

Contact: Diana Gonzalez

**MATHEMATICS AND SCIENCE COLLABORATIVE STUDY OF
WOMEN AND MINORITIES IN STEM PROGRAMS**

Action Requested: (1) Consider approval of the report to the Iowa General Assembly regarding the enrollment of women and minorities in STEM (science, technology, engineering, mathematics) programs. (2) Direct the Board Office to submit the final report to the General Assembly by January 15, 2009.

Executive Summary: As a result of legislation in 2008, HF 2679 (Attachment A) directed the Board of Regents to conduct a mathematics and science collaborative study to (1) collect data and report on the number and proportion of women and minorities enrolled in STEM programs, including high school programs, such as Project Lead the Way; and (2) make recommendations for STEM-related programming measures for improving the number and proportion of women and minorities in STEM programs.

The collaborative study was assigned by the Council of Provosts to the Iowa Mathematics and Science Education Partnership (IMSEP) under the leadership of Dr. Jeff Weld, IMSEP Director. A team of inter-institutional faculty and staff, as well as representatives from the Iowa Department of Education, the Iowa Commission on the Status of Women, and the Board Office, collected and analyzed the data and prepared the report.

Women and many U.S. minorities are underrepresented in STEM (science, technology, engineering, and mathematics) majors and occupations. "Underrepresentation of women and U.S. minorities in some STEM fields at the university level is puzzling given high school performance trends." Data from the Iowa Department of Education (2007) indicate that high school young men and women participate and perform nearly equally in math and science coursework.

The report (Attachment B) includes the following recommendations:

1. Seek opportunities for ongoing and new STEM initiatives within the state to increase the number of women and/or minorities participating and succeeding where imbalances exist.
2. Maintain existing STEM diversity programs at Regent universities and pursue opportunities to expand these programs within and beyond the Regent university system.
3. Encourage additional collaborations across the Regent universities, within Regent universities, and among the Regent universities, the Iowa Department of Education, Iowa private and community colleges, Iowa Department of Economic Development, Iowa Workforce Development, regional economic development groups/STEM employers, K-12 schools, AEAs, and other educational institutions and groups on issues and programs addressing women and/or minorities in STEM.

4. Aspire to institutionalize STEM diversity/gender positions and programs within the normal administrative structures of the Regent universities.
5. Provide opportunities for faculty involvement in programs associated with women and/or minorities in STEM.
6. Provide professional development opportunities for Regent faculty and staff on research-based best practices for creating teaching/learning experiences in STEM disciplines that most effectively meet the learning needs of all students, particularly those underrepresented in the instructor's field.
7. Provide annual updates on enrollment and graduation of women and minorities in STEM programs to the Board of Regents, State of Iowa.

The report has been reviewed by the Board Office and the Council of Provosts and is recommended for approval.

HOUSE FILE 2609

Section 13. BOARD OF REGENTS MATHEMATICS AND SCIENCE COLLABORATIVE STUDY – WOMEN AND MINORITIES IN STEM PROGRAMS.

1. The state board of regents shall conduct a mathematics and science collaborative study. The purpose of the study shall be to collect data and report on the number and proportion of women and minorities enrolled in science, technology, engineering, and mathematics programs, including high school programs such as project lead the way. The study shall develop and submit to the board recommendations for science, technology, engineering, and technology-related programming measures for improving the number and proportion of women and minorities in science, technology, engineering, and mathematics university programs. The state board of regents shall submit the data and its findings and recommendations in a report to the general assembly by January 15, 2009.
2. The state board of regents shall direct the universities it governs to take every reasonable measure to improve the number and proportion of women and minorities in university science, technology, engineering, and mathematics programs and colleges.

**Women and Minorities in STEM Programs at
Iowa's Regent Universities
and in the
High School Program *Project Lead The Way***

*A report produced by a committee of faculty and staff from
Iowa's three Regent universities and the Iowa Department of Education under the
auspices of the Iowa Mathematics and Science Education Partnership on behalf of
the Board of Regents, State of Iowa.*



January 15, 2009

EXECUTIVE SUMMARY

A collaborative team of faculty and staff from Iowa's Regent universities, working with contributors from the Iowa Department of Education, was charged to conduct a study of the number and proportion of women and minorities enrolled in science, technology, engineering, and mathematics programs, including high school programs such as Project Lead The Way. The report is to include recommendations for improving the number and proportion of women and minorities in STEM university programs. This report looks to answer three questions relevant to the legislative charge:

What do general indicators suggest about the preparation of high school-age women and students of diversity for science-technology-engineering-mathematics (STEM) study at Iowa's public universities?

What is the current representation of women and minorities in STEM fields at Iowa's three public universities?

What are key recommendations for maintaining and improving the proportion of women and minorities enrolled and degreed in STEM fields at Iowa public universities?

Indicators, including the results of standardized tests (the Iowa Test of Educational Development and the ACT), advanced course taking, and course grades and grade point averages, all suggest that young men and women enjoy similar opportunities and successes in high school STEM fields of study. For Iowa's minority students, performance gaps persist, but increased opportunities for advanced coursework help close the gap. Project Lead the Way is a rapidly expanding high school program of engineering-related courses reaching 87 high schools in 2008, though proportional participation of women and minorities lags.

At the Regent universities the proportion of women and minorities in STEM majors has generally increased over the last nine years. Women comprise the majority of majors in some fields of STEM study, including the biological sciences at the undergraduate level, and veterinary medicine at the graduate/professional level. The numbers of minority students enrolling and earning degrees at the Regent universities have been on a steady climb. However, the proportion of women choosing STEM fields of study is well below campus populations. Likewise, as percentages of some minority groups increase on the university campuses (e.g., African American and Native American students), matching increases in their numbers in STEM majors are not always seen, particularly in physical science, computer science, and engineering.

A series of recommendations derived from the ample and growing literature regarding best practices in providing for successful study in STEM for women and minorities, indeed all students, is provided. In addition to highlighting existing programs for recruiting and retaining women and minorities in STEM fields, seven recommendations are proposed for increasing the proportion of women and minorities in STEM fields:

1. Seek opportunities for ongoing and new STEM initiatives within the state to increase the number of women and/or minorities participating and succeeding where imbalances exist.

2. Maintain existing STEM diversity programs at Regent universities and pursue opportunities to expand these programs within and beyond the Regent university system.
3. Encourage additional collaborations across the Regent universities, within Regent universities, and among the Regent universities and the Iowa Department of Education, Iowa private and community colleges, Iowa Department of Economic Development, Iowa Workforce Development, regional economic development groups/STEM employers, K-12 schools, AEAs, and other educational institutions and groups on issues and programs addressing women and/or minorities in STEM.
4. Aspire to institutionalize STEM diversity/gender positions and programs within the normal administrative structures of the Regent universities.
5. Provide opportunities for faculty involvement in programs associated with women and/or minorities in STEM.
6. Provide professional development opportunities for Regent faculty and staff on research-based best practices for creating teaching/learning experiences in STEM disciplines that most effectively meet the learning needs of all students, particularly those underrepresented in the instructor's field.
7. Provide annual updates on enrollment and graduation of women and minorities in STEM programs to the Board of Regents, State of Iowa.

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Section A

Background on the Equity and Diversity Challenge in STEM Education

An Unbalanced Equation

Women and many U.S. minorities are underrepresented in STEM (science, technology, engineering, and mathematics) majors and occupations, to the detriment of our technology-reliant economy and globally-connected society. A constellation of factors—including unequal opportunities for advanced coursework, and instructional practices that favor some students and groups over others—is likely to figure in to this unbalanced equation. Hard-earned progress, however, is being made in some STEM sectors, while in others an unacceptable chasm of opportunity persists, rooted in gender, race, and ethnicity.

High School Performance in STEM Fields

Underrepresentation of women and U.S. minorities in some STEM fields at the university level is puzzling given high school performance trends. Data from the Iowa Department of Education (2007) indicates that high school young men and women participate and perform nearly equally in math and science coursework.

2006-07 school year course enrollment in Iowa high schools

50% of the students enrolled in higher level math courses were female.

52.7% of the students enrolled in chemistry were female.

42.8% of the students enrolled in physics were female.

Proficiency on the Iowa Test of Educational Development also indicates that the performance of high school men and women in math and science is quite similar.

Percentage of proficient 11th graders on ITED (2005-06 and 2006-07)

<u>Mathematics proficiency</u>	<u>Science proficiency</u>
Females = 77.7%	Females = 82.5%
Males = 78.9%	Males = 78.1%

Minorities (African American, Hispanic, Native American) are about 20 percentage points behind on the ITED: Math = 54.2%; science = 60.5%.

College Entrance Examinations

When it comes to math and physical science components of college entrance exams nationally, males outperform females, on average (Corbett, et. al. 2008). In Iowa, on the other hand, for the graduating class of 2008, ACT scores are only a few percentage points apart (IDE, 2007). Two-thirds of Iowa high school graduates take the ACT exam.

On the math component of the Scholastic Aptitude Test, boys consistently, though modestly, outscore girls by a 40 point spread (on a 200 to 800 score scale) that has persisted for decades (Halpern et. al. 2007). The greater percentage of women taking both the ACT and SAT broadens the range of abilities, lowering average or aggregate scores (Corbett et. al.).

Iowa ACT participation and average scores for the graduating class of 2008

	<u># of test takers</u>	<u>Math average</u>	<u>Science average</u>
Males	10,541	22.6	22.9
Females	12,013	21.2	21.8

The expanding opportunity for advanced coursework in STEM fields is showing results in progress for minority high school students nationally. The percentage of African American and Hispanic students taking the AP exam in chemistry and physics is increasing faster than the rate of increase for non-minority students while the mean gap in math scores between minority and non-minority has closed by over 30% over the last 20 years (NCES, 2007).

What goes on between secondary school—where young women get better grades on average than their male counterparts in math and science (NCER, 2007)—and college graduation where women earn slim percentages of physical science and engineering bachelor’s degrees (NCES, 2000)? How can it be that at the point of post-secondary enrollment, the proportion of African American students majoring in science and engineering programs is nearly the same as the proportion of white students (12% to 13%) (Babco, 2003), yet only 37.8% of minority engineering majors persist to graduation while 46.1% of non-minority students graduate (McPhail, 2008). The collegiate study of the STEM fields is differentially experienced by women and minority students, by evidence of proportions majoring in, and finishing, STEM programs.

STEM Workforce Trends

Considering that women and minorities comprise about 60% of the U.S. workforce, their numbers in science and engineering professions come nowhere close to their numbers as a proportion of the U.S. population (Bureau of Labor Statistics, 2001). Women make up 46% of the U.S. workforce but represent only 27% of those employed in physical science and engineering nationally (Halpern, et al, 2007). In Iowa, women comprise 48.5% of the “science research and development” category of occupations and 26.9% of “architectural and engineering” (Pearson & Gordon, 2008). African Americans, Hispanics, Native Americans, and other minorities constitute some 30% of the U.S. population but only 7% of the physical science and engineering labor force (NSF, 2002).

