Annual Diversity Report

College of Engineering
Iowa State University

Submitted by:
Mark J. Kushner, Dean

Compiled by: Derrick K. Rollins, Sr., Assistant Dean for Diversity Affairs

15 April 2008
Table of Contents

I. COE Diversity Mission/Vision Statement ........................................... 3
II. Response to Diversity Statistics ......................................................... 4
III. Diversity Efforts ........................................................................... 5
IV. College/Unit Diversity Training and Resources ............................... 7
V. Curriculum, Pedagogy, Research, and Scholarship and Outreach Efforts .......... 8
VI. Best Practices/Final Comments .......................................................... 8

References ......................................................................................... 9
Figures ............................................................................................. 10
I. COE Diversity Mission/Vision Statement

Increasing the diversity of our students, staff and faculty is a priority objective of the College of Engineering (COE) as directed by the “2005-2010 Strategic Plan” of the university and is an essential element to meeting the 2050 Challenge, the bedrock of the COE Strategic Plan. Our commitment is entrenched in supporting an intellectually diverse environment to “broadly stimulate excellence and enable all members of our community to pursue their scholarship in the manner that can best serve our mission” as we fulfill our vision of international leadership in “producing innovative graduates and researchers that focus on meeting the present and future needs of society.”

As the management of resources continues to be challenging, it is clear that bold and creative initiatives are necessary to realize our vision. To accelerate our efforts, the COE has committed a significant amount of resources in the recent establishment of the Engineering Diversity Affairs (EDA) Office and the appointment of Professor Derrick Rollins in the newly created position of Assistant Dean for Diversity. This office provides college wide assistance in programming, fund raising and networking to significantly impact our success in diversity at all levels. In particular, this office provides oversight of the recruitment and mentoring of multicultural and female undergraduate engineering students, as well as providing critical input and accountability to our success in diversifying our graduate programs and faculty ranks. The final section of this report highlights some of the new programs this office will implement in the near future. The COE administration has also vigorously supported its Diversity Committee, tasked with developing and implementing best practices for diverse faculty recruiting. The administration has also been a vigorous supporter of the ADVANCE program.

The diversity goals in the COE are driven by the 2050 Challenge in recognition that “if the field of engineering remains alien for multicultural students and women, the US may not be able to produce enough engineers to technically compete with the rest of the world.” More specifically, our goals include tripling the number of Latino/a (LA) and African Americans (AAm) undergraduate students in the next three to five years and increase retention level of all students in the COE. For undergraduate females, we hope to exceed the national percentage in Engineering in the next three to five years. Our undergraduate enrollment is now about 2 percent below the national average. Our graduate enrollment of under-represent and female students is also lower than the national averages by similar values. Hence, we have set goals to close these gaps significantly in the next three to five years. Currently there are 177 tenured/tenured track faculty in the COE (head count). Of this total 17 are female, 1 is LA, 1 is AAm, and 72 are Asian/Pacific Islander (US Citizen or Permanent Resident). Through assistance with the NSF ADVANCE project and by strategic use of Cluster Hiring, we hope to double the number of female faculty in the next five years and add at least two multicultural underrepresented each year for the next five years. The chairs and deans in the College will be evaluated on their ability to meet these objectives.
II. Response to Diversity Statistics

In this section, the COE’s diversity is statistically compared to the national (US) and university using undergraduate, graduate, and faculty data. The ISU data comes from Office of Institutional Research (IR) and the national data comes from the National Science Foundation (NSF) and Engineering Workforce Commission under different sources as indicated. The percentage of Native Americans (NA) in national and university figures are so small that meaning in terms of trends are difficult to see. Thus, statistics on NA are not included while recognizing the need for considerable improvement. In addition, Asian/Pacific Islander Americans performance and enrollment numbers are excellent and as such will be left out of this analysis.

The US undergraduate enrollment trends from 1995 to 2005\(^1\) are shown in Fig. 1. The female enrollment reached a maximum around 2000 but has been steadily dropping since. For LA there is a slow upward trend but for AAm there is a slow downward trend. This could be a reflection of population trends. Note that all of these groups are enrolled much less than the proportion of population they represent. Similar ISU data (1996-2007) is shown in Fig. 2. There is also a downward trend for female enrollment about 2% less than national averages. For LA and AAm, our enrollment percentages are considerably less than the national numbers values and do not reflect the divergence of LA and AAm as in national data, though in 2007 there is some indication that LA may be overtaking AAm as the largest underrepresented group. The fact that ISU enrollments for LA and AAm lag behind national trends is in part explained by the Iowa undergraduate pool which is significantly less diverse than the national average.

