. [Replaced with university and national survey instruments]
- Continued support for two of the original, college-based diversity programs at Penn State—The Multicultural Engineering Programs and the Women in Engineering Program. The activities of these programs are integrated into the college at all levels. The programs create and implement activities designed to recruit ethnic minority and women students into the College of Engineering and to develop and retain them once here. The programs are an important source of information on diversity in general for the college as a whole, offering workshops and information to departments and units and participating in regularly scheduled meetings with the Associate Deans for Undergraduate Studies and Graduate Studies, Research and Outreach and with faculty. The directors have direct access to the Dean and are members of the Academic Council, one of the two primary leadership bodies of the college. (See Appendix III for overviews of MEP and WEP activities.) [The programs merged under one office with leadership from an assistant dean]
- Launching of a newly revised college Website provides prominent visibility for MEP and WEP. [Ongoing]
- Creation of the Council of Senior Faculty Women, which reports to the Dean and is supported through the Women in Engineering Program. The Council offers workshops, acts as a climate liaison for faculty women, and undertakes diversity initiatives. In fall 2003, they took junior faculty women to Washington D.C. for meetings with NSF, NIH and other government funding agencies. [Ongoing]
- Ensuring that diversity is a performance factor considered in annual performance reviews and encouraging supervisors to make comments in regard to this factor. [Ongoing practice]
- Offering initiatives through the Office of Engineering Human Resources: [Opportunity for renewed activity]
  - A college wide workshop on Sexual Harassment: What everyone needs to know
  - Encouraging college employees to attend a program "Communicating with People with Disabilities."
- Creating access as an important aspect of fostering a welcoming environment. The college Facilities Office has overseen installation of an accessible ramp and first floor restroom in Old Botany and installation of an ADA ramp between Central and South wings of Sackett Building. [Completed]

### **Planned Actions for 2004-2009**

- Continue to support Departmental Climate Committees and be involved actively in implementation of the 2004-09 Engineering Diversity Strategic Plan. [Department committees vary in level of activity, increased activity at the college level]
- Use the results of the college survey to: 1) gauge the understanding of diversity issues and "buy-in" by members of the engineering community; 2) assess the quality of our climate; and 3) identify areas for action and improvement. [Completed, next efforts will be with the results from recent surveys]
- Use the data and subsequent analysis and the existing Climate Committee network to create college- and Unit-wide approaches to identify and disseminate best practices as well as to identify and address climate issues. [Program specific issues are addressed in an ongoing manner; opportunity exists to organize approaches for more effective dissemination]
- Continue to actively support for the MEP and WEP activities. [Ongoing]
- Develop a web page as part of the college website that describes the college diversity position and activities, provides resources and the opportunity for Q&A, and posts this plan. [Ongoing with new website]
- Continue offerings of workshops related to diversity and the implementation of good diversity practices by HR. [Intermittent programming, identified by one of the new Challenge Task Teams as an action item]
- Develop a "Diversity Search Toolkit," based on a successful University of Washington model, as an undertaking of the Council of Senior Faculty Women. [Recent efforts have utilized STRIDE materials]
- Reinforce core values in the departments by developing student and faculty "pledges" or "contracts" along the lines of those developed in the Industrial and Manufacturing Engineering Department. [Uneven practice]
- Installation this summer of exterior enhancements to EE East that will include a new ADA entrance ramp. [Completed]

## **REPRESENTATION (ACCESS AND SUCCESS)**

### **Challenge 3: Recruiting and Retaining a Diverse Student Body**

### **Challenge 4: Recruiting and Retaining a Diverse Workforce**

A diverse workforce is a crucial element in the development of a diverse student body. Diversity of backgrounds, perspectives, and approaches by the faculty and staff provide the rich learning experiences that prepare our students to enter and contribute to the global workforce and be effective global citizens. The college's first strategic goal directly addresses the issue of representation.

#### **Students**

The efforts to recruit and retain students are an important and shared practice in the college. A key factor has been, and will continue to be collaboration among all units within the college and our external partners. In addition to the many programs and activities listed in the 2004-2009 Diversity Plan and Midpoint Update, there have been new programs and incentives to recruit and retain women, underrepresented minority students, and underserved populations. Many of these programs have had the added benefit of enhancing the opportunities and experience for all students.

During this cycle of the diversity plan, the college has embarked on several new programs, strengthened existing programs, and broadened access. Of particular note are the following efforts and achievements:

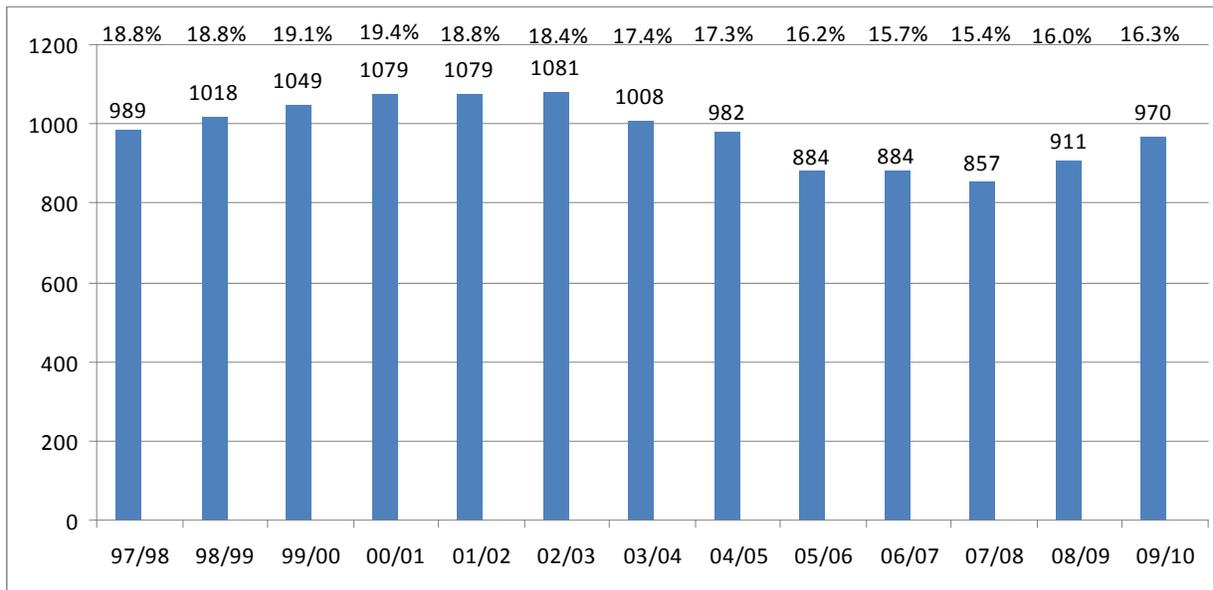
- Multicultural Engineering Program Orientation (MEPO) initiated for minority students and built upon the highly successful Women in Engineering Program Orientation (WEPO). MEPO is a three-day, interactive program designed to introduce students to the university. Students take part in academic and networking seminars, and workshops that prepare them for success inside the classroom, and for a successful career. 2008: 40 participants: 2009: 50 participants
- Academic Summer Enhancement (ASE) was expanded for greater participation by students at the campuses. ASE is a residential bridge program for multicultural students who begin their studies at one of the campuses. Students come to University Park for four weeks in the summer for intensive math, chemistry, and English and professional development. Launched in 2002 with 20 students, ASE is now expanding as part of a successful NSF proposal led by the School of Engineering Design, Technology, and Professional Programs. Evidence of the success of this program is in the retention rate of underrepresented minority students beginning at the campuses in engineering. Retention rates in engineering at the campuses for minority students have been below the national average; however, the students that participate in ASE have a retention rate in engineering on par with the national average (33%), which we are striving to increase, working toward our hallmark bridge program, PREF, Pre First-Year Summer Bridge Program which boasts a 5-year graduation rate ranging from 63% to 88%.
- The college increased endowments to support access and the success of students. Specific gains were in Trustee Scholarships where in 2008-2009, \$623,134 was awarded compared with \$50,700 awarded in 2003-2004.
- The Dean provided support for one-quarter time of a faculty member to serve as Graduate Program director. Reporting to the Associate Dean for Academic Programs, the director is focusing attention on graduate student recruiting, including attending graduate student recruiting fairs and creating materials for attracting a diverse applicant pool.
- In order to change the long-standing pattern of 10% women in the undergraduate Mechanical Engineering program, the department partnered with the American Society of Mechanical Engineers to secure NSF funding to revamp the manner in which it describes its major. The assessment is underway. The strategies were based on the findings and recommendations from the NAE report *Changing the Conversation*.

During the midpoint update, we reported a national trend of declining undergraduate engineering enrollment according to the American Society for Engineering Education (*Profiles in Engineering & Engineering Technology Colleges, 2005*). Fortunately, the most recent report (*Profiles in Engineering & Engineering Technology Colleges, 2008*) reported that the nation's engineering enrollments are on the rise (up 10% in the past 3 years). The number of bachelor's degrees awarded shows a slight increase which corresponds to the enrollment upswing three years earlier. Not surprisingly, our college reflects the national trends for enrollment and degrees awarded.