Factors Associated with Underrepresentation

Factors associated with underrepresentation of women and minorities in some STEM majors and occupations are a mixed collection of promising trends and maddening stagnations. For example, women currently earn about 57% of U.S. bachelor’s degrees, and account for over half of the degrees awarded in the social sciences (Corbett, et. al.). At Iowa’s Regent universities, as well as nationally, over half of biology bachelor’s degrees and about half of all chemistry four year degrees are earned by women. These successes account, in part, for the fact that half of all medical school graduates and three-fourths of veterinary school graduates are women (Halpern, et al, 2007). Things are different in the mathematically-based fields of computer science, physics, and engineering at Iowa universities

where women earn less than one in four bachelor’s degrees. Nationally, women earn 25% of computer science-related degrees, 22% of physics degrees, and 21% of engineering degrees (NCER, 2007). The net effect is an aggregated STEM figure that belies an imbalance of participation for women and minorities across the STEM field spectrum. At Iowa’s Regent universities, 40% of all STEM undergraduate degrees are awarded to women. Minorities, constituting about 8% of all enrollees, earned 9% of all STEM degrees in 2008. Compared to national proportions of women in selected STEM fields, Iowa lags (Figure 1).

Figure 1: Bachelor's Degrees Obtained by Women

in Selected STEM Fields Nationally, and for Iowa’s Regent Universities*, 2005-06

(Source: NCWIT, 2007)

Degree	National	Iowa
Computer Science	15%	8.4%
Physics	21%	12%
Chemical Engineering	36%	37.7%
Mathematics	45%	41%
Chemistry	52%	47.6%
Biology	62%	56.5%

*National data from 2005-06; Iowa data from fall 2008

Nationally, the most popular bachelor’s degree for African American students is business (21% of total enrollees) while one of the least frequently enrolled is engineering (2.6%) (NCES Table 25.2, 2007). An unfortunate but fixable cascade of events, including limited opportunities for advanced coursework at the high school level and the impacted test scores and class grades that ensue in college, create hardship for many African American students with interests in STEM fields (Babco, 2003).

Challenges remain but thoughtful answers to the complex question of imbalance are emerging. Increasingly clear is the importance of previous and challenging, relevant coursework and personal interest in preparing women, minorities, indeed all students, for success in STEM (NCER, 2007). For women particularly, beliefs in ability—strongly linked to teacher actions— equate to accomplishment in STEM-related coursework (Halpern, et al). Successful learners encounter and must socially navigate negative stereotypes associated with success in STEM courses (Corbett et. al.).

A report from the U.S. Department of Education (NCES, 2000) highlights many of the factors that can affect women and ethnic minority students’ decisions to enroll and persist in STEM related programs. Key factors include the following:

- Student self-confidence in math and science.
- Student attitudes regarding quantitative studies.
- Student attitudes about changing gender roles (anticipated ability to balance career/family).
- Academic preparation.
- Precollege curriculum, instruction, teachers/counselors, and STEM learning opportunities.

- College/university institutional structure and commitment, academic and social climates, and special programs in STEM.

National Imperative, Local Action

Underrepresentation, by a sizable degree, of broad sects of the American population in STEM coursework and resultant careers is unfair and unsustainable for our 21st century society. As Irving Pressley McPhail, C.O.O. of the National Action Council for Minorities in Engineering states, "... science and engineering have, to a large extent, failed to recognize that diversity and inclusion drive innovation, and that their absence imperils our designs, our products, and most of all, our creativity" (McPhail, 2008). This report is an important step in contributing to a state and national urgency to level the field of access and opportunity in STEM fields at Iowa's Regent universities.

Section B

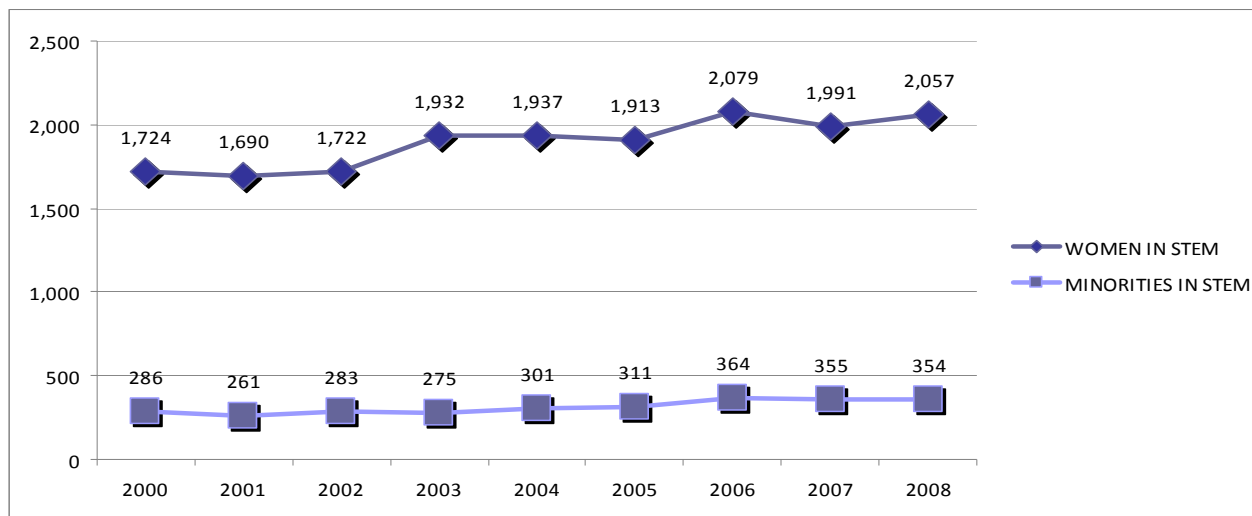
2000-2008 Enrollment and Degree Data for Women and Minorities

The Regent universities are actively committed to increasing the diversity of the enrollment in STEM fields. While the universities have made progress, there is still plenty of room for improvement of the representation of women and minorities in STEM. Appendix I lists the STEM majors included in this report.

Enrollment in STEM Fields

Representation of women and minority students in STEM fields at the three Regent universities has seen modest increases since 2000. Women account for 40% of all students enrolled in STEM fields in fall 2008 compared to 37% in fall 2000, while minority students account for 9% of all STEM students in fall 2008 compared to 7% in fall 2000. The greatest percentage increases for women occurred in the professional schools (medical, dental, and veterinary medicine), where the percentages increased from 51% to 57%. At the undergraduate level, the percentage increase was more modest from 37% to 39%, while the graduate student percentage increased from 38% to 41%. Increases in minority percentage were fairly consistent across all three classifications of students (undergraduate, graduate, and professional). Figure 2 provides the number of women and minorities enrolled in STEM for undergraduate, graduate, and professional studies at Iowa's Regent universities over the last nine years.

Figure 2
Total Enrollment of Women and Minorities in STEM Fields at Iowa Regent Universities, 2000-08



Some differences in the representation of women and minority students in STEM fields among the three universities can be attributed to the overall demographics of the institutions (for minority students) and the degree programs offered (for example, majors offered which may bring more women students). For fall 2007, the overall percentage of minorities in the campus population is 8.9% at SUI, 9% at ISU, and 5.7% at UNI (Figure 3). Therefore, the fact that minority student enrollment in STEM follows a similar

trend is expected. Minority students account for 11% of the STEM students at SUI, 8% at ISU, and 6% at UNI. Women account for 48% of the STEM students at SUI, 44% at UNI, and 34% at ISU (figures 4 through 19). Since engineering is significantly underrepresented by women and engineering accounts for half of the STEM students at Iowa State, it is no surprise that Iowa State’s overall percentage of women in STEM is significantly lower than SUI and UNI, based on engineering enrollments. The University of Iowa also has an increase in percentage of women, as women are attracted and enrolled in medical related majors (medical school, biomedical engineering, etc.) at levels equal to or greater than men. Iowa State University sees a similar situation in the College of Veterinary Medicine (which accounts for all ‘professional’ students at ISU and is 75% women).

Figure 3: Current Undergraduate Enrollments at Iowa Regent Universities by Race/Ethnicity

Race/Ethnicity	SUI		ISU		UNI	
	Count	%	Count	%	Count	%
White & No Response	18,649	89.2%	18,357	87.4%	10,081	91.6%
African American	465	2.2%	597	2.8%	287	2.6%
Asian American	747	3.6%	678	3.2%	133	1.2%
American Indian	98	0.5%	67	0.3%	34	0.3%
Hispanic American	544	2.6%	543	2.6%	177	1.6%
<i>Race/Ethnic US minority</i>						
<i>Subtotal</i>	<i>1,854</i>	<i>8.9%</i>	<i>1,885</i>	<i>9.0%</i>	<i>631</i>	<i>5.7%</i>
International Students	404	1.9%	762	3.6%	298	2.7%
Institutional Total	20,907	100.0%	21,004	100.0%	11,010	100.0%

(Source: Board of Regents, State of Iowa Fall 2007 Enrollment Report, as reproduced in the Report of the Regents Inter-institutional Task Force on Retention, Graduation, and Diversity, 2008)

Nine-year Enrollment Trends: Women and Minorities

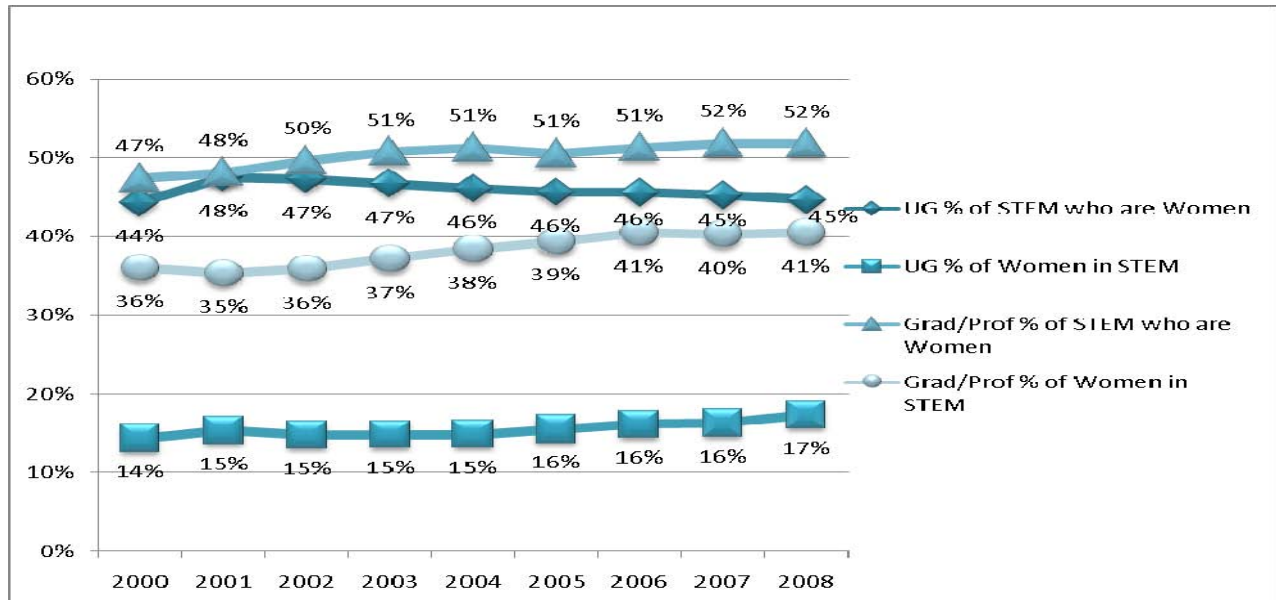
Increasing populations of women and minorities on campus translate into increases in the overall number of women and minorities enrolled in STEM at the Regent universities. The total number of women in STEM fields system-wide has increased from 8,002 to 9,258, while the total number of minority students in STEM fields has increased from 1,570 to 2,007.