Enrollment data for ISU are given in Fig. 3 for females and Fig. 4 for LA and AAm. The US-level data for bachelors’ degrees in engineering\(^2\) are shown in Fig. 5 for females, AAm and LA. One can compare these with Fig. 1 to get an indication of retention on a national level. ISU retention will be examined through 1-year retention rates as given in Fig. 6. First year retention is highest for females. Although retention rates are lower for AAm and LA, they has risen over the years. For reasons which are unclear at the moment, retention dropped considerably for AAm in 2006. The data for Fall semester 2007 seem to indicate that this trend will continue and we will also see a drop in LA. While the COE has not studied this drop in depth, data from the Carver Academy this spring (not shown) for Carver Scholarship students showed significant decline in the ACT scores of entering AAm students that could account in part for this trend.

While the COE will continue to work on increasing retention for all of its students and female students in particular, the most critical factor to increase the number of women in engineering is to increase recruiting efforts to increase the number of women in the incoming class. (That is, retention is not necessarily the issue.) According to current research, the recruitment effort should start as early as K6 education. Our plans to increase enrollment and to address retention of underrepresented students are discussed in the concluding section.

US\(^3\) and ISU graduate enrollment data are shown in Figs. 7 and 8. These trends follow the data for female undergraduates (Figs. 1 and 2) but report significantly lower values for LA and AAm on a National level. The figures for ISU numbers are similar. The improvement in graduate student diversity will in large part follow the improvement in our faculty diversity. We have placed high importance and instituted high standards in our faculty searches. In order for an offer to be made to a faculty candidate, there must be evidence of diversity in the candidate pool and, if lacking that, due-diligence in searching out diverse candidates. For example, this...
new policy has more than doubled the rate of interviewing of female faculty candidates. During the past year, 21% of regular faculty candidates interviewed were women. When including cluster candidates, 19% were women.

III. Diversity Efforts

The diversity related programs and activities in the COE are extensive. A subset of some of the more notable activities are described below. These include the LEAD Program, the COE Diversity Committee, and faculty and staff in collaboration with departments and central units in the college and university.

Retention

- Continued support from Lockheed Martin allowed the LEAD Program to open the Lockheed Martin Homework Help Center during AY2007-08. Upper class LEAD students who excelled in entry level calculus, chemistry, and physics courses are paid to give homework help and basic tutoring to underclass students. The Center, staffed 25 hours per week, has increased traffic to the LEAD Study Center by 50% and significantly increased informal peer mentoring.

- Participation in the LEAD Learning Community has doubled from 13 to 27 participants through enhanced marketing efforts.

- Funds have been allocated for tutoring female engineering students in collaboration with the Program for Women in Science and Engineering.

- The department of Mechanical Engineering (ME) has initiated the Women in Mechanical Engineering support program for current and prospective female students. The goal of the program is to substantially increase the percentage of undergraduate women in the program (currently $\approx 7\%$), as well as retain the current women and enhance their overall satisfaction and experience in the department.

Networking

- 2007 Welcome Cook-out – The first event of the Fall 2007 semester was a cook-out to welcome new students to campus and welcome back returning students and encourage networking amongst students, faculty, and staff. Faculty members from various departments were in attendance.

- 2008 Welcome Back Chili Supper - The purpose of this event was for students to meet Asst. Dean Rollins. Dean Rollins discussed the COE vision for students of color and innovative ways in which the LEAD Program can help students reach their full potential. During this event, the LEAD Program announced the establishment of a Student Advisory Board.

- Brown Bag Lunch with Industrial Representatives in the LEAD External Advisory Board Meeting.