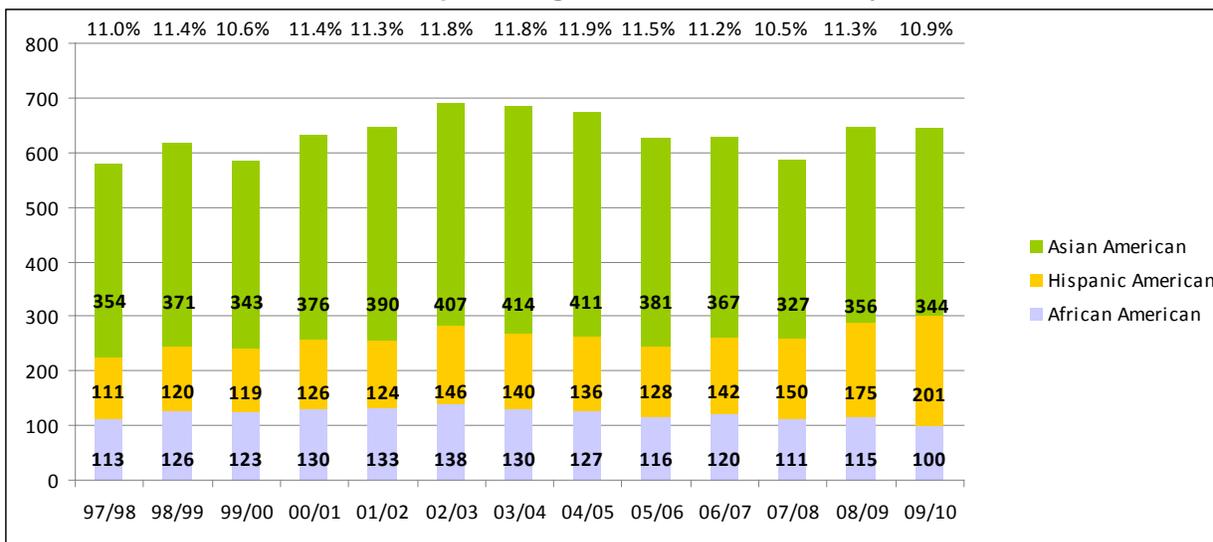
The enrollment trends for both undergraduate women and underrepresented minority students (African-American, Hispanic-American, and Native American) students held steady or improved slightly prior to 2002-2003. For several years following, the percentages and number of women and minority

undergraduate students declined, but are now rebounding (see Figure 1 and Figure 2). Currently the percentage of women enrolled in undergraduate engineering programs nationally is 17.9%, compared with Penn State's 16.3%. The percentage of African-American and Hispanic-American students enrolled in engineering nationally has stayed virtually constant for the past decade at a combined 11%, compared with Penn State's steady increase, which is now at 5.1%. As further indication of this promising turnaround we turn to the enrollment of the entering first-year engineering students at University Park. Briefly, four years ago, the entering class was 14.1% women; this year it is 19.9% women. Four years ago, the entering class was 5.6% underrepresented minority; this year it is 8.5%.

**Figure 1: Engineering Undergraduate Women Enrollment  
Number and percentage of students - University Park**



**Figure 2: Engineering Undergraduate Minority Enrollment  
Number and percentage of students - University Park**

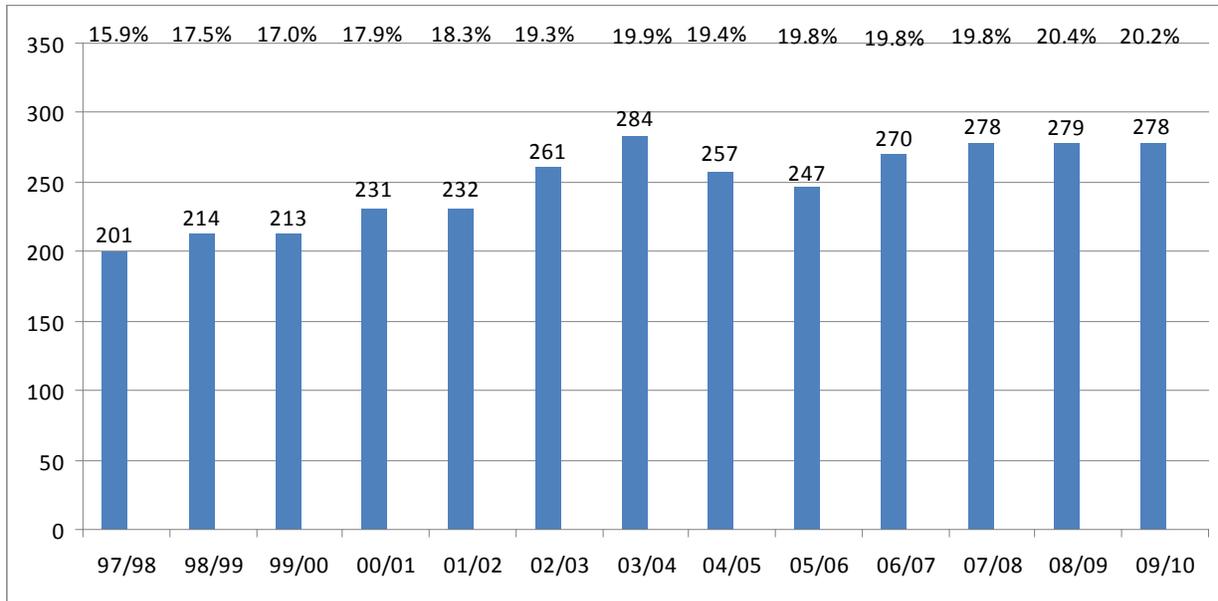


The college's orientation programs and bridge programs were instrumental in improving retention, therefore the efforts during 2004-2009 have been directed toward program expansion. Going forward, the challenges will involve ensuring access to the programs that have been important contributors to the success of students, and to expand the programs to ensure that participation by underserved populations.

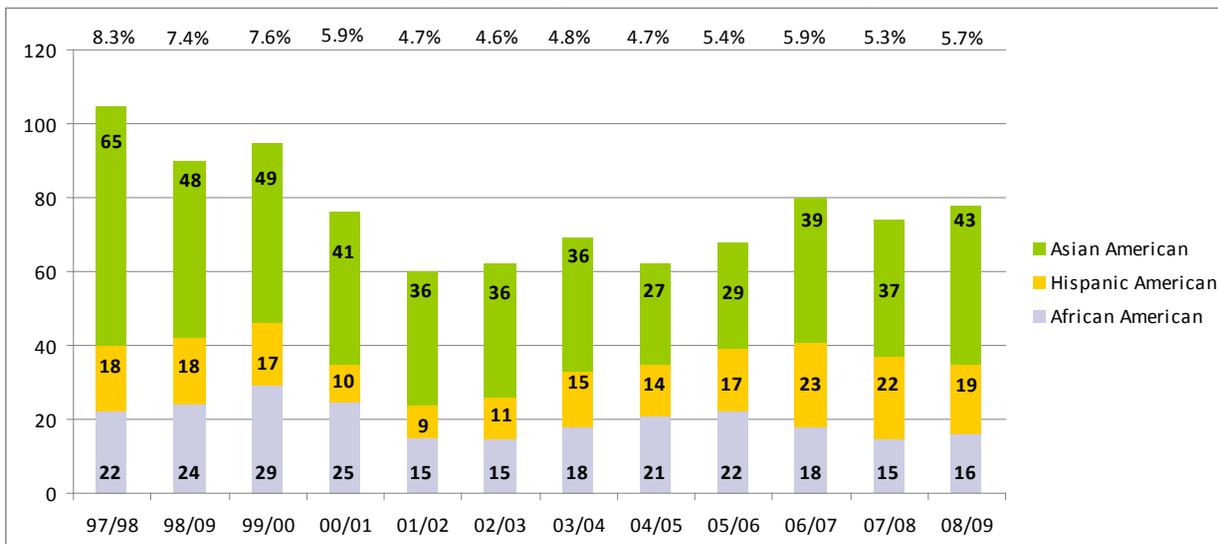
Graduate student enrollments have seen slight increases in women enrollments and minority enrolments during 2004-2009 (Figures 3 and 4, respectively). Currently women enrollments are slightly below the

national average of 22% and Hispanic American, African American and Native American enrollments accounting for approximately 7% of graduate students. Graduate fellowships and program quality continue to play significant roles in attracting students to pursue advanced degrees. The recruitment efforts to increase visibility of our programs are being pursued as part of the responsibilities of the new director of graduate programs working with the graduate officers in the departments. Department heads working closely with development officers continue to pursue endowments that will support fellowships.

**Figure 3: Engineering Graduate Women Enrollment  
Number and percentage of students - University Park**



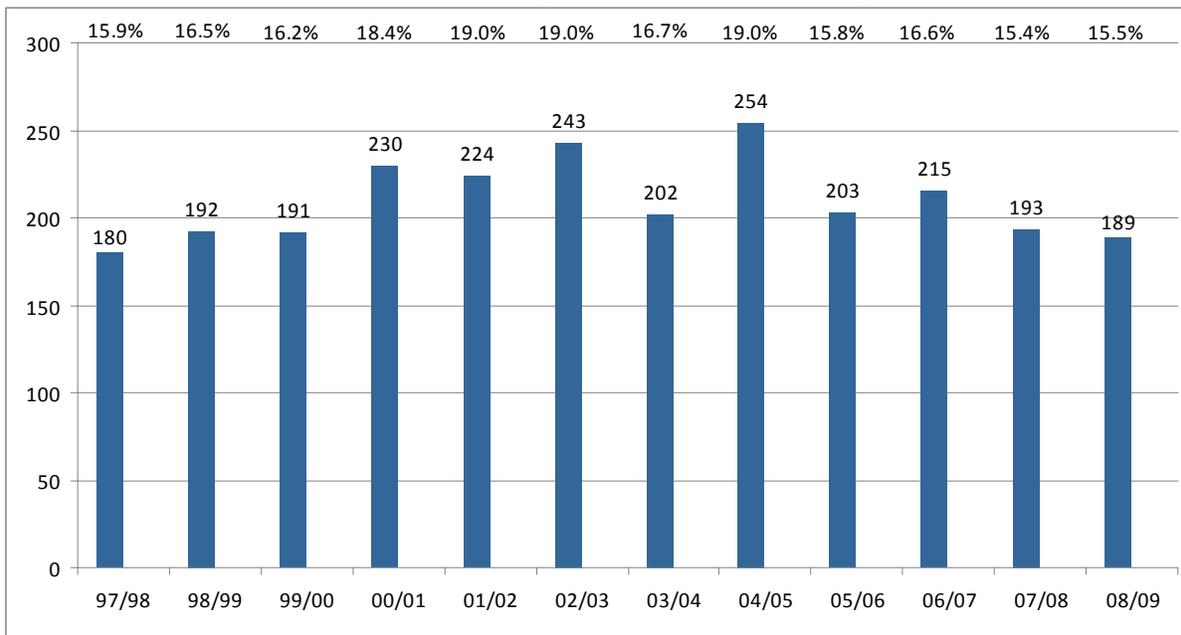
**Figure 4: Engineering Graduate Minority Enrollment  
Number and percentage of students - University Park**