Another way to consider the enrollment of women and minorities in STEM is in relation to the overall enrollment at the institutions, answering the question, “What percentage of our overall enrollment for a particular group is in STEM fields?” In fall 2008, 34% of all students enrolled at a Regent university were enrolled in a STEM field. Of the minority students enrolled at the Regent universities in fall 2008, 33% were enrolled in STEM fields. Minority students are enrolling in STEM fields at our universities at about the same rate as the institutional average. The same does not hold true for students based on gender. For fall 2008, 27% of the women enrolled at Regent universities were in STEM fields, while of all men enrolled at Regent universities, 41% were in STEM fields.

A wealth of data resides in the enrollment and graduation tables provided as Appendix II (STEM ENROLLMENT DATA TABLES) and Appendix III (STEM DEGREES DATA TABLES). The overview provided by this report provides a framework for specific inquiries as to STEM performance and degree by ethnicity or race, and by gender. For example, the consideration of women of color in STEM fields is illuminating. Across the Regent universities, Latinas/Hispanic women and African American women are represented

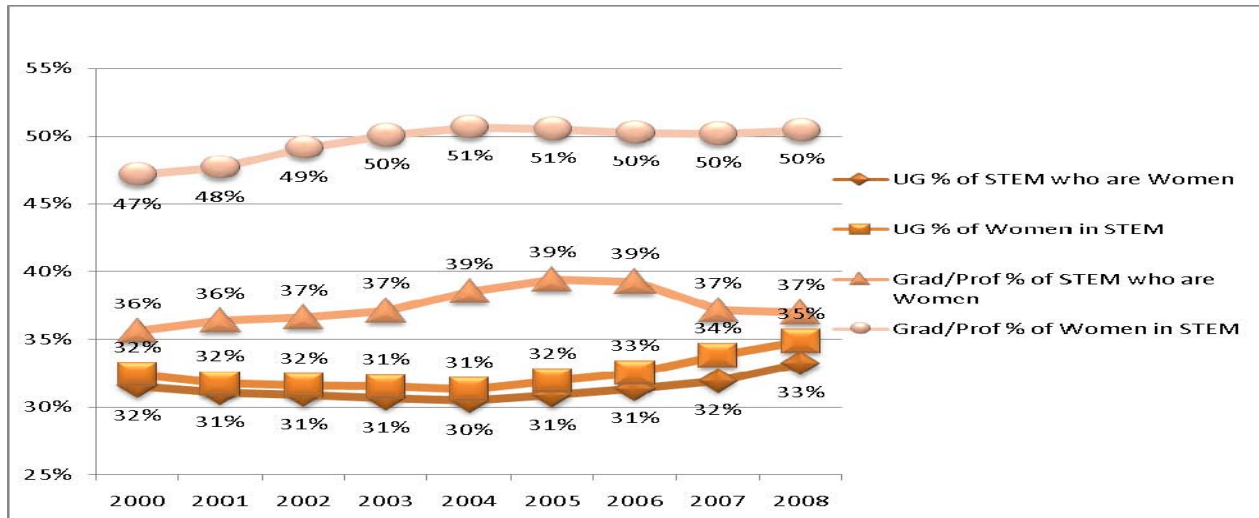
at a higher rate than other racial/ethnic groups when comparing representation by gender within a race/ethnic population. Of the undergraduate Hispanic students enrolled in STEM fields at the Regent universities, 45% are female; and within undergraduate African American STEM students, women account for 42% of the students. In contrast, women account for 39% of the Asian American undergraduate students in STEM, 38% of Caucasian undergraduate STEM students, and, 38% of the Native American/American Indian undergraduate STEM students.

Figure 4: Women Enrolled in STEM Fields at SUI



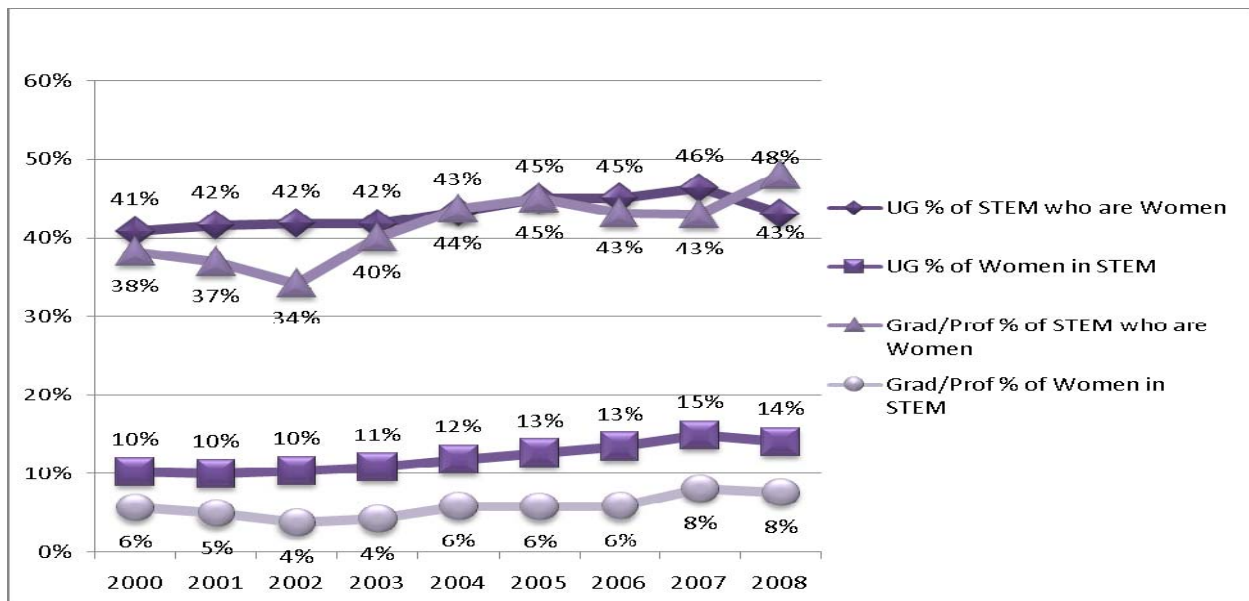
At the University of Iowa, the percentage of women studying STEM fields at the undergraduate level (represented by squares) has steadily increased over the most recent nine-year period even though the percentage of STEM majors who are women (diamonds) has declined slightly. An overall increase in STEM enrollment accounts for the difference. The percentage of women in STEM at the graduate level (circles) and the percentage of graduate STEM majors who are women (triangles) have both risen at SUI.

Figure 5: Women Enrolled in STEM Fields at ISU



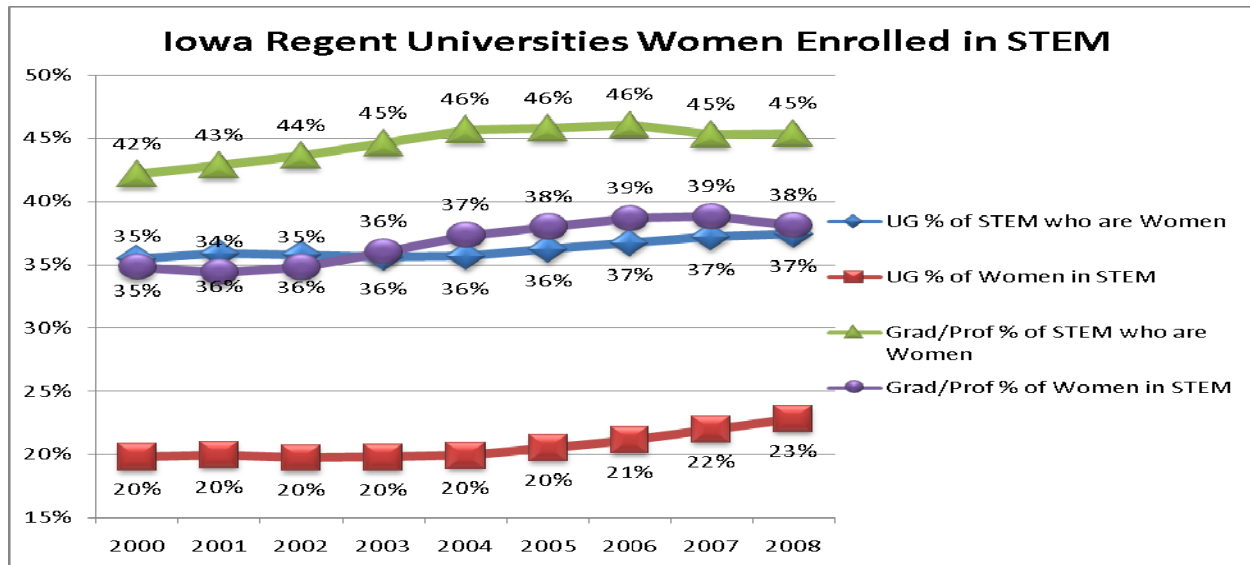
At ISU, graduate and professional enrollments of women in STEM have steadily climbed, as have the percentage of undergraduate majors who are women. Also increasing is the number of women who major in STEM fields. A slight recent decline is observed in the percentage of graduate/professional women in STEM majors.

Figure 6: Women Enrolled in STEM Fields at UNI



A slight recent dip in the percentage of STEM majors who are women at UNI (Figure 6) coincides with the 1% downturn in the percentage of women who choose to study STEM, in an otherwise steadily increasing participation rate over the most recent nine-year period.