- The LEAD Awards and Networking Banquet showcased students’ academic accomplishments throughout their experience at Iowa State and honored graduating seniors. This year, the event was transitioned into an Awards and Networking Banquet. Not only were students commended on their academic accomplishments but they also networked with peers, faculty and staff, and corporate leaders and recruiters from industry. Parents of graduating seniors and students receiving awards were invited to the event as well. By
providing students with the opportunity to attend this event, the college showcased the talents of multicultural students and provided industry with the opportunity to interact with students. There were five corporate sponsors in attendance that contributed $4,000 to make this event successful.

Notable Faculty Efforts

- The Toying with TechnologySM Program coordinated by the Department of Materials Science Engineering (MSE) is one of the largest outreach efforts in the COE, impacting thousands of K-12 students per year and hundreds of teachers. The program also has a 3 credit undergraduate engineering course for education majors (pre-service teachers) and a 2 credit graduate engineering summer class for practicing (in-service) teachers.
- Faculty in the department of Industrial and Manufacturing Systems Engineering (IMSE) are actively involved in various university committees and national organizations that promote ethnic and gender diversity in engineering and academia.

Professional development opportunities

- In partnership with the MSA and COE Career Services, the COE hosted a professional development workshop on Resume Building to prepare multicultural students for the Career Fair. This session provided students with useful tips on how to prepare their resume and how to utilize the online services of Career Management Service (CMS) to create an account and upload a resume.
- Diversity Networking Reception – The purpose of this event was to provide an opportunity for students to interact with recruiters from various companies prior to the Engineering Career Fair. Approximately 60 students attended.
- Stress Management Workshop – To provide help students deal with the high levels of stress during midterms. Students engaged in conversation with Ray Rodriguez and his student assistant.
- National GEM Consortium Presentation – The LEAD Program organized a session with representation from the National GEM Consortium to encourage multicultural students to pursue graduate school. Students were briefed on what to look for when choosing a university for graduate study and received support for their future graduate study endeavors.
- Financial Planning Workshop – The purpose of this event was to expose students to best practices for managing their finances. During this event Dr. Doug Borkowski, author of the Financial Tip of the Week, spoke to students about: credit report scores, buying a home, credit card debt and student loans.
- Provided funding for members of Society of Women Engineers (SWE), National Society of Black Engineers, (NSBE), American Indian Science and Engineering Society (AISES), Society of Hispanic Professional Engineers (SHPE), Society of Mexican American Engineers and Scientists (MAES), and the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE) to attend national meetings, as well as participate in regional leadership opportunities. These opportunities involved interacting with leaders and recruiters from corporations and graduate schools. By sending students to these meetings, the college showcases the talents of students of color and women, provides students with a means to develop professionally and as leaders while improving the visibility of the COE.
Contributions from corporate donors: To date for AY2008, nine corporations have donated more than $40,000 for undergraduate diversity activities and programs.

Multicultural Events

- The COE actively participated in and co-sponsors the Iowa State Conference on Race and Ethnicity (ISCORE). Members of the COE are members of the planning committee and various faculty, students, and staff presented at the conference. Attendance to this conference is mandatory to students who are GWC or MVP Scholars as well as for students who are members of the LEAD Learning Community.
- Throughout the academic year, EDA through LEAD offers opportunities to minority students to develop their leadership potential and career development. Some of these funded opportunities are: 15 participants for Noche de Cultura/Night of Culture; and tables for Diwali Night; the Legacy Ball; and the NAACP Freedom Fund Banquet.
- With the purpose of celebrating the accomplishments of our students of color, EDA and LEAD provide sponsorship for the graduation celebration People of Nia. This event is organized by the Black Student Alliance and the Black Graduate Student Association but recently joined forces with the Latino Graduate Student Association to make this a larger scale celebration.

Notable University and Regent Awards and Honors For COE Multicultural Students

- Rachel Iheanacho, CBE – The Wallace E. Barron All-University Award
- Brandon M. Kennedy, ME – The W. Robert Parks and Ellen Sorge Parks Senior Scholarship
- Whitney Bynum 2008, ME -- "Women Impacting ISU" Calendar
- Korin Reid, CBE -- Erroll B. Davis, Alliant Energy Award, presented by the Board of Regents

IV. College/Unit Diversity Training and Resources

This section highlights some of the diversity training that faculty and staff in the COE received during the 2007-2008 school year are presented.