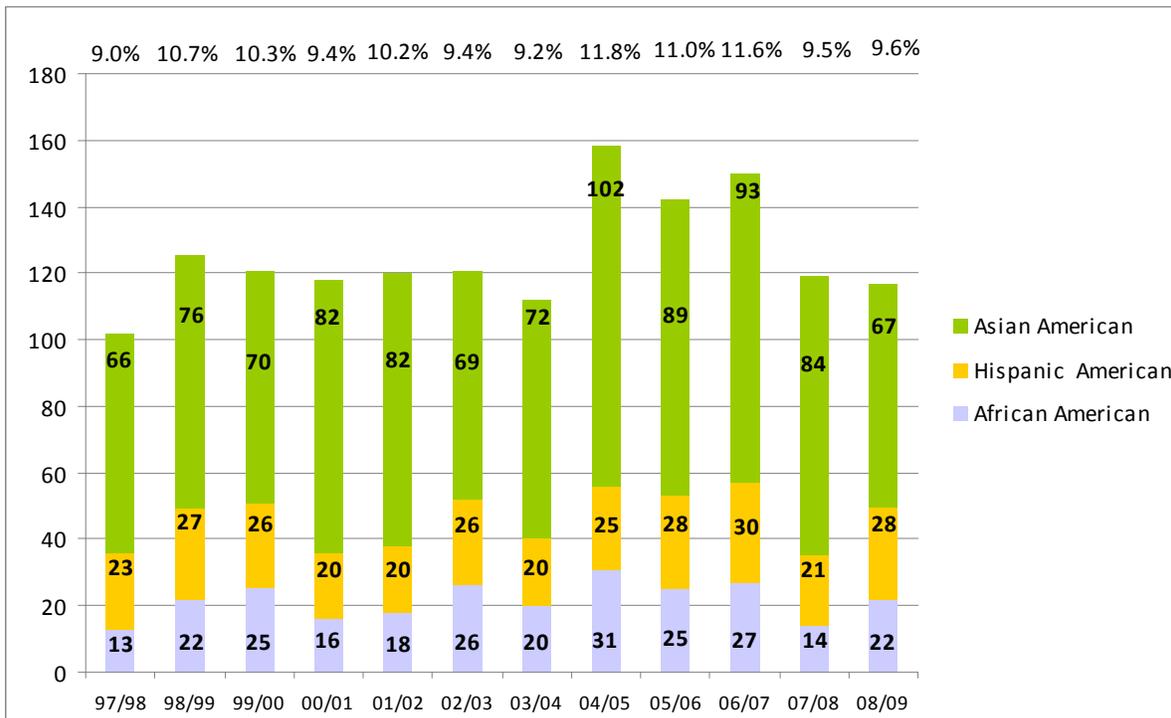
Graduation rates of women and underrepresented minorities at the undergraduate and graduate levels have been consistent with the enrollment trends. The decrease in percentage and number of women being awarded baccalaureate degrees, shown in Figure 5, has tracked with the decrease in enrollment. The projection for future years is that an increases due to increasing enrollments. When the incoming class had a relatively low percentage of women (e.g., 14.3% in 2006), the percentage of women graduating two years later was slightly larger, which is a reflection of the success in the retention programs. Similarly, the percentage of underrepresented minorities (Hispanic American, African American, Native American) earning baccalaureate degrees (Figure 6) corresponds to the percentage of underrepresented minority enrollments, again reflecting positively on the retention programs.

At the graduate level, degrees awarded fluctuates more from year to year, therefore occasionally we experience the case that a relatively high percentage one year will be followed or preceded by a low percentage, as is the case in Figure 7, years 07/08 and 08/09. For minorities, the degrees awarded has been steady throughout this cycle (Figure 8), primarily because the enrollment trends have also been steady. The new recruiting efforts are likely to have an impact in the next cycle. Building upon the successful retention programs at the undergraduate level, similar attention will need to be directed toward graduate student populations.

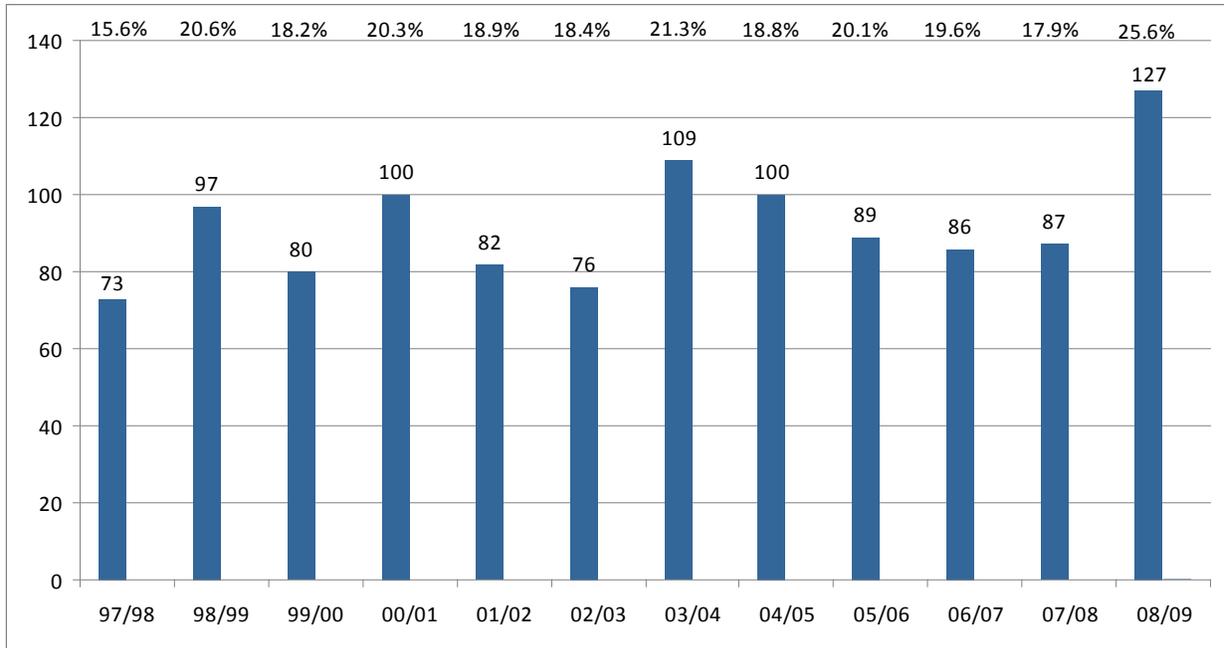
**Figure 5: Engineering Undergraduate Women Degrees  
Number and percentage of students - University Park**



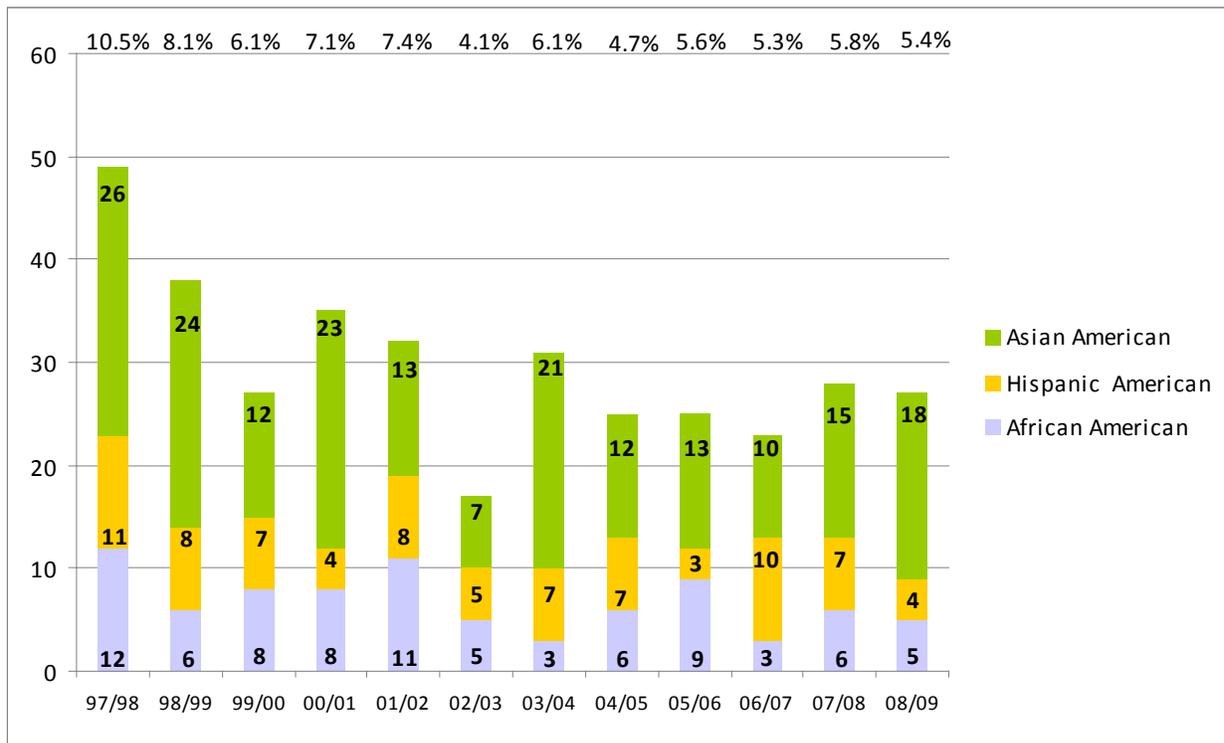
**Figure 6: Engineering Undergraduate Minority Degrees  
Number and percentage of students - University Park**



**Figure 7: Engineering Graduate Women Degrees  
Number and percentage of students - University Park**



**Figure 8: Engineering Graduate Minority Degrees  
Number and percentage of students - University Park**



Through the college's Office of Engineering Diversity and the Office of the Associate Dean for Academic Programs, graduate and undergraduate students continue to be recruited. Retention programs that include academic support, mentoring, and professional development and which have been successful are being expanded. Departments participate by hosting visits by high school students and graduate school prospects and providing tours and information sessions. The annual Spend-A-Summer Day sessions continue to draw large numbers of prospective undergraduate students. Additionally, the college continues to offer an equally important recruiting event for graduate students. Held in early spring semester, the college's Graduate Open House weekend provides an opportunity for departments to

showcase their strengths and the opportunities for study. Recent efforts by some departments with consistently low percentages of underrepresented students successfully competed for funds to assist with recruiting. The challenge in the future is to establish sustainable support and identify the features that are important to maintain.