Figure 7: Women enrolled in STEM Fields at Iowa Regent Universities

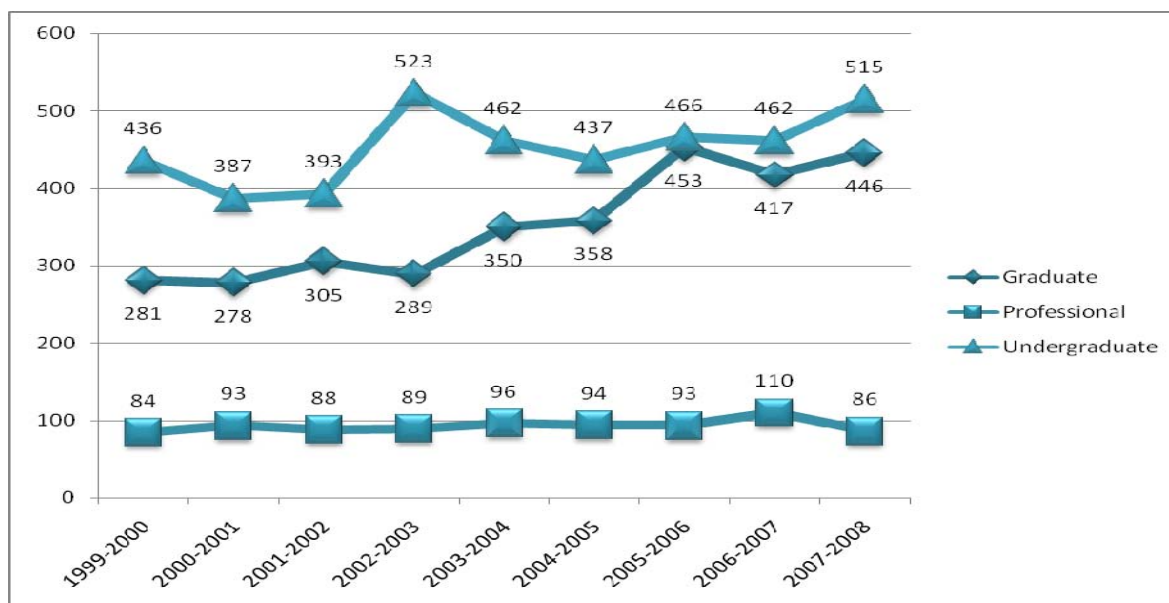


Over the nine-year period of the 21st century, Iowa’s Regent universities show steady increases in the proportion of STEM majors who are women, and the proportion of women who choose to study STEM fields.

Nine-year Degree Trends: Women

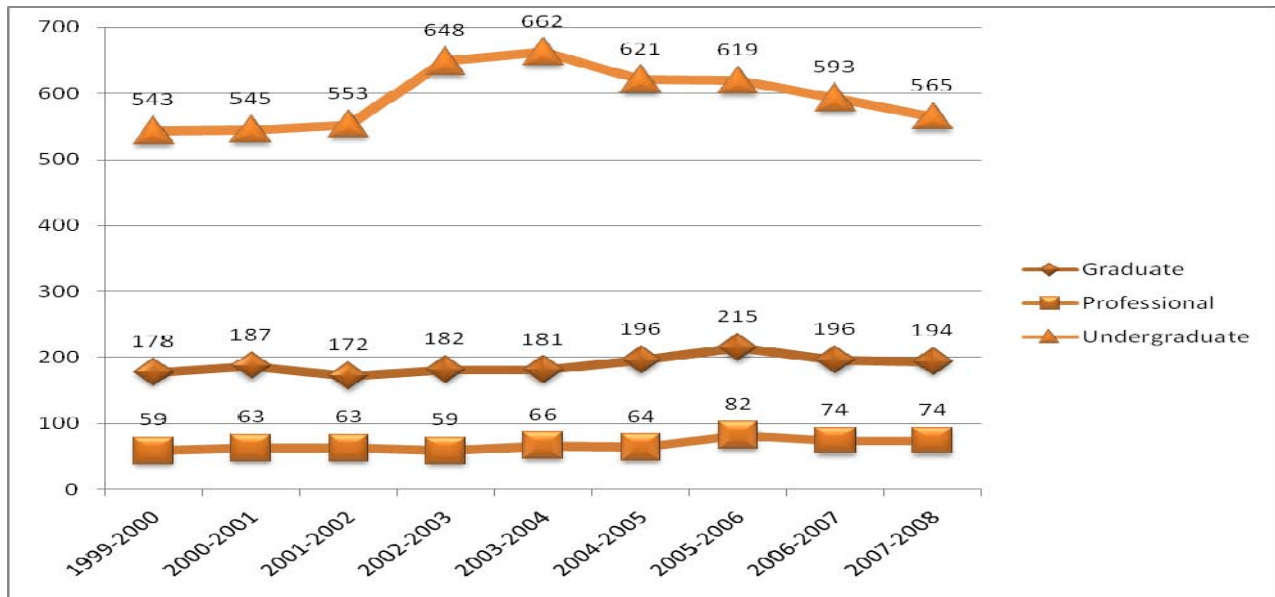
The data on the enrollment of women and minorities in STEM is promising, while still identifying opportunities for improvement. Since the goal of most students enrolling in STEM programs is to graduate with a STEM degree, tracking degrees awarded in STEM is equally, if not more, important.

Figure 8: Degrees awarded to women in STEM Fields at SUI



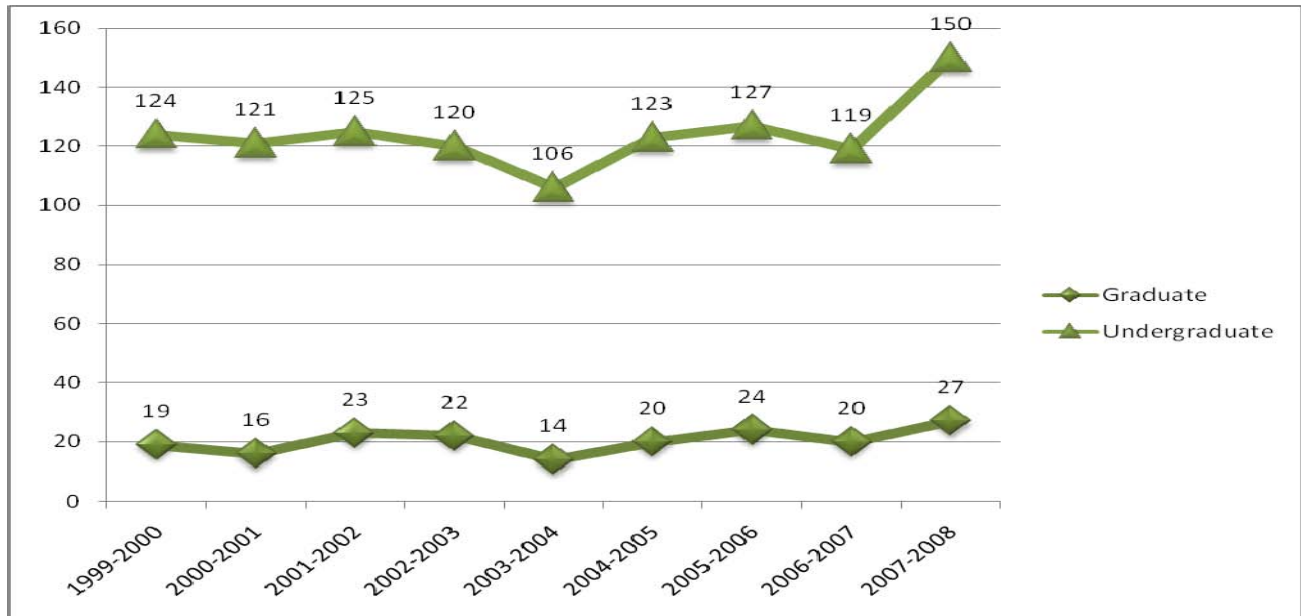
Undergraduate and graduate degrees awarded to women have unevenly increased at SUI while professional degrees have remained flat (Figure 8).

Figure 9: Degrees awarded to women in STEM Fields at ISU



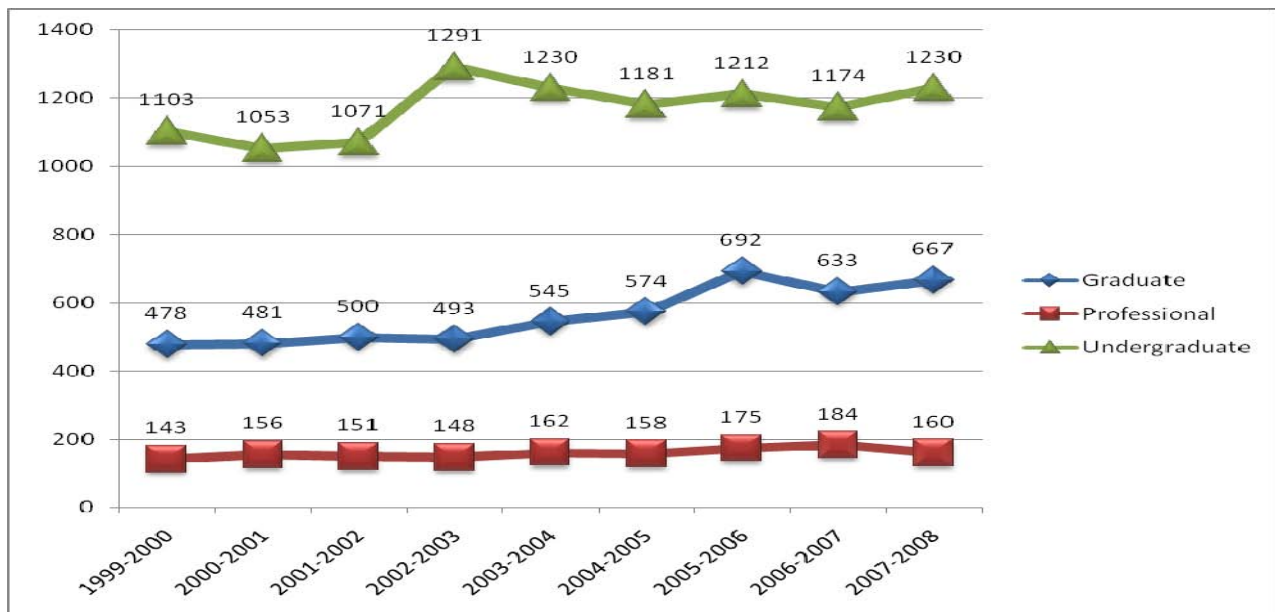
The number of graduate and professional degrees awarded to women at ISU has remained steady over the decade while the number of undergraduate degrees awarded to women has dipped following a recent peak in 2003-04.

Figure 10: Degrees Awarded to Women in STEM Fields at UNI



At UNI the number of STEM degrees awarded to women has recently spiked while graduate degrees have steadily climbed.

Figure 11: Degrees Awarded to Women in STEM Fields at Iowa Regent Universities



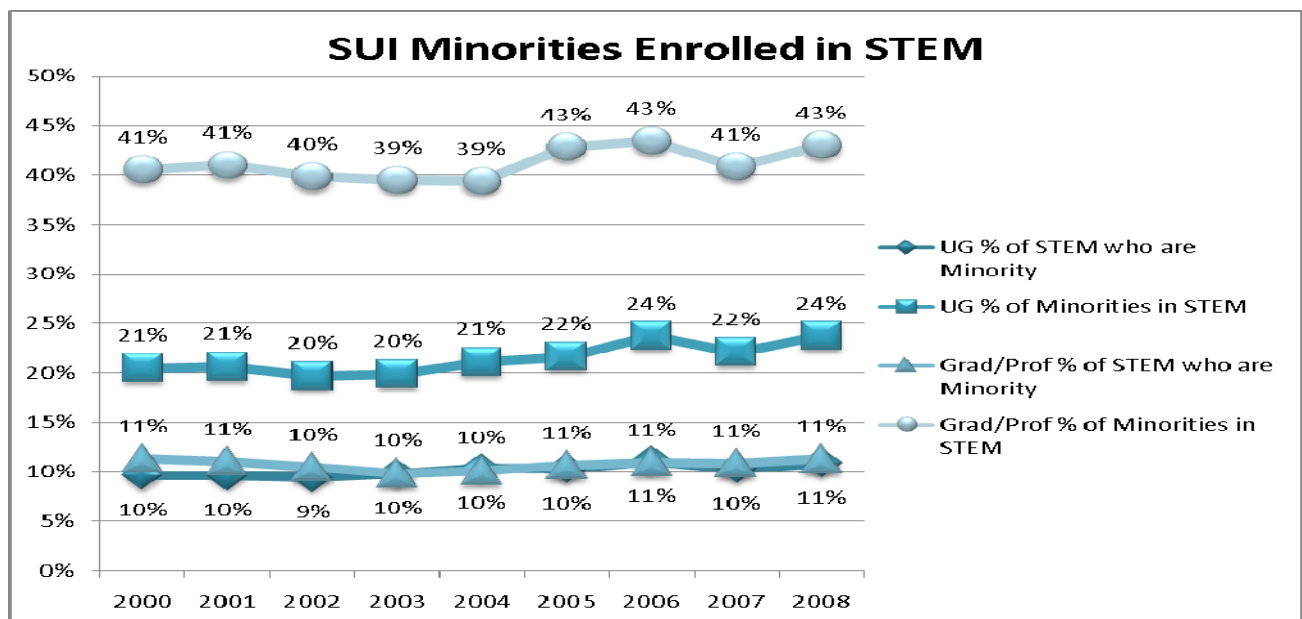
Overall across the Regent universities, graduate STEM degrees awarded to women have increased markedly while undergraduate degree counts show a net increase over the decade. Professional degrees

in STEM for women remain steady. Modest increases are evident in the number and percentage of STEM degrees awarded to women over the time period: for undergraduates the percentage has risen from 37% to 40%. For graduate degrees the percentage has grown from 39% to 46%. For professional degrees, the percentage awarded to women has risen from 44% to 51%. The total number of degrees awarded to women in STEM increased from 1,724 in the 1999-2000 academic year to 2,057 in the 2007-08 academic year.

Nine-year enrollment trends: Minorities

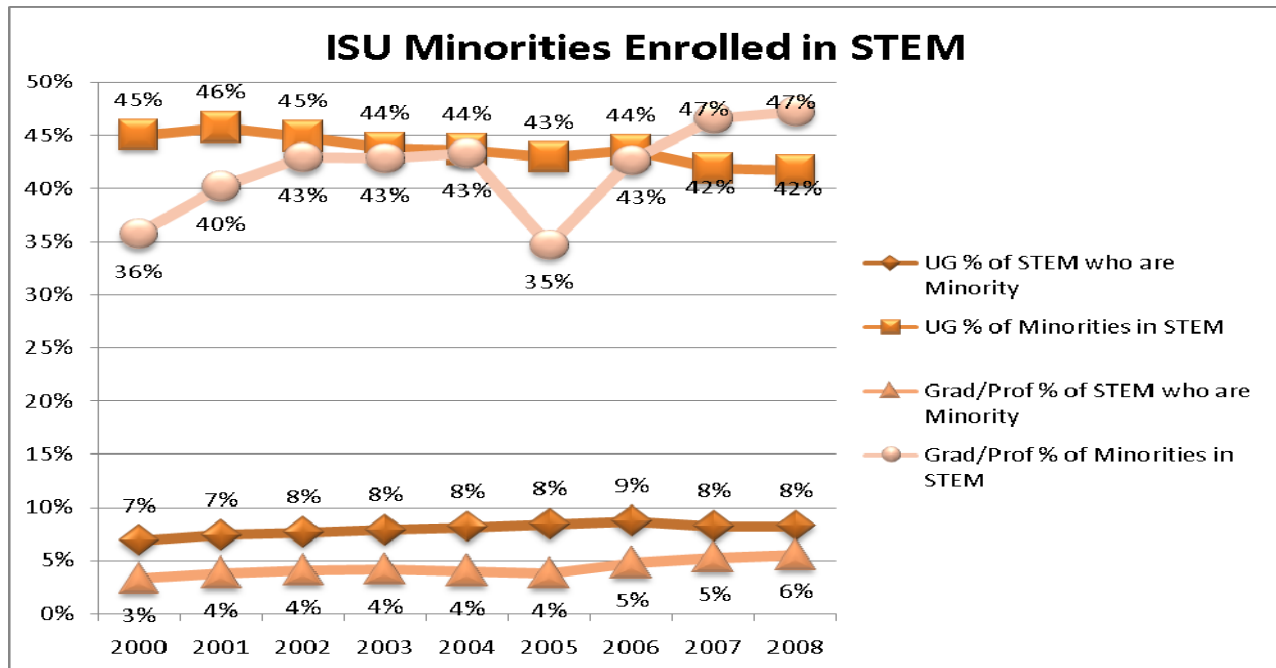
The percentage of minority students enrolled in STEM fields at the Regent universities has remained relatively flat over the most recent decade. Proportionally, minority participation in STEM fields slightly over-represents the minority population in the Regent system. However, it is important to note that great variance exists in the participation rates of disaggregated subpopulations of minorities. For Native Americans and African Americans the proportion of enrollees in STEM fields under-represents student populations in the Regent system.

Figure 12: Minorities enrolled in STEM Fields at SUI



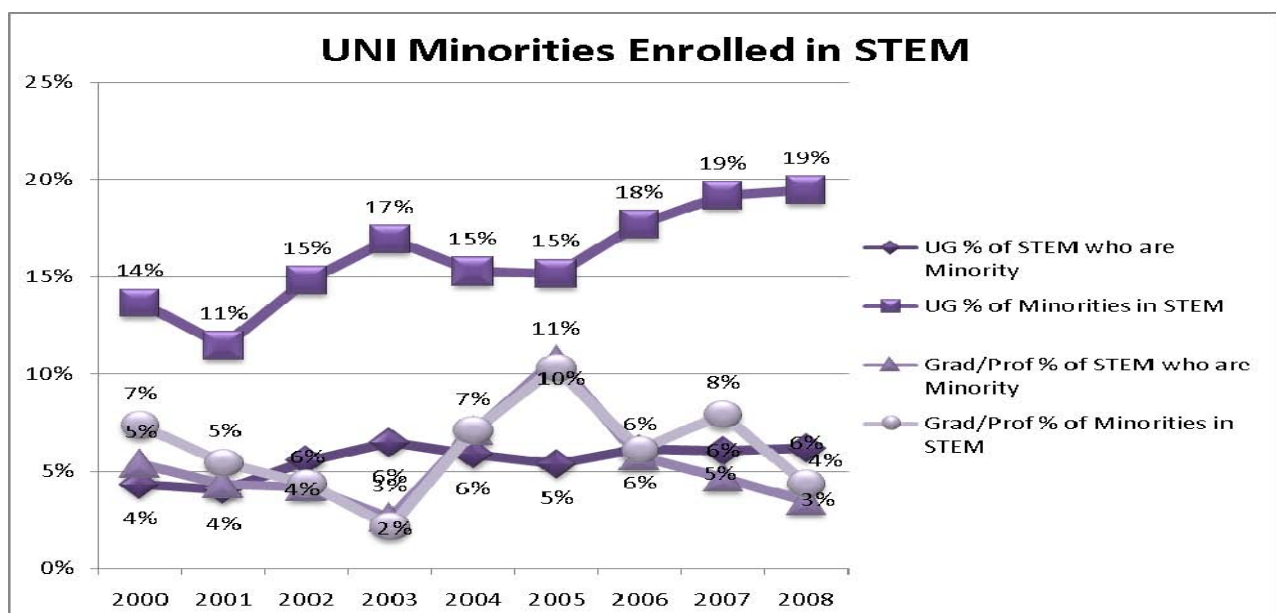
A slight increase in the percentage of graduate and professional minority enrollees in STEM at SUI contrasts to a level participation rate of 11% among undergraduates. Of minority students as a subpopulation, the percent enrolling in STEM majors has seen a slight increase (21 to 24%).

Figure 13: Minorities enrolled in STEM Fields at ISU



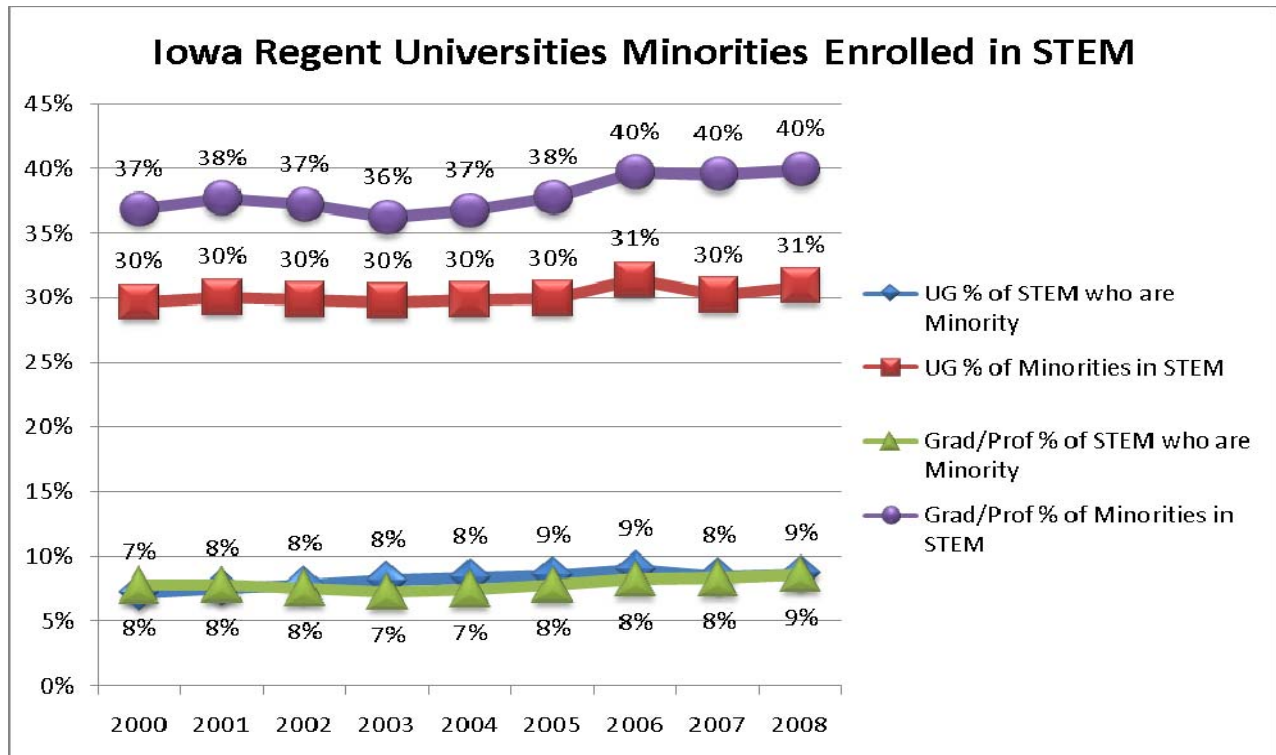
Similarly to SUI, ISU enjoys a gradual increase in the percentage of minorities enrolling in STEM programs at the graduate/professional level (Figure 13). At the undergraduate level, the percentage of STEM majors who are minorities has not risen while the percentage of minorities enrolled in STEM fields has declined.

Figure 14: Minorities enrolled in STEM Fields at UNI



For UNI, the percentage of STEM majors who are minorities has not changed over the decade, but the proportion of minorities entering STEM fields has increased by 5% over nine years.

Figure 15: Minorities enrolled in STEM Fields at Iowa Regent Universities

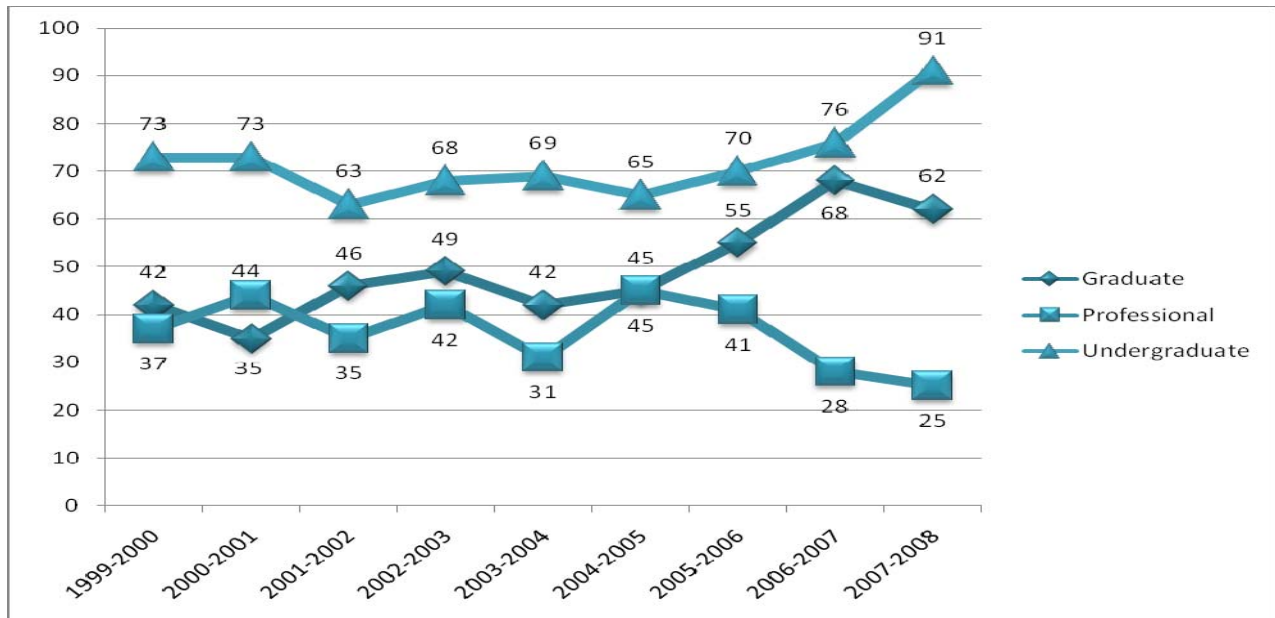


Overall, the proportion of minority students choosing STEM fields at Iowa Regent universities has held steady. Slight increases across the board at both the graduate and undergraduate levels indicate that a greater proportion of minority students are choosing STEM, and of all STEM majors, a greater percentage are minority students.

Nine-year degree trends: Minorities

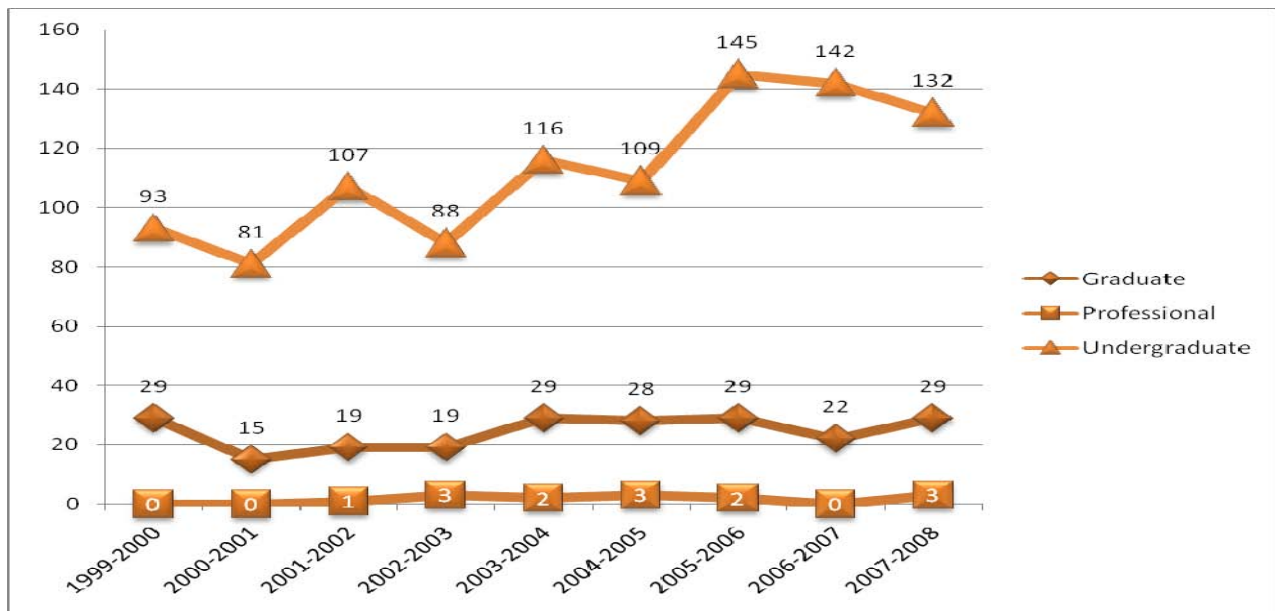
As with enrollment patterns, the percentage of degrees in STEM awarded to minority students over the same time period has remained fairly stable. Undergraduate degrees for minorities in STEM have risen from 6% in 1999-2000 to 7% in 2007-08. For graduate students, the figure holds steady at 6%. At the professional school level, a slight decline is observed from 11% to 9%.

Figure 16: Degrees awarded to minorities in STEM Fields at SUI



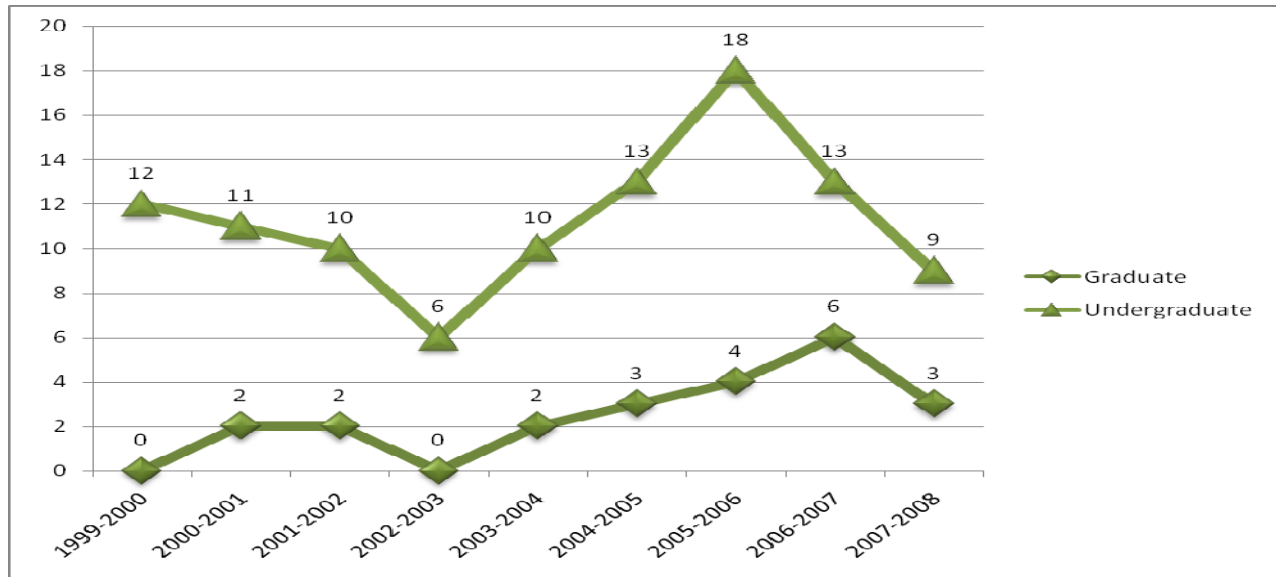
The number of undergraduate and graduate degrees awarded to minorities at SUI has risen significantly over the decade. The decrease in the percentage of professional degrees at SUI chiefly accounts for the decline in minority professional degrees system-wide. The percentage of minority degrees in STEM fields at SUI went from 16% in 1999-2000, to a peak of 21% in 2004-05, down to 12% in 2007-08.

Figure 17: Degrees awarded to minorities in STEM Fields at ISU



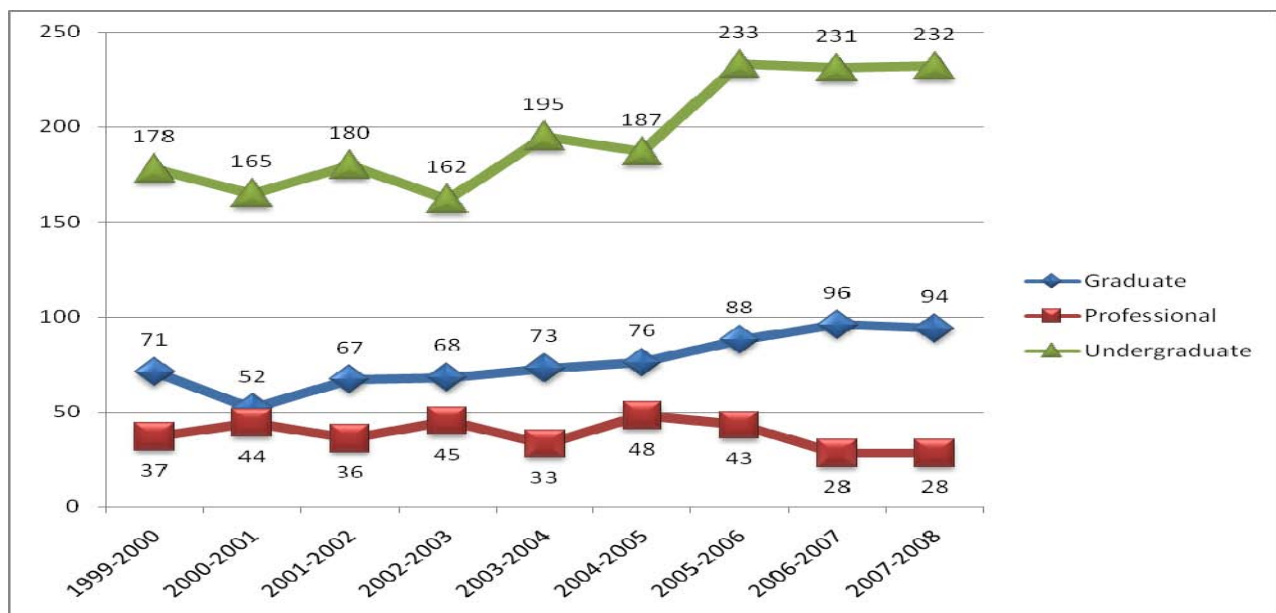
ISU graduate degrees in STEM for minority students show no gains over the decade, while undergraduate degrees for minorities have increased by almost 30%.

Figure 18: Degrees awarded to minorities in STEM Fields at UNI



At UNI, the comparatively low number of minority students earning degrees in some STEM fields creates the likelihood of exaggerated fluctuations: a few enrollees in a program can change proportions significantly. Unique challenges face programs seeking to build diverse student enrollments from the ground level.

Figure 19: Degrees awarded to Minorities in STEM Fields at Iowa Regent Universities



Regent-wide, undergraduate and graduate degrees earned by minority students have increased steadily. While percentages of degrees awarded in STEM have remained flat or decreased, the overall number of degrees awarded to minority students has increased over the time period from 286 degrees to 354 degrees, an increase of 23.8%. Improvements are being seen, but the pace of gain in drawing women and minorities into STEM majors, particularly physical and computer science, and engineering, needs to be accelerated.

Section C

High School Preparatory Program: *Project Lead The Way*

This report is to include "...data on the number and proportion of women and minorities enrolled in science, technology, engineering, and mathematics programs, including high school programs such as project lead the way." Project Lead The Way is a unique program because of its integration within schools and taught by school teachers. Loosely comparable programs are described in Section D, including the Program for Women in Science and Engineering (PWSE), Science Bound, Women in Science and Engineering (WISE), and The Iowa Mathematics and Science Academy (IMSA).

Project Lead The Way is a program designed to offer college credit through hands-on STEM classes to high school students and to provide a seamless transition to higher education. Project Lead The Way is a set of up to eight engineering-related courses. Each course is a college level, project-based class designed to provide high school students with an interactive lesson using math, science, and engineering concepts.

Enrollment

The project began in 2004 as a joint venture of the Iowa Department of Education, Regent universities, and Iowa's 15 community colleges. The first cohort of students enrolled in Iowa Project Lead The Way in fall 2005. At the time, seven high schools were offering the program. In 2008, 28 high schools will be participating in Project Lead The Way (Figure 21).

In the 2005-2006 academic year, 233 students were enrolled in the program. In 2006-2007, the number of sites doubled and enrollment quadrupled to 1,044 students. By 2007-08 enrollment quadrupled to 1,782 students. Females make up only 15% of enrollment in PLTW. Figure 20 shows the representation of the students in Project Lead the Way compared the statewide percentages for each category of student.

Minorities currently make up 9.9% of Project Lead The Way enrollment. Statewide, minorities are 14.4% of total student enrollment. Asian American students were over-represented in Project Lead The Way. African American students were underrepresented, 5.4% (statewide average) to 2.9% (enrollment in Project Lead The Way); as were Hispanic Americans, 6.3 to 3.9%; and American Indians, 0.6 to 0.4%.

Section D

Recommendations, including successful models

Convergent reports

Over the eight year period of the early 21st century Iowa's Regent universities show increases in the percentages of women and minorities enrolling and graduating in STEM fields generally, though particular program participation rates call for heightened awareness and effort toward facilitating the success of students of diversity. Some of these recommendations for improving the numbers of women and minorities in STEM programs at the Regent universities intersect with and echo the identified promising practices and recommendations made for increasing campus diversity as proposed in the 2008 *Report of the Regents Inter-institutional Task Force on Retention, Graduation, and Diversity*. In particular, these general recommendations of the 2008 report bear repeating for their relevance to this STEM field report:

"Publicize and promote efforts to support the success of students from underrepresented minority groups." (promising practices 5, pg.8)

"Formalize inter-institutional cooperation" and "Plan joint programs" to recruit and educate students of underrepresented groups. (recommendation B, pg. 19, and recommendation 2, pg. 20)

"...it is also important to provide strong central leadership, to ensure opportunities are coordinated and appropriately leveraged for maximum benefit..." (promising practice 2, pg. 5)

"Success for underrepresented minority students cannot be the job of a few units within the universities. Instead, the responsibilities have to be distributed throughout the organization, as must the associated leadership." (promising practice 2, pg. 5)

"Build faculty and staff members' competencies to work with a diverse student body."(promising practice 6, pg. 9)

Recommendations for increasing the proportion of women and minorities in STEM Fields

1. Seek opportunities for ongoing and new STEM initiatives within the state to increase the number of women and/or minorities participating and succeeding where imbalances exist.
2. Maintain existing STEM diversity programs at Regent universities and pursue opportunities to expand these programs within and beyond the Regent university system.
3. Encourage additional collaborations across the Regent universities, within Regent universities, and among the Regent universities and the Iowa Department of Education, Iowa private and community colleges, Iowa Department of Economic Development, Iowa Workforce Development, regional economic development groups/STEM employers, K-12 schools, AEAs, and other educational institutions and groups on issues and programs addressing women and/or minorities in STEM.

4. Aspire to institutionalize STEM diversity/gender positions and programs within the normal administrative structures of the Regent universities.
5. Provide opportunities for faculty involvement in programs associated with women and/or minorities in STEM.
6. Provide professional development opportunities for Regent faculty and staff on research-based best practices for creating teaching/learning experiences in STEM disciplines that most effectively meet the learning needs of all students, particularly those underrepresented in the instructor's field.
7. Provide annual updates on enrollment and graduation of women and minorities in STEM programs to the Board of Regents, State of Iowa.

Resources for Supporting Recommendations

The collaborative initiative of the Regent universities, the *Iowa Mathematics and Science Education Partnership* (IMSEP) is an appropriate vehicle through which to provide the additional funds required to support the recommendations of this report. IMSEP aspires to 10 objectives, one of which is to *Increase the number and diversity of students who major in math and science fields at Iowa's Regent universities*. A targeted expansion of IMSEP funding for FY 2010 and beyond, dedicated exclusively to STEM programs diversity, will permit the growth and replication of successful programs, the facilitation of further collaborations, the institutionalization of STEM diversity/gender positions, the professional development of faculty toward inclusive practices, and other recommendations.

Existent programs and initiatives targeting Underrepresented groups in STEM

The following summaries of programs (many with Internet links for further information) are provided as examples of what currently exists at Iowa's Regent universities for improving the participation of women and underrepresented minorities in STEM fields. Many additional programs exist which are not included here. Programs such as these and others enjoy proven track records, and may best serve the universities and the state in expanded and replicated form.

Iowa State University

- **Program for Women in Science and Engineering**

The Program for Women in Science and Engineering (PWSE) provides programming to support and encourage women to pursue STEM education from pre-K through undergraduate students. Outreach programming (that reaches over 6,300 students a year) includes one-day career conferences for 6-12 grade students, undergraduate student role models visiting classrooms across the state, and transitional programming for students in high school or community college students preparing to enter Iowa State. Programs to support undergraduate women in STEM fields include multiple residential and course-based learning communities, scholarship programs, academic support programs, leadership development programs, and research summer programs. Demand for programming from PWSE continues to grow. In fact, demand for the outreach programs exceeds the capacity of the program. PWSE is funded by a combination of state funding, private/corporate gifts, grants, and participant fees. www.pwse.iastate.edu

- **Science Bound**

Science Bound attracts, motivates, and prepares ethnic minority students to pursue science/technical disciplines in college. The Science Bound Program serves more than 250 students in grades 8-12 in the Des Moines, Marshalltown, and Denison school districts each year. The program:

- Educates students and parents about college and career planning
- Raises teachers' expectations of students' academic abilities and career aspirations
- Provides students with more rigorous course expectations and academic support
- Identifies, develops, and implements learning opportunities to meet students' specific academic needs
- Provides experiences for students to observe and participate in STEM careers and interact with STEM professionals
- Provides tuition scholarships for students who complete the program and enroll at Iowa State in a science-related field

Students meet regularly in small groups at their home school and also participate in activities on the Iowa State campus. Science Bound is funded by a combination of institutional and private/corporate support. www.sciencebound.iastate.edu

- **LEAD Program within the College of Engineering**

The Leadership through Engineering Academic Diversity (LEAD) program within the College of Engineering provides programs that support the successful transition to college and retention of multicultural students and female students in engineering. Programs include an eight-week transition program for students the summer prior to their freshman year in engineering, skill development workshops for gateway science and mathematics courses, academic support through help rooms and tutoring, a living-learning community, and various social and academic programs throughout the year. The LEAD program also supports numerous diversity student organizations within the College, including 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). www.eng.iastate.edu/lead

- **ISU ADVANCE: Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers**

The ISU ADVANCE Program, supported by the National Science Foundation (NSF) is focused on creating institutional transformation that results in the full participation of women faculty in STEM fields. The ISU model focuses on transforming departmental cultures (views, attitudes, norms, and shared beliefs), practices (what people say and do), and structures (physical and social arrangements) as well as university policies through active participation of individuals at all levels of the university. Faculty in nine focal departments, chosen from the College of Engineering, the College of Liberal Arts and Sciences, and the College of Agriculture and Life Sciences, form the core department-level working groups. Although the efforts of the ISU ADVANCE Program are focused on faculty, it is anticipated that the changes in department culture will also positively impact students within the department. www.advance.iastate.edu

- **Collaborative Research: STEM Student Enrollment and Engagement through Connections (SEEC)**

Iowa State University (ISU) and Des Moines Area Community College (DMACC) are partnering on this NSF sponsored project to increase the number of students graduating with a bachelor's degree in engineering at ISU and the number of students in STEM areas of study at DMACC. One of the foci of the grant is to broaden the participation of students, by increasing the number of women and underrepresented ethnic minority students in STEM fields both at ISU and DMACC. Program components include:

- A learning village (or meta-learning community).
- A review of first-year and gateway engineering courses and academic advising to better engage and support transfer students.
- A new recruitment initiative with ISU Extension aimed at attracting students from every county in Iowa.

www.eng.iastate.edu/seec

University of Iowa

- **Women in Science & Engineering (WISE) at the University of Iowa**

- Peer Mentoring Program – Has served 200 undergraduate women in STEM majors every year since 1995 with a laudable four-year retention rate in STEM varying between 60% and 81% compared to national rates of 30% to 46%. Last year, 54% of volunteer mentors had also been mentees during their first-year at SUI and 33% of mentors were serving for a second or third year.
- Living-Learning Community - An academic living-learning community at SUI (first of its kind, initiated 1996-97) provides academic and social support to 85 first- and second-year women in STEM majors annually. Last year's figures are 100% retention of majors into second year studies in science, and 92.3% in engineering. Second to third year retention for both science and engineering was 100%.
- Graduate/Post-doctoral Professional Development Workshops - For female post-comprehensive Ph.D. candidates and post-doctoral fellows in STEM, these workshops provide access to information and faculty/staff expertise on such vital topics as Negotiating Your First Tenure-Track Faculty Position or Developing a Research Statement and Teaching Philosophy.
- WISE research - The Visual/Spatial Abilities Research Project is a six year study looking at relative skill levels of entering first-year engineering students on tasks of mental rotation, a skill considered to be a strong indicator of future success in certain fields of engineering. Findings mirror the literature: Females enter the College of Engineering with statistically higher GPAs than their male counterparts, but exhibit significantly less well-developed visual/spatial/rotational skills ($p < 0.001$). Interventions are being developed. www.uiowa.edu/~wise

- **The Ethnic Inclusion Effort for Iowa Engineering |ei|²**
|ei|² develops integrative programming to position the UI College of Engineering as an inclusion leader through cultural awareness, a welcoming environment, and other activities which integrate diversity awareness throughout the curriculum at the graduate and undergraduate levels. Supported by federal, state, corporate, and campus-based funding, efforts include ethnic inclusion professional development seminars and active participation of graduate fellows in outreach and recruiting at professional meetings. Students are encouraged to give back to the community through mentoring undergraduate students and through K-12 outreach. Diverse engineering graduate students collaborate with students in the STEM disciplines to provide tutoring in math and science and to introduce students to the engineering professions. The College of Engineering fosters a welcoming environment for all students and continues to remain a national leader in its inclusion effort at the doctorate level. <http://www.engineering.uiowa.edu/ethnic-inclusion/>
- **Office of Graduate Ethnic Inclusion (OGEI) – Graduate College**
OGEI focuses on increasing diversity and building community among students, particularly improving recruitment and retention of students in STEM areas through summer research opportunities for minority students, for example. For 20+ years, the Graduate College has hosted a CIC Summer Research Opportunities Program (SROP) with 25-30 undergraduates working closely with UI faculty for 8 weeks. The SUI McNair Scholars Program was modeled after the Iowa SROP, and we hosted 18 students for research internships during summer 2008. We will host 27 McNair scholars for summer 2009. The SROP/McNair initiative recruits back ~20-30% of its scholars to Iowa for doctoral, masters, or professional studies in STEM. OGEI coordinates with other UI programs involved in minority STEM recruitment – e.g., IBA, WISE, AGEP, Ethnic Inclusion in Engineering at Iowa (|ei|²).

University of Northern Iowa

- **The Iowa Mathematics and Science Academy (IMSA)**
IMSA recruits minority students, students from low-income families, and first generation college-bound students for immersion in Science, Technology, Engineering, and Mathematics (STEM) through two components: academic year and summer. The academic year component is designed around monthly academic advising meetings and an option of either a scientific research project or 40 hours of volunteer experience in a STEM-related business or organization. The summer residential component is a six-week residential experience on the UNI campus where participants take courses in Chemistry, Physics, Biology, Statistics, and College Writing and Research. The summer component of the IMSA project allows students to experience academic aspects of college life while still in high school. <http://www.uni.edu/eop/ubms/>

- **IMSEP I-Teach recruitment**

I-Teach is a pilot program to recruit diverse, talented math and science majors into teaching. Students are recruited from introductory majors' lectures and at social events including those that enhance the freshman experience for students of diversity, including UNI's *Jump Start Orientation Program*. After the completion of a one-semester seminar, "Exploring Math & Science Teaching," students qualify for scholarships, internships, and mentorships that sustain them through the major. I-Teach was piloted in partnership with North Iowa Area Community College in fall 2008, to be launched at ISU in spring 2009. <http://www.iowamathscience.org/projects.shtml>

- **MCaPS Scholarships**

The College of Natural Sciences at UNI has been awarded a multi-year NSF grant to provide financial support for students in the fields of Mathematical, Computational, and Physical Sciences. The scholarship program is open to students (women and minorities are particularly encouraged to apply) majoring in these areas of study and provides funds to cover the costs of not only tuition but also research related expenses, such as travel to conferences, as well as publication and equipment costs. In the first year of funding, seven scholarships were awarded, four to women. <http://www.cns.uni.edu/MCaPSinfo.html>

- **AGEP at UNI**

UNI is a subcontractor on the Iowa AGEP grant (detailed below). The Mathematics Department is currently the only participating department, but the Chemistry and Psychology Departments will be included in the renewal application. Since 2004, the department has recruited 12 minority graduate students, awarded them fellowships, and provided student development support. Key to the effort has been mentoring of the students by faculty. Five students have graduated, one will finish this fall, one switched to the department of education and has since graduated, two are currently in the program, and three dropped out. Of those who graduated, two are in the Ph.D. program in statistics at ISU, and one is in the Ph.D. program in mathematics at SUI. <http://www.uni.edu/math/projects/agep/>

Collaborative Program across Institutions

Iowa AGEP Program, and the National Alliance

Alliance for Graduate Education and Professoriate. In 1995, SUI Department of Mathematics faculty members made a commitment to substantially increase the number of underrepresented minority doctoral students enrolled in the department. By 2007 the department could boast of a graduate program whose student body consists of 20-25% U.S. underrepresented minority students, and the training of 13 U.S. underrepresented minority Ph.D.s since 2002, about 7% of the national total during this period. Leaders of this effort were able to institutionalize its success through National Science Foundation grants to support the National Alliance for Doctoral Studies in the Mathematical Sciences, a consortium consisting of faculty in math and science departments at the three Regent universities together with approximately fifty mathematics faculty at over twenty minority serving undergraduate and Masters granting institutions nationally (<http://math.uiowa.edu/alliance/>). A separate NSF AGEP grant was obtained by SUI on behalf of all three Regent institutions in 2002, with the goal to substantially increase the number of U.S. underrepresented minority students receiving the doctoral

degree in STEM fields. The ISU Department of Statistics along with the ISU Department of Mathematics was one of the founding departments of the National Alliance. The UNI Department of Mathematics was one of the founding departments of both the National Alliance and the Iowa AGEP. Funding to continue and to expand this program derives from campus-based support while external funding is sought. A focus on minority graduate education leads to a focus on the practices in this area that are currently in place at our universities, a focus that can lead to modernizing our curriculum and fostering cooperation and community. www.grad-college.iastate.edu/agep

Conclusion

Iowa high school-age women and men perform approximately equally on standardized tests of math and science, take similar course loads, and earn about the same grades. Iowa minority students lag in measures of math and science achievement but the differential has much to do with course opportunities. When advanced coursework is available and taken, minority students make encouraging gains on the achievement gap in math and science. Project Lead The Way (PLTW) is a promising high school program of engineering-related courses adopted by increasing numbers of Iowa secondary schools. Although the participation of young women and minorities in PLTW is proportionally low, expansion of the program into Iowa's diverse communities will help to address the current imbalance.

At the Regent universities the proportion of women and minorities in STEM majors has generally increased over the last nine years. Women comprise the majority of majors in some fields of STEM study, including the biological sciences at the undergraduate level, and veterinary medicine at the graduate/professional level. The numbers of minority students enrolling and earning degrees at the Regent universities have been on a steady climb. However, the proportion of women choosing STEM fields of study is well below campus populations. Likewise, as percentages of some minority groups increase on the university campuses (e.g., African American and Native American students), matching increases in their numbers in STEM majors are not always seen, particularly in physical science, computer science, and engineering. Many talented and dedicated professionals at each university are at work to broaden the opportunities for women and minorities in STEM fields. One series of recommendations of this report focuses on maintaining and building upon the successes of those existing programs. Another key factor in increasing the proportion of women and minorities in STEM fields is to involve more faculty members (especially those of fields underrepresented by women and minorities) in programs and efforts to improve student diversity in these fields of study. Steady gains characterize the early twenty-first century for improving the percentage of women and minorities in STEM fields at Regent universities. These gains are not across the board, and they are not always consistent within programs. Collaborations, program expansions, and best practices implementation across the university system hold promise to increase the proportions of women and minorities in STEM fields at the Regent universities.

Legislation

House File 2679

Pg. 15 of 53 - of the House File
82nd General Assembly
Governor Chester Culver
Patrick J. Murphy
Speaker of the House

Sec. 13. BOARD OF REGENTS MATHEMATICS AND SCIENCE

25 1 COLLABORATIVE STUDY == WOMEN AND MINORITIES IN STEM PROGRAMS.

25 2 1. The state board of regents shall conduct a mathematics
25 3 and science collaborative study. The purpose of the study
25 4 shall be to collect data and report on the number and
25 5 proportion of women and minorities enrolled in science,
25 6 technology, engineering, and mathematics programs, including
25 7 high school programs such as project lead the way. The study
25 8 shall develop and submit to the board recommendations for
25 9 science, technology, engineering, and technology-related
25 10 programming measures for improving the number and proportion
25 11 of women and minorities in science, technology, engineering,
25 12 and mathematics university programs. The state board of
25 13 regents shall submit the data and its findings and
25 14 recommendations in a report to the general assembly by January
25 15 15, 2009.

25 16 2. The state board of regents shall direct the
25 17 universities it governs to take every reasonable measure to
25 18 improve the number and proportion of women and minorities in
25 19 university science, technology, engineering, and mathematics
25 20 programs and colleges.

REFERENCES

Babco, E.L. (2003). *Trends in African American and Native American Participation in STEM Higher Education*, Commission on Professionals in Science and Technology. Retrieved October 2, 2008, from <http://www.cpst.org/STEM.pdf>.

Bureau of Labor Statistics (2001). *Report on American Workforce* [Table 5, p. 126]. U.S. Department of Labor. Washington, DC: Government Printing Office. Retrieved October 11, 2008, from <http://www.bls.gov/opub/rtaw/pdf/rtaw2001.pdf>.

Corbett, C., C. Hill, & A. St. Rose (2008). *Where the Girls Are: The facts about gender equity in education*. AAUW Educational Foundation, American Association of University Women.

Halpern, D.F., C.P. Benbow, D.C. Geary, R.C. Gur, J.S. Hyde, M.A. Gernsbacher (2007). *Sex, Math and Scientific Achievement: Why do men dominate the fields of science, engineering, and mathematics?* Scientific American Mind, November 28. 2007.

Interinstitutional Task Force on Retention, Graduation, and Diversity (2008). *Report of the Regents Interinstitutional Task Force on Retention, Graduation, and Diversity*. Committee: Marcella David, SUI; Diana Gonzalez, Board Office; David Holger, ISU; Kathleen Jones, ISU; Beverly Kopper, UNI; Inez Murtha, UNI; and Tom Rocklin, SUI, Chair.

Iowa Department of Education (2007). *The Annual Condition of Education Report*. Des Moines, Iowa: State of Iowa.

McPhail, I.P. (2008). *Confronting the "New" American Dilemma*, NACME 2008 Data Book, National Action Council for Minorities in Engineering, Inc.

National Center for Education Research (NCER) (2007). *Encouraging Girls in Math and Science: IES Practice Guide*. Institute of Education Sciences, U.S. Department of Education.

National Center for Education Statistics (2000). *Entry and Persistence of Women and Minorities in College Science and Engineering Education*. Institute of Education Sciences, U.S. Department of Education.

National Center for Education Statistics (2007). *Status and Trends in the Education of