- Classroom Climate Workshops - In collaboration with the Center for Excellence in Learning and Teaching (CELT), the COE presented the workshop series Enhancing the Climate in Engineering to share best practices for improving the climate for students in engineering. The methods are intended to increase participation, leadership and sense of community for all students and thereby help retain multicultural students and women in engineering.
- Visiting Scholar – With the intent of promoting engineering faculty’s understanding and implementation practices for improving undergraduate classroom climate, Dr. James Johnson, Dean of Engineering, Architecture, and Computer Science at Howard University, visited the COE in October 2007. He is the 2005 recipient of the National Society of Black Engineers Lifetime Achievement Award in Academia and is recognized as a national leader in the development of strategies to increase underrepresented groups in science, technology, engineering, and math (STEM) disciplines. While at ISU, Dr. Johnson met with the COE Diversity Committee, department Chairs and directors of graduate education. He also gave a seminar entitled “Diversity in the Worlds of Math, Science, and Engineering.”
• The workshop “Planning Inclusively for Classroom Diversity” was attended by about 40 faculty. The workshop was partially a response to the call of President Geoffroy in the fall of 2007 for student recruitment and retention to be a major priority for ISU. The presenter was Dr. Susan Yager, Associate Director of CELT. In preparation for the workshop, Dr. Yager attended several engineering courses across the college to observe classroom practices. In the workshop she compiled information and shared valuable insights for improving teaching effectiveness.

• NAMEPA Conference – Dean Rollins and Laura Centeno-Díaz, the LEAD Program Coordinator, attended the 2008 National Association of Multicultural Engineering Program Advocates (NAMEPA) Conference in Atlanta, GA. This conference provided networking opportunities with other professionals in similar positions and information about ways to recruit and retain students with compliance to current laws and practices.

V. Curriculum, Pedagogy, Research, and Scholarship and Outreach Efforts

Outreach efforts included the following:

• Partnered with Engineering Outreach and Recruitment to host 24 prospective students of color at Evening with Engineering in February 2008, an event that provided students and their parents with information about academic and social support available through the LEAD program.

• In collaboration with SHPE/MAES, the annual SHPE/MAES High School Shadow Day was held to encourage Latino students from Iowa to explore the field of engineering and connect with successful and influential engineering students. Over 25 SHPE/MAES members and volunteers participated in the 2008 High School Shadow Day.

• In collaboration with the Office of Multicultural Student Affairs (MSA), the COE co-sponsored the Academic Program for Excellence (APEX) during the 2007 summer.

• The COE participates in the Multicultural Vision Program (MVP), which has an emphasis on recruitment. Currently there are 46 MVP scholarship recipients in the COE and 3 are graduating the spring of 2008. Recruitment of high achieving minority students have led to 30 new students from the COE receiving George Washington Carver Scholarships for AY2007-08. Currently there are 126 GWC scholarship recipients in the COE and 16 will be graduating in the spring of 2008.

VI. Best Practices/Final Comments

Although diversity efforts in the COE are broad and substantial there is still a significant amount of variation in the efforts of departments and programs, and some amount of disconnect between those efforts. As a result, the COE will look at ways to maximize resources and streamline those practices to be more effective in reaching our goals. For example, the Mechanical Engineering (ME) Department, in an effort to significantly impact the number of undergraduate and graduate females, has hired two staff members dedicated to the recruitment
and retention of female students. To this end ME has planned and hosted a number of visitation and social activities to increase the connection of its female students to members of their department. Another example worth noting is the pool of candidates that Chemical and Biological Engineering interviewed this academic year – 6 of the 11 were either a woman or person of color. Through the COE Diversity Committee we will continue to provide workshops to educate on best practices and work with all members of our college.

The data presented in the report suggest that the number of female students will grow through recruiting and mentoring at an early age. However, the growth of underrepresented students of color will require aggressive recruiting in new areas inside and outside of Iowa. We will also require effective transition programs for incoming freshman and programs to mentor and address deficiencies early in their undergraduate careers. In addition, to reach our enrollment goals we will target larger number of students from low income, academically disadvantaged environments who may not have documented prior academic success (e.g., test scores) but do have the potential to succeed. As such, their success will strongly depend on the development of effective transition and academic year programs. In this regard, this summer the COE plans to launch a new transition program called the Summer Program for Enhancing Engineering Development or SPEED. Starting next fall we will hold Academic Workshops that will focus on the skill development to academically succeed. The funding for these programs will dominantly come from corporate partnerships where the supporters will play an active role in the professional development of the students.