This past semester, the college launched a program called Engineering Ambassadors. Undergraduate students in two-person teams present to high-school or middle-school audiences throughout the state. The program is based on the 2008 NAE report *Changing the Conversation*, which emphasizes the need to better articulate the value of engineering and science in making a difference in the world. The presentations are based on the assertion-evidence method of presentation, the students have their presentations honed, and have been coached on addressing questions. We intend to expand this program, which will have multiple effects: wider participation by our students, more opportunities to hone communication skills, and increased interest in engineering and science.

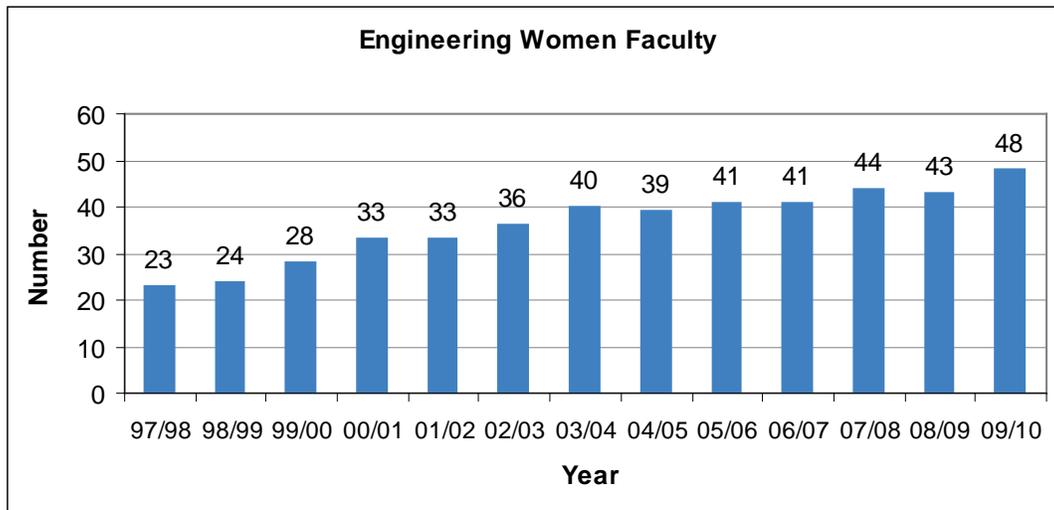
**Faculty**

As reported in the midpoint update, the college’s efforts to recruit and retain a diverse faculty continue to be successful. Penn State’s College of Engineering total faculty has declined slightly through this cycle.. The college emphasis on identification and hiring of diverse faculty candidates contributed to an increase in both women and underrepresented minority faculty members as shown in Figures 9 and 10. Since the start of the 2004-2005 academic year, the college’s number of women increased from 39 to 48 and the number of underrepresented minorities increased from 13 to 19. These increases continue to place our college above the national averages for both women and underrepresented minority faculty as shown in Figure 11. Considering the strong competition from industry and the budgetary climate facing Penn State and other institutions of higher education, the absolute increase in numbers of minority and women faculty underscores the college’s commitment to diversity. This commitment is shared by college departments, programs, and faculty in general.

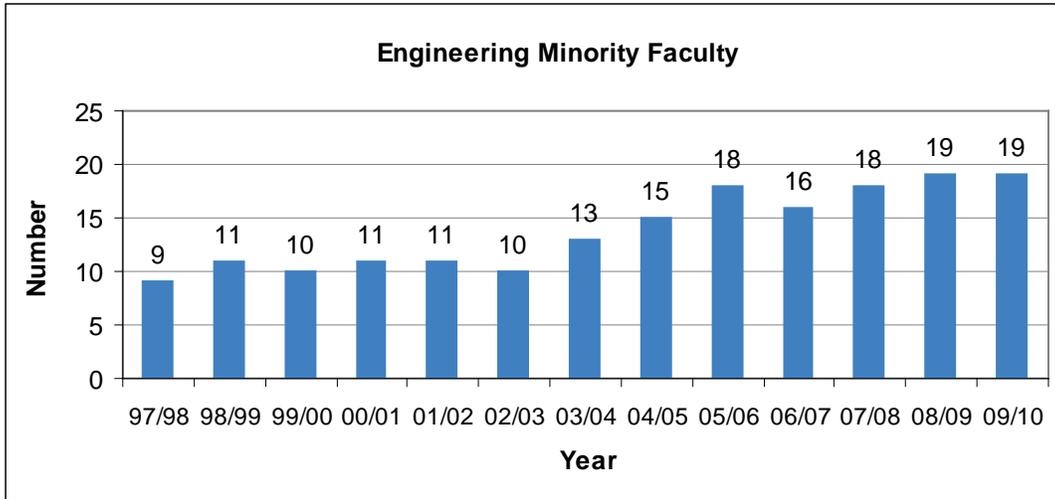
During the 2004-2009 cycle, the college has also increased the diversity in leadership positions. The number of women academic administrators increased. A woman was appointed associate dean; a minority woman was appointed assistant dean; a minority man was appointed department head, and two women were appointed as heads of departments. One of these women was an internal candidate, the other an external hire. Additionally, a woman was appointed the director of a university institute through an internal search. The appointment of women within the college demonstrates awareness of the need to acknowledge, recruit, and retain women of excellence.

The Council of Senior Women Faculty continues to have an active role in supporting the development of junior women faculty. During the 2004-2009 cycle, the Council submitted an ADVANCE NSF proposal for women faculty development and presented the “Achieving National Recognition” workshop to junior women faculty. The Council offered a workshop on “Promotion to Full Professor” for junior women faculty and has held networking events.

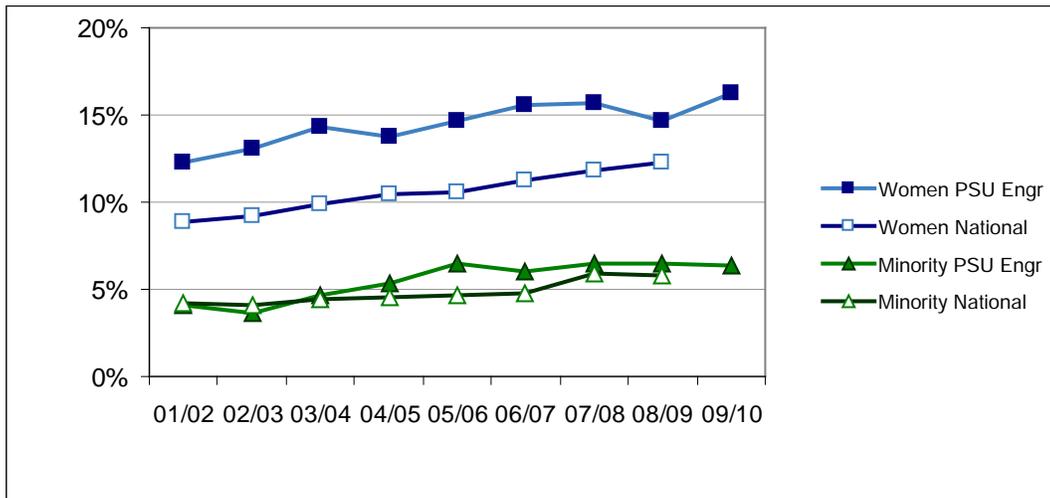
**Figure 9: Longitudinal View of College of Engineering Women Faculty Growth University Park**



**Figure 10: Longitudinal View of College of Engineering Minority Faculty Growth University Park**



**Figure 11: Engineering Faculty Growth at Penn State compared to National\* Trends**  
 \*Source: ASEE Profiles of Engineering and Engineering Technology Colleges

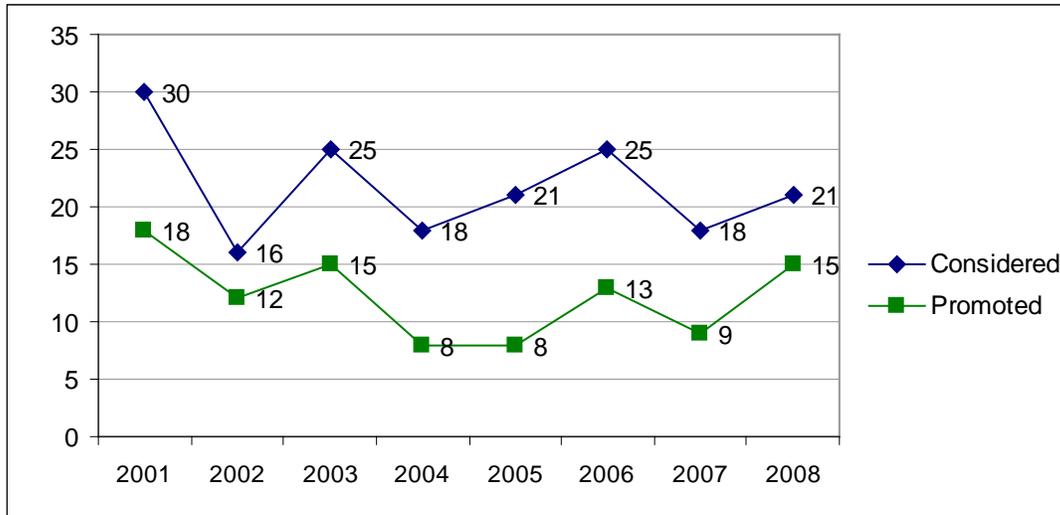


**Staff**

Efforts to increase the diversity in the workforce have led to eight underrepresented minority staff members joining the college. Avenues for minority recruitment continue to be utilized, and more opportunities through new partnerships in diverse communities, e.g., Navy Shipyard in Philadelphia, may provide access to a diverse pool of applicants. The college continues to utilize the programs that Penn State offers to increase diversity among the workforce. These programs offer access to underrepresented minorities with skills and knowledge acquired at post-secondary schools and with an interest in working at University Park. Penn State resources such as the Staff Assistant Program, Professional Entry Program and use of the Diversity Talent Bank and the Office of Human Resources recruiters are available to college departmental staff as a resource to develop a diverse staff.

Additionally, creating a workplace that supports staff in their professional development and is personally rewarding is an important element in creating a welcoming and inclusive environment. The college seeks ways recognize exceptional performance. And although the Peer Review of Exceptional Performance (PREP) was not offered this past year due to the budget constraints, it will be resumed in the future. To date this program has provided recognition and financial reward to a significant number of staff in the college as shown in Figure 12.

**Figure 12: Staff Peer Review of Exceptional Performance (PREP)**



The following list which is excerpted from pages 10 through 14 from the original report in reference to **Challenges 3 and 4** identifies activities proposed in 2004. [The status is shown in brackets].

<b>Continuing Activities Addressing the Framework for Diversity: Recruiting</b>	
<b>Faculty</b>	<ul style="list-style-type: none"> <li>• Aggressive pursuit of women and minority faculty candidates for faculty positions through identifying larger pools, creating recruitment networks, and ensuring informed search committees. [Ongoing]</li> <li>• Regular programming by Engineering Human Resources: [Ongoing] <ul style="list-style-type: none"> <li>○ Offer a Promotion and Tenure Workshop that stresses diversity recruiting</li> <li>○ Offer a workshop presented by the Affirmative Action Office that covers faculty affirmative action goals and strategies for recruiting diversity candidates</li> <li>○ Make presentations to departmental search committees that points out affirmative action goals and diversity recruitment</li> </ul> </li> </ul>
<b>Graduate Students</b>	<ul style="list-style-type: none"> <li>• Active recruitment of strong minority graduate students at Big Ten institutions and creation of partnerships with minority institutions such as North Carolina A&amp;T, Morgan State, Tennessee State and University of Puerto Rico-Mayaguez [Ongoing, schools vary]</li> <li>• Attend national career fairs to reach women and ethnic minority students for graduate school [Ongoing]</li> <li>• Offer annual visitation weekends for top candidates with an emphasis on women and ethnic minorities [Ongoing]</li> <li>• Exchange names of promising undergraduate women and students of color with other major universities to increase the graduate recruiting pool through the WEP Cross-Fertilization project [Replaced by other recruiting methods]</li> <li>• Revamp and continue more aggressive recruitment packages targeting ethnic minority and women candidates developed by the Office of Graduate Studies, Research and Outreach. [Ongoing]</li> </ul>

### **Undergraduate Students**

- Visit high schools by departmental honor societies to seek minority undergraduates [\[Ongoing\]](#)
- Conduct hands-on workshops to attract women and minority students: [\[Ongoing, expanded list\]](#)
  - MEP attends 10-12 conferences annually to nationally recruit undergraduate and graduate students.
  - WEP Take Your Daughters To Work Day
  - MEP and WEP tutoring and presentations at local schools
  - WEP Spend an Engineering Day
  - WEP Girl Scout Saturdays
- Conduct summer camps for middle and high school women and minority students: [\[Ongoing\]](#)
  - MTM (Move the Mountain) camp for high school girls (1 week) which offers special sessions for African American girls from Harrisburg and Latinas from Philadelphia.
  - VIEW (Visit in Engineering Week), two 1-week programs for high schoolers and a 3-day program for middle school students.
- Early identification of girls and ethnic minority high school students through PSAT and outreach programs [\[Ongoing\]](#)
- Contact with prospective students and insuring that prospective students meet women engineering students through the Alumnae Recruiting project and Envoy program [\[Ongoing but with different programs and contacts\]](#)
- Maintaining PSU4YOU recruiting listserv and website that presents stories from current students and information about student life to prospective students [\[Ongoing, different format\]](#)

### **Continuing Activities Addressing the Framework for Diversity: Retention**

#### **Faculty**

- The Council of Senior Faculty Women was established in 2003. Working with WEP, the council coordinated a trip to Washington D.C. in Fall 2003 to introduce faculty women to potential funders and plans a "Promotion to Full Workshop" in Spring 2004. [\[Council is Ongoing; Activities vary\]](#)
- WEP offers monthly Graduate/Faculty Networking & Professional Development lunches with speakers. [\[Ongoing, but intermittent\]](#)
- The college has implemented tenure clock stoppage for junior faculty members. [\[Ongoing\]](#)

#### **Staff**

- Design and introduction in 2001 of The Peer Review of Exceptional Performance (PREP) to recognize, reward, and retain exceptional staff employees within the college by offering all employees the potential for two promotions within grade. (see right). In 2001, the PREP peer review committee considered 30 candidates for promotion. Eighteen, or 60%, were promoted. In 2002, the peer review committee considered 16 candidates for promotion. Twelve, or 75% were promoted. In 2003, the peer review committee considered 18 candidates for promotion. Fifteen, or 83% were promoted. [\[Ongoing, on hiatus during salary freeze\]](#)
- Consider diversity as a performance factor in annual SRDPs. Supervisors are encouraged to make comments in regard to this factor. [\[Ongoing\]](#)
- Development of a Staff Scholarship Award as part of the Grand Destiny Campaign. [\[Ongoing\]](#)

#### **Graduate**

- Emphasize diversity and diversity recruiting in annual Office for Graduate Students, Research and Outreach (OGSRO) workshops (resulting in the enrollment of 22 new students in Fall 2003) [\[Ongoing, new college structure has enabled increased opportunities\]](#)
- Close collaboration among OGSRO, MEP and WEP in developing timely and attractive recruitment packages for ethnic minority students and women [\[Ongoing\]](#)
- With sponsorship from OGSRO, offers monthly WEP Grad-Faculty Networking lunches with topics ranging from "Preparing for a Faculty Career" to "Writing a Corporate Resume" to "The Imposter Syndrome" with more than 200 participants per year [\[Ongoing, but integrated into other activities\]](#)
- Offer MEP graduate students a Brown Bag Lunch series for graduate students to get to know each other and develop a support community [\[Ongoing\]](#)
- Build a pipeline of M.S. and Ph.D. candidates through undergraduate research experiences in state-of-the-art facilities through the Center for Undergraduate Research Opportunities (CURO) and college and WEP supported undergraduate research activities [\[Ongoing, opportunity to increase activity\]](#)

- Provide a voice for graduate student concerns through the Engineering Graduate Student Council [\[Ongoing\]](#)

### **Undergraduate**

- Women in Engineering Orientation (WEPO) program, begins with an intensive, hands-on orientation to engineering and continues with year long individual, group, and email mentoring for first year women engineers with professional women and upper class women, with resulting increased retention of participants [\[Ongoing, and expanded to MEPO for multicultural students\]](#)
- Pre First-Year Engineering & Science Program (PREF) - targets students who are prepared to enter their first-year at a Calculus math level. Students receive 6 credits and are housed on campus for six weeks to receive study skills instruction plus introductions to Physics, Chemistry, and Calculus. [\[Ongoing\]](#)
- Mentoring activities including: [\[Ongoing\]](#)
  - MEP: Peer Mentoring Program (PMP) matches upper level mentors with first-year students. PMP also hosts group activities and encourages students to interact with each other as they adjust to college life.
  - WEP: WEPO mentoring Teams of 6-8 students are led by upper level engineering women. The groups meet monthly. Campus college women are also matched with former CC student mentors who are now at UP via email (See Figures 3 & 4 above).
- Support for student chapters of the National Society of Black Engineers, the Society of Hispanic Professional Engineers, the American Indian Science and Engineering Society, the Society of Women Engineers and the Phi Sigma Rho Professional Sorority for engineering women [\[Ongoing and added oSTEM\]](#)
- Assistance to undergraduates and graduate students with resume development and submission for internships, co-op, and permanent employment opportunities through the Engineering Cooperative Education and Internship Office [\[Ongoing\]](#)
- Collaboration between MEP and the Engineering Cooperative Education Office to offer a funded Internship Program for ethnic minority students with NASA-Kennedy Space Center that includes student recruitment, academic and professional development, a field trip to NASA-Kennedy Space Center, and internship assignments [\[Ongoing\]](#)
- Promotion of academic excellence by providing tutoring, computer access, "survival" and professional skills courses, and career development materials through the MEP Academic Excellence Center and WEP Facilitated Study Groups [\[Ongoing\]](#)
- MEP-sponsored Book Scholarship Fund as an incentive for students to improve academic performance. Funds are awarded based on the positive change in GPA to assist upper division students who earn GPAs between 2.0 and 3.0. [\[Ongoing\]](#)
- Outreach programs to engineering students at Campus Colleges
  - MEP: (Academic Summer Enhancement (ASE) is a month-long summer orientation designed to familiarize CCC students with the University Park campus (where they will later attend) and provides an intensive review of Trigonometry and Pre-calculus. This review will help to ensure the students' success in math courses in the first semester at the campus college assigned [\[Ongoing, and expanded\]](#)
  - WEP: The Women in Engineering at the Commonwealth Initiative (WESAC) includes a peer e-mentoring program, newsletter and listserv. [\[Ongoing\]](#)
- Comprehensive dissemination of information through E-News, a weekly electronic newsletter distributed throughout to College of Engineering students and pre-majors systemwide. WEP and MEP both offer additional listservs to make sure that underrepresented students are well within the vital information loop. [\[Ongoing\]](#)
- Creation of E-House, a new living option for engineering students which aims towards having a diverse population and emphasizing multicultural experiences, connections with engineering faculty, academic support and career development. It complements two existing options, FISE (the First Year in Science and Engineering Interest House) and EASI (Engineering and Applied Science Interest House). [\[Ongoing\]](#)

### **Assessment**

- Implementation of systemic assessment plans to measure activity effectiveness and long term tracking of participants [\[Ongoing\]](#)
- Participation in NSF Assessing Women in Engineering Project to develop national assessment tools [\[Ongoing\]](#)
- Continuation of longitudinal cohort retention study [\[Ongoing\]](#)

## Planned Actions for 2004-2009

### Faculty

- Continue emphasis on recruiting diverse faculty candidates [Ongoing]
- Develop and offer workshops for funding, promotion and other identified areas [Ongoing]
- Provide career development workshops for faculty members (on promotion, management, leadership, and other ingredients for advancement) and take steps to ensure that underrepresented faculty members are not requested to serve on a disproportionate number of committees. (Current practices of directing requests to participate on committees through the department heads help prevent over-commitment of women and ethnic minority faculty should be reinforced.) [Ongoing]
- Require enhanced level of training for all search committees on the topic of diversity as outlined in University policy [Ongoing]
- Develop a guidebook for distribution to all search chairs and committee members and posting on the college website that includes outlets for advertising to reach underrepresented or nontraditional populations, objectives of the college diversity plan, and effective methods for running a search (In progress by Council of Senior Faculty Women.) [Ongoing, some activities have evolved to other distribution methods]
- Set up a training team that includes volunteers from the faculty and appropriate administrators who would be trained to meet with search committees throughout the college. (The participation of faculty as peers will help to institutionalize diversity values.) [Not in place]
- Proactively identify, recruit and hire qualified minority and women candidates, especially new Ph.D.'s and those in industry [Ongoing]
- Encourage open searches [Ongoing]
- Make advertisements for faculty positions as broad as possible to increase the potential pool of applicants. Advertisements and on-site interviews should provide information about the Penn State location (low cost of living, low crime rate, quality public schools, wide variety of outdoor recreational activities, active religious communities, etc.) and on assistance available for spousal employment support. Discourage the tendency during recruiting visits to be unintentionally critical or apologetic regarding the community (i.e., as isolated or lacking cultural outlets), even in jest, recognizing that many of us have, in fact, found the community and region to be a very pleasant place to live and work. [Ongoing]

### Faculty and Staff

- Identify and promote women and ethnic minority candidates for internal and national awards [Ongoing]
- Continue and expand HR workshops and offerings on diversity and affirmative action [Ongoing]
- Develop and implement strategies to improve the success of search processes in identifying and assessing the credentials of women and minority employee candidates for faculty and staff positions [Ongoing]
- Develop a college orientation manual to acclimate new faculty and staff to the college's resources and services to reaffirm the college's diversity vision and mission [Opportunity to revitalize]
- Develop packets of information for minority candidates for all positions that detail availability of goods, services and social institutions available in the area [Opportunity to revitalize]

### Staff

- Require that all faculty members and administrators make it possible for their staff to participate in some minimal number of career development activities per year [Ongoing]
- Expand locus of recruiting to include urban areas and to cast opportunities and the local environment in their best light; advertisements should sell Happy Valley as a great and affordable place to live [Ongoing]
- Provide reimbursements for moving expenses for underrepresented candidates who will have to relocate
- Offer orientation sessions for all new staff members [Uneven in the college; opportunity to strengthen]

### Graduate

- Explore new ways to recruit women and minority undergraduate and graduate students [Ongoing]
- Continue to develop relationships with colleges and Universities with high ethnic minority enrollment [Ongoing]
- Attract ethnic minority and women graduate students through effective financial aid and fellowship packages [Ongoing]

- Expand orientation and mentoring services for women and students of color [Ongoing]
- Present recruitment and retention workshops for faculty at all departmental faculty meetings [Uneven, other avenues available for participation]
- Develop a system for identifying and disseminating best practices for graduate recruitment, including aggressive networking, casting the Penn State community in its most favorable light, and involving current students as ambassadors [Ongoing, opportunity to improve]

#### Undergraduate

- Develop strategies for recruitment and retention in majors with low diversity percentages [Ongoing]
- Continue to identify prospective students early, particularly those who have the skills and talent for engineering but who have not identified engineering as a possible career, and create efficiencies by working with target schools, and math and science teachers [Variety of programs are ongoing]
- Increase awareness of faculty on issues and challenges faced by underrepresented students [Ongoing, e.g., AWISE]
- Continue to expand the financial support for underrepresented students and concentrate undergraduate recruitment on PA-residents for whom providing a significant contribution to the cost of attendance is a more attainable proposition [Ongoing]

## EDUCATION AND SCHOLARSHIP

### Challenge Five: Developing a Curriculum that Fosters Intercultural and International Competencies

Throughout 2004-2009, the college focused attention on developing curriculum components that address the attributes of World-Class Engineers. The college strengthened its commitment by identifying as one of its strategic goals “to implement the World-Class Engineer vision in the undergraduate curriculum with an emphasis on globalization and innovation”. The college recognizes that to prepare engineering students for an increasingly competitive and global workplace, an understanding of diverse cultures and attitudes becomes even more important from both a professional and personal point of view. In addition to the efforts to develop curricula to increase global awareness, seminars for faculty and graduate students on issues of equity and integrating diverse teamwork in the classrooms were offered, and several first-year seminars were offered with gender-balanced enrollments or clustered for ethnic minority students, building upon the highly successful summer bridge programs and orientation programs.

Over the past several years, courses have been developed by faculty to help students increase their global awareness and develop intercultural competencies. Additionally, the college saw an expansion of embedded programs where a small portion of the course (usually spring break) or a follow up summer component included travel to tour engineering and manufacturing facilities or to install a device or design in a community. The sample below, not exhaustive, illustrates the range of experiences and locations characterizing our embedded programs.

- AE 597I *Sustainable Building Methods* and AE 497I *Design Build Montana* – students learn to design a building based on principles supporting sustainability, and using materials that are locally available. The buildings are situated on the Northern Cheyenne Indian Reservation in Montana. A follow-up building activity occurs in the summer with participation by students, faculty, alumni, and Native American community members. To date, more than eight structures have been built including a technology center, an education center, homes and research buildings.
- EDSGN 497D *Sustainability Leadership Projects* – students learn to design for solar PV installations and then implement those designs as part of service projects. In 2008, students traveled to Honduras to work in conjunction with an electric firm to manufacture the array and install it. Through this course students gain a greater respect and knowledge of the world around them and recognize the value in community-industry relationships
- BIO E 401 *Introduction to Bioengineering Research and Design* and EDSGN 497C: *Design for Developing Communities* included components of the Mashavu (chubby-cheeked in Swahili) Project and provided an opportunity for an embedded education program. In summer 2009, 31 students and six faculty member spent three weeks in Kenya to implement three projects. One of the projects, Mashavu, focused on the design of affordable health monitoring equipment and the effective deployment of these technologies in eastern Africa (Kenya) for the purpose of keeping the children ‘chubby cheeked’ –a sign of good health. These courses with over 120 students

during the 2008-09 academic year developed an understanding of the community in which the designs were to be implemented, designed the devices, or technical solutions.

- I E 469 *Global Industrial Engineering Experience* accompanies a manufacturing course which addresses global manufacturing topics. The experience component of the course prepares students for a short-term professional tour that includes seminars and demonstrations of various manufacturing facilities. To date, Japan has been the destination.
- ENGR 197 *Impact of History, Culture, Society and Environment on Engineering Design in China* was developed based on the very popular First-Year Seminar *Engineering in China* which included opportunities for students to have internships in China. The new course, offered in China in the summer provide students the opportunity to visit multinational companies, learn about large engineering construction projects in China, and develop a greater understanding of the culture, education, and society that have shaped China's engineering workforce.

In addition to expanding these embedded, travel-based programs and encouraging students to participate in international internships, and study abroad programs, future plans include a concerted effort to build intercultural and international competencies in the curriculum which do not include a travel component. A particularly promising initiative is with the Mechanical Engineering capstone course, which will include an industry-sponsored project and teams of students that will have Penn State students and students from Shanghai Jiao Tong University. The ability to communicate and coordinate designs of international products needs to be stressed more as our graduates start their careers. We expect this program to evolve to reach 200 students annually and involve teams from several international universities. Another new program is the creation of I-LEAP (International LEAP) offering, in which international first-year students enroll in a pair of courses designed to assist them in acclimating to the US and Penn State. The course pair includes CAS 100 *Effective Speech* paired with a new course STS 197 *History and Culture of American Professionals in Technology and Science* which will explore the roles that engineers and scientists play both within their professions and within American society by looking at the way they are represented in art, literature and popular culture. The I-LEAP program will be offered summer 2010.

We continue to work with industry to provide cooperative education and internships that enable students to realize the importance of these experiences in today's world and adapt their thinking to a broader perspective. And our students participate in study abroad programs offered by the University through Global Programs. Collectively these opportunities provide students with valuable opportunities to learn with, and from, others who are different from themselves.

Table 3 shows the level of engagement and participation in the opportunities that are available to students through the Framework cycle 2004-2009. *Study abroad* includes the formal programs that are at least one-semester. *Engineering short-term or semester abroad* programs tend to be those which were the result of an embedded experience. *Work abroad* represents all paid or unpaid internships or cooperative education assignments. Internationalization at Penn State includes all non-travel based programs, thus 170 (or approximately 3%) participated in at least one travel-based international experience.

While it is important to understand the overall participation numbers, it is also valuable to understand who participates and where our students are going. Of the 762 participants in 2008-2009, 231 (30.3%) were women, which is a higher percentage than represented in the engineering undergraduate engineering population (16.3%). Likewise, the participation by underrepresented minority students was 43 (5.3%) which is slightly higher than the underrepresented minority percentage in the undergraduate engineering population (5.1%). Some students participate in more than one program. Thus considering the number of individual participants, we note that 589 (or approximately 10%) of the University Park engineering students participated in at least one international experience in 2008-2009, Most majors have 5-10% of their students participating in an international experience, but the majors with the largest percentages of its students participating are bioengineering (61%), biological engineering (44%), and chemical engineering (40%).

Table 3: International Engineering Participation Data

Academic Year	Study Abroad	Engineering Summer and Short-Term Programs Abroad	Work Abroad	Internationalization At Penn State		Total excludes language courses
				PSU Programs	Language Courses (Basic, INT/ADV)	
2004-05	72	16	17	N/A	N/A	105
2005-06	85	28	18	N/A	N/A	131
2006-07	74	53	21	N/A	N/A	148
2007-08	32	99	36	92	464 (274, 190)	259
2008-09	27	126	17	592	621 (349, 272)	762

Finally, when considering the diversity of experiences, it is valuable to know the diversity of locations, and the diversity of students. Table 4 shows the distribution for the student participants and with an indication of the program locations in 2008-2009—the last year of the Framework cycle.

Table 4: 2008-09 International activities participation by engineering students at University Park

Participation Category	Male	Female	American Indian or Alaskan Native	Black American (Not Hispanic)	Asian American or Pacific Islander	Hispanic American or Puerto Rican	White American not Puerto Rican	Foreign (in US on student or temporary visa)	Not Indicated	Total
* Study Abroad – Semester	18	9	0	1	0	1	22	0	3	<b>27</b>
* Summer and Short-Term Programs Abroad	85	41	0	1	10	6	94	4	11	<b>126</b>
* Work Abroad	15	2	0	1	2	0	12	1	1	<b>17</b>
Non-travel based Internationalization programs at Penn State	413	179	1	11	52	21	449	11	47	<b>592</b>
<b>Total</b>	<b>531</b>	<b>231</b>	<b>1</b>	<b>14</b>	<b>64</b>	<b>28</b>	<b>577</b>	<b>16</b>	<b>62</b>	<b>762</b>
Language Courses	467	154	0	24	68	33	419	9	68	<b>621</b>
Full-Time International Students	334	67	0	4	16	3	1	123	254	<b>401</b>
International Exchange Students	25	6	0	0	0	0	0	26	5	<b>31</b>

\* **Travel-based experience countries** (in order of highest participation rate to lowest): China, Italy, Kenya, Japan, Dominican Republic, France, Hungary, Morocco, United Kingdom, Spain, Germany, Singapore, Turkey, Peru, Australia, Ireland, South Korea, Egypt, Argentina)

The following list which is excerpted from pages 15 and 16 of the original report in reference to **Challenge 5**, identifies activities proposed in 2004. All have been pursued at some level during the past cycle; however, the ones that have had the greatest impact in addressing this challenge are the expansion of international opportunities both in quantity and variety, creation of courses with significant international or intercultural components, and the establishment of endowments to support these activities.

## Education and Scholarship

### Continuing Activities Addressing the Framework for Diversity

- Course offerings that have specific diversity content and are designed to attract a diverse enrollment:
  - Senior Capstone Design Projects (described in the preceding paragraph.) [\[Expanded to include international topics and in Spring 2010 to include multinational teams\]](#)
  - ED&G 497U: Global Approaches to Engineering design uses information technology and existing partners and contacts around the world to examine diverse approaches in engineering design. In collaboration with faculty and students in other countries, students study advanced topics, and engage in short studies and projects using the diverse views offered by their international partners. [\[Ongoing, formalized with multiple courses and permanent courses\]](#)
  - ENGR 497: Career Strategies for Engineering Women is team taught and developed with the participation of practicing engineers. It introduces tools and methodologies and employs professional mentors to better prepare students for success in the work force. Students study gender communications and diversity as part of the course. [\[Ongoing\]](#)
  - ENGR 297: Wellness Strategies for Engineering Women incorporates the development of effective lifelong wellness strategies, physical training, and stress management for engineering women and includes career development and gender components. [\[Ongoing\]](#)
  - ENGR 588: Seminar for Engineering TAs offers instructional training for Engineering Teaching Assistants and includes material related to diversity and cultural issues that impact pedagogy. [\[Ongoing, re-established as ENGR 888 to better align with the professional studies goals\]](#)
  - Success 101: A Road Map for the Successful Student, is a two-credit course for first year students of color designed to reveal successful strategies and contributions of earlier pioneers, and offering experiences in the application of calculus, chemistry and physics to upper level courses. [\[Ongoing\]](#)
  - ENGR 297: Lab and Shop Skills, a one-credit course designed to introduce women and ethnic minority students to key skills and showcase underrepresented students in leadership roles. [\[Ongoing\]](#)
  - Gender-balanced course sections in Math 140, Math 141, and first year seminars that feature hands-on mechanical experience. [\[First-year seminars continue. Math support is provided via the Academic Excellence Center operated by the Engineering Diversity Office\]](#)
  - Cluster course sections for under-represented minority students in Math 140, Math 141, Chem 12, Physics 211, and ED&G 100. [\[Replaced with other support via Academic Excellence Center, and orientation programs\]](#)
  - An S T S 497V (International Orientation seminar) one-credit course to prepare students who are going overseas. Issues covered include engineering practices in other countries, cultural differences, and what it is like to be in a professional environment in other countries. [\[Ongoing, formalized with a permanent course number\]](#)
  - Introduction of minors and minor courses that attract a high number of women students and help to increase retention. These are Leadership Development and Entrepreneurship. A comparison of participation rates by gender reveals that females in the college population are more likely to take leadership courses than their male counterparts ( $\chi^2=16.186$ ,  $df=1$ ,  $p<.0001$ ). This finding has been supported anecdotally by the course instructors for entrepreneurship as well. [\[Ongoing\]](#)
- Workshops for new faculty offered by the Instructional Services Office and The Leonhard Center with particular emphasis given to classroom climate, issues of cultural diversity, and diversity in managing and organizing teams in the classroom. [\[Ongoing\]](#)
- Supporting materials and documentation for facilitators and distribution of the video tape, "[In Their Own Words](#)", to partnering institutions for faculty training. [\[Replaced with World-class engineer banner video clips on College of Engineering website\]](#)
- An active International Program that provides students with the skills and orientation to function effectively in multicultural workplaces and social environments. This activity allows students to pursue various international experiences that enhance their education and facilitate their development as world-class engineers. Options include studying engineering abroad and pursuing a professional work experience through an international internship or co-op. In 2002-2003, the Global Internship and Cooperative Education program engaged fourteen Penn State engineering students in study and work abroad and an equal number of international students came to Penn

State. [Ongoing, programs and participation continue to expand as noted in the description of progress in Challenge 5]

#### **Planned Actions for 2004-2009**

- Continue to expand diversity course offerings in college, including a course on Professional Issues that will integrate diversity issues and is in the planning stages.
- Integrate diversity into all First Year Seminar offerings. [Ongoing, Leonhard Center workshop in May 2009 sought proposals; Race Relations Project being considered as a requirement for all first-year students beginning in 2010]
- Integrate diversity more explicitly into definition of the World-Class Engineer. [Ongoing].
- Offer diversity training to all faculty who regularly teach first and second year students. [Component in new faculty workshop and TA training; should be reviewed and expanding].
- Be cognizant of differences in learning styles, skill and confidence levels and certainty of the major choice (or even the decision to study engineering) held by different groups of students when devising or explaining class activities and assignments. This should include provisions to ensure that students with disabilities have the same opportunity for learning as students without disabilities, especially as the learning formats become more active. [Component in new faculty workshop and required TA training for all college teaching assistants]
- Insure that the advising system is proficient in helping students make course selections and utilize electives that will promote curricular coherency in their general education and major courses.
- Take advantage of opportunities to engage students actively in defining and agreeing on shared core values that will guide and enhance subsequent team-project and design efforts; establish an award program for senior projects that exhibit consideration of and sensitivity to cultural differences, to be given at the end-of-semester Design Showcase organized by The Learning Factory. [Not pursued at this time]
- Invite industrial representatives into the classroom and take advantage of the perspectives gained by co-op students to communicate the corporate processes for instilling commitment to and rewarding diversity. [Ongoing but intermittent]
- Offer faculty and TA workshops on the incorporation of non-intimidating approaches, such as role-playing, into the classroom experience to illustrate circumstances or dilemmas that call for policies and standards regarding ethics, diversity, flexible work arrangements and sexual harassment. [Ongoing and intermittent]
- Launch a searchable web database of engineering courses offered at study abroad locations, and increase the number of students participating in International Programs by developing an informational module for First Year Seminars. [Completed: database; Being discussed: International module for FYS]

## **INSTITUTIONAL VIABILITY AND VITALITY**

### **Challenge 6: Diversifying University Leadership and Management**

### **Challenge 7: Coordinating Organizational Change to Support Our Diversity Goals**

Since the development of the 2004-2009 Diversity Plan, several changes have occurred to address **Challenge 6** organizationally for the college and specifically with regard to the Multicultural Engineering and Women in Engineering Programs which contribute significantly to recruitment and retention programs.

- The Multicultural Engineering Program (MEP) and the Women in Engineering Program (WEP) were placed under the purview of a newly formed Office of Engineering Diversity, headed by an assistant dean. Associate directors for each program and two full-time, permanent staff members comprise the office. Students are employed for program support to the Academic Excellence Center, and to welcome visitors and respond to inquiries in the office, which is co-located with the Engineering Advising Center and the Career Resources and Employer Relations offices. Streamlining administrative functions and synergies that led to the creation of new programs were the products of the reorganization. Examples include previously mentioned programs and events: Diversity Showcase, Multicultural Engineering Program Orientation (design based on WEPO), EMIX—an internship program, and coordinated efforts to increase program and student support.
- The Academic Council, an expanded group composed of the Executive Committee and directors of key programs (such as the Engineering Diversity, Student Services, and the Leonhard Center) was created “to advance the college's efforts in continuing to build a strong and supportive

academic climate for a diverse group of students, staff and faculty.” The broadening of this committee has added to the diversity of perspectives on topics of importance to the college.

- An Academic Programs Steering Team was created to plan and discuss academic initiatives. Chaired by the associate dean for academic programs, the steering team includes the assistant deans for student services and engineering diversity, and the directors of the following offices and functions: Leonhard Center, Learning Factory, Career Resources and Employer Relations, First-Year Seminar, Engineering Institutional Assessment (a position filled since the Midpoint Update), Engineering Communications, and Graduate Programs.
- Although the college Executive Committee reduced from 19 members to 17 members due to realigning duties of an unfilled associate dean position and repositioning an intercollege program within a department, the diversity of the Executive Committee increased and now consists of 4 women, 1 Asian-American, and 1 African-American.

Particular efforts to address the elements in **Challenge 6** span practice as well as structure. Executive Committee and Academic Council Meetings, held three or four times a semester, provide opportunities to share information and discuss critical topics related to the college operation. Discussion items include budget updates, enrollment and graduation trends, research opportunities, strategies for nominating faculty for national recognition, and accreditation procedures and updates. Invited presenters over the past several years discussed topics related to governmental relations, protections and intellectual property, public relations and increasing visibility, diversity of graduate students, and stimulus funding. Not only do these topics provide valuable information to the existing leadership, they also provide opportunities for faculty leaders to present, e.g., Padma Raghavan provided an update on the Institute for CyberScience that she leads, and Tim Simpson shared the progress to increase industry-sponsored design projects in the Learning Factory. The Department Heads are encouraged to send a faculty member in their stead if they are unable to attend. This provides an important flow of information to the Department Head, but also assists faculty leaders in the departments to acquire additional knowledge about the college and university. Both the Executive Committee and the Academic Council play important roles in the development of the college’s strategic plan.

As evident by the active participation in, and leadership within the Faculty Senate, and other University level committees, the college encourages and supports faculty and staff to acquire leadership skills through participation in various professional development programs offered at the college and university levels while appropriately balancing the range of responsibilities. The college recognizes the value to the individual in establishing networks while developing leadership skills and benefits from staff and faculty gaining different perspectives, broader views of the university, as well as new knowledge and skills. These activities continue to be important in providing experiences that enable faculty and staff to be seen as viable candidates for leadership positions. Within the college, the Engineering Administrative Fellows Program, initiated in 1991 provides a formal opportunity for staff members to serve fellowships with higher-level staff members in different areas of the college.

Searches for faculty candidates are conducted by the departments, usually with a committee that leads the search and which is comprised of members that are both demographically and academically diverse. Broad announcements and communications across established networks are utilized. Recently, the University offered STRIDE (Strategies and Tactics for Recruiting to Improve Diversity and Excellence) at the Academic Leadership Forum. The program is designed for academic leaders and search committees to improve the effectiveness of search committees in their efforts to establish and review a diverse pool of applicants. To better assist search committees in addressing its goals, the college arranged for a second session of STRIDE to be offered for members of search committees in the college. This program reinforces the message and commitment that the college has to create a diverse pool of applicants.

The following list which is excerpted from pages 16 and 17 from the original report in reference to **Challenge 6**, identifies activities proposed in 2004. All have been pursued at some level during the past cycle; however, the ones that have provided the clearest path forward, have been those focused on developing leadership skills internally and enabling diverse perspectives to be part of the regular decision-making and strategic planning within the college.

## Diversifying University Leadership and Management

Continuing Activities Addressing the Framework for Diversity
<ul style="list-style-type: none"> <li>Peer Review of Exceptional Performance (PREP) and promotion and tenure workshops [<a href="#">PREP on hold for 2008-2009; P&amp;T workshops continue</a>]</li> <li>Provide opportunities for training through University workshops; encourage women and ethnic minorities to participate [<a href="#">Ongoing</a>]</li> <li>Actively promote women and ethnic minorities for recognition inside and beyond the University [<a href="#">Ongoing</a>]</li> </ul>
Planned Actions for 2004-2009
<p>Developing the leaders</p> <ul style="list-style-type: none"> <li>Outline and encourage among faculty interested in leadership roles the ways to develop broader knowledge of college and university infrastructures and functions [<a href="#">Ongoing</a>]</li> <li>Articulate approaches to balancing these developmental activities with successful advancement through the faculty ranks [<a href="#">Limited actions pursued.</a>]</li> <li>Support faculty aspirations towards leadership and upper administration roles and eliminate impediments and disincentives [<a href="#">Ongoing; opportunity to address mid-career faculty</a>]</li> </ul> <p>Diversifying the perspective</p> <ul style="list-style-type: none"> <li>Consider expanding the Executive Committee to include additional appointees to further diversify the leadership of the college and provide valuable experience and insights in deliberation and decision-making that are not currently available to the Committee. These appointments can be rotating so that the committee does not become too large. Steps have already been taken to invite heads of administrative units other than departments, such as institutes, research centers or distinguished or chaired professors, to selected meetings. Rotating appointments would not only serve as a way to introduce diversity into the committee, but would also provide retention and career development opportunities for other faculty. [<a href="#">Ongoing</a>]</li> <li>When searching for department heads or attempting to fill other leadership positions, invite applicants to submit a document that discusses their diversity and professional leadership philosophy. [<a href="#">Uneven application</a>]</li> </ul>

To address **Challenge 7**, considerable effort was directed toward integrating the strategic planning process to address the diversity framework goals. The planning process that led to the development of the 2008-2013 College of Engineering Strategic Plan engaged a cross-section of the college, and was influenced by department heads, directors, faculty, staff, development officers, and advisory boards. Not only did the process engage a diverse group, but the goals were grounded in a commitment to diversity. Beginning with the first goal, “Attract and develop an outstanding and diverse faculty, student body, and staff”, and concluding with the seventh goal, “Advance philanthropy and external relations”, the plan intersects the Framework to Foster Diversity goals and demonstrates the college’s commitment to achieve excellence through a commitment to diversity.

College Strategic Goal	Framework to Foster Diversity Challenges
1. Attract and develop an outstanding and diverse faculty, student body, and staff	3. Recruit and Retain a Diverse Student Body 4. Recruit and Retain a Diverse Workforce
2. Implement the World-Class Engineer vision in the Undergraduate Curriculum with emphasis on globalization and innovation	5. Developing a Curriculum that Fosters Intercultural and International Competencies
5. Enhance Outreach to the Commonwealth and Beyond (as it pertains to Promoting Activities to Engage the K-12 Community)	3. Recruit and Retain a Diverse Student Body
7. Advance Philanthropy and External Relations (as it pertains to undergraduate scholarships, graduate fellowships, faculty and program support)	3. Recruit and Retain a Diverse Student Body 4. Recruit and Retain a Diverse Workforce 5. Developing a Curriculum that Fosters Intercultural and International Competencies

The Engineering College Relations Office continues to play an important role in achieving the goals related to diversity. Two years ago one of the college's development officers was assigned, as part of his responsibilities, the Office of Engineering Diversity. The regular attention to increase support to programs and students is evident in annual gifts and endowments, but more broadly in the effort to cultivate relationships at networking events and to work with departments in their efforts to pursue mutually beneficial development goals. Since the last update, the Office of Engineering Diversity has been able to secure four endowments: two program endowments for the Multicultural Engineering Program, one program endowment for the Women in Engineering Program, and one endowment for a scholarship for the Women in Engineering Program. Additional support to the Office of Engineering Diversity programs has been achieved through funding agency support when faculty-led proposals leverage existing successful programs as part of their proposed activities. For example a recent award exceeding \$2 M from the National Science Foundation included support to expand the Academic Summer Experience (ASE) program—a bridge program designed for academic support and networking of underrepresented minority students admitted to the campuses.

Diversity goals are integrated into other functions and offices within the college. For example, the College's Engineering Career Resources and Employer Relations Office (formerly Cooperative Education and Professional Internship Programs) works closely with the Office of Engineering Diversity to identify and cultivate industry representatives for involvement in their activities and for support. The Engineering College Relations Office has also been successful in securing endowments that support faculty and students in their efforts to pursue international educational opportunities thereby addressing the college's goal to increase intercultural and international competencies (Challenge 5). Many of these exciting experiences are communicated to our constituents through an array of publications, online and print, to showcase the activities and to garner additional interest and support. Finally, the Engineering College Relations Office continues to oversee college publications and ensure that engaging and inclusive images are available and used in all publications. The college's new website launched in 2008, while a significant improvement over the former site, will continue to receive attention during the next cycle. For example, diversity resources, reports, and data, will be organized and more easily accessible, consistent with ADA compliance, and presented in a style that is balanced—all with an eye toward demonstrating a commitment to diversity and inclusiveness.

The following table which is excerpted from pages 16 and 17 from the original report in reference to **Challenge 7** identifies activities proposed in 2004. All have been pursued at some level during the past cycle; however, the ones that have been most instrumental in addressing the college's vision have been integrating the strategic planning process with the diversity plan goals, and establishing support for activities and programs that support diversity goals.

**Coordinating Organizational Change to Support Our Diversity Goals**

<b>Continuing Activities Addressing the Framework for Diversity</b>
<ul style="list-style-type: none"> <li>• Institution of Academic Council (see above) <a href="#">[Completed]</a></li> <li>• Taking leadership role in national for LEAP Conference sponsored by the National Academy of Engineering <a href="#">[Completed]</a></li> <li>• Integration of diversity goals into publications and development activities <a href="#">[Ongoing]</a></li> <li>• Integration of diversity goals and vision into overall college and departmental strategic planning <a href="#">[Completed]</a></li> </ul>
<b>Planned Actions</b>
<ul style="list-style-type: none"> <li>• Review of "A Framework to Foster Diversity at Penn State 2004-2009" to develop additional action items by the Academic Council <a href="#">[Limited actions pursued]</a></li> <li>• Integration of diversity questions and challenges into all IPAC meetings <a href="#">[Intermittent relative to other college needs for IPAC, e.g. ABET reviews]</a></li> <li>• Continued emphasis on diversity in unit strategic planning <a href="#">[Ongoing]</a></li> <li>• Communicate diversity values and imperatives more effectively to all faculty, students, staff and administrators through workshops and web dissemination <a href="#">[Limited actions pursued]</a></li> <li>• Work with the college development staff to identify Academic Excellence endowment resources to institutionalize programs currently reliant on annual income sources, grants and gifts <a href="#">[Ongoing]</a></li> <li>• Continue to expand departmental and faculty involvement and participation through appropriate incentive and recognition mechanisms <a href="#">[Ongoing]</a></li> </ul>

## CONCLUSION

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Every journey begins with a first step. The College of Engineering began in 1993 to make more explicit our goals to create a more diverse and inclusive environment. Each plan has put forward goals to pursue. During the past cycle the college has made progress toward achieving the following:

- increasing the representation of women and minorities on the faculty
- achieving greater diversity in the college leadership and the staff
- creating educational experiences that internationalize the curriculum for undergraduate students
- establishing processes to recognize exceptional performance among the staff.
- attracting underrepresented minority students for undergraduate study
- re-establishing percentages of women undergraduate enrollments to earlier
- integrating diversity planning and goals into the strategic planning and goals for the college.

In addition to maintaining the programs and practices that have enabled the college to make progress in those areas, the college recognizes that the past forward will require focused attention on the following goals:

- increasing underrepresented minority enrollment in graduate programs
- increasing women enrollments in undergraduate programs that have traditionally seen lower percentages of women students
- creating greater visibility for faculty and staff who contribute to creating a diverse and inclusive environment
- enhancing the communication and visibility of diversity initiatives using all available vehicles to inform and involve students, faculty and staff
- actively engaging all students in thinking about their perspectives of diversity and its linkage to their studies, particularly through inclusion in the design component and professional preparation
- utilizing established assessments and indicators to measure progress in addressing the diversity objectives and climate in the college.

In addition to establishing diversity as a core component of our vision, our ability to define progress toward addressing the Framework challenges has been dependent on the ability to provide specificity to actions and measures. Building upon our involvement in national efforts, centrally administered or supported surveys, and regular on-going data collection, the college will establish methods to organize our own data and results to better understand where our greatest opportunities lie. We continue to strengthen that effort with the recommendations that will comprise the 2010-2015 diversity plan, and which includes greater integration of activities, specific methods to measure progress, and responsibilities aligned with offices and task teams.