We were successful in obtaining substantial funding for a Federal earmark project in partnership with the Florida A&M University (FAMU) and the South Dakota School of Mines & Technology (SDSMT). FAMU is an HBCU (Historically Black College and University) and SDSMT has a substantial Native American population. These partnerships will provide us with direct access to undergraduate students of color for internships and graduate school as we nurture the relationships. Equally exciting is the strong possibility that we will be awarded an NSF Research Center in Biorenewable Chemicals which has a strong diversity component across all levels of education.

The COE is committed to and devoting resources to improving its diversity. There are many factors which contribute to its diversity being less than the ISU average (i.e., historic national trends for engineering programs and deficient pipelines of STEM prepared human resources), the COE is working hard towards becoming a destination of choice for diverse students, faculty and staff. This improvement is and will continue to occur over many years.

References

Figure 1 - US enrollment 1995-2005 for all engineering undergraduates.

Figure 2 - ISU enrollment 1996-2007 for all engineering undergraduates.
### Figure 3 – ISU enrollment in engineering freshmen class from 1994-2007 by gender.

<table>
<thead>
<tr>
<th>Year</th>
<th>Female</th>
<th>Male</th>
<th>% Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>170</td>
<td>746</td>
<td>18.6%</td>
</tr>
<tr>
<td>1995</td>
<td>190</td>
<td>710</td>
<td>21.1%</td>
</tr>
<tr>
<td>1996</td>
<td>158</td>
<td>738</td>
<td>17.6%</td>
</tr>
<tr>
<td>1997</td>
<td>185</td>
<td>835</td>
<td>18.1%</td>
</tr>
<tr>
<td>1998</td>
<td>188</td>
<td>833</td>
<td>18.4%</td>
</tr>
<tr>
<td>1999</td>
<td>202</td>
<td>901</td>
<td>18.3%</td>
</tr>
<tr>
<td>2000</td>
<td>155</td>
<td>886</td>
<td>14.9%</td>
</tr>
<tr>
<td>2001</td>
<td>193</td>
<td>1,041</td>
<td>15.6%</td>
</tr>
<tr>
<td>2002</td>
<td>179</td>
<td>907</td>
<td>16.5%</td>
</tr>
<tr>
<td>2003</td>
<td>167</td>
<td>887</td>
<td>15.8%</td>
</tr>
<tr>
<td>2004</td>
<td>149</td>
<td>842</td>
<td>14.7%</td>
</tr>
<tr>
<td>2005</td>
<td>125</td>
<td>895</td>
<td>14.6%</td>
</tr>
<tr>
<td>2006</td>
<td>153</td>
<td>997</td>
<td>14.8%</td>
</tr>
<tr>
<td>2007</td>
<td>173</td>
<td>997</td>
<td></td>
</tr>
</tbody>
</table>

### Figure 4 – ISU enrollment in engineering freshmen class from 1994-2007 by race.

<table>
<thead>
<tr>
<th>Year</th>
<th>African American</th>
<th>Hispanic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>25</td>
<td>13</td>
</tr>
<tr>
<td>1995</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>1996</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>1997</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>1998</td>
<td>27</td>
<td>17</td>
</tr>
<tr>
<td>1999</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>2000</td>
<td>20</td>
<td>27</td>
</tr>
<tr>
<td>2001</td>
<td>36</td>
<td>40</td>
</tr>
<tr>
<td>2002</td>
<td>27</td>
<td>22</td>
</tr>
<tr>
<td>2003</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>2004</td>
<td>21</td>
<td>29</td>
</tr>
<tr>
<td>2005</td>
<td>18</td>
<td>27</td>
</tr>
<tr>
<td>2006</td>
<td>24</td>
<td>27</td>
</tr>
<tr>
<td>2007</td>
<td>23</td>
<td>31</td>
</tr>
</tbody>
</table>
Figure 5 - US Engineering bachelor's degrees awarded from 1990-2005.

Figure 6 - ISU first-year retention rates from 1994-2006.
Figure 7 - US graduate enrollment in engineering from 1998-2005.

Figure 8 - ISU graduate enrollment in engineering from 1996-2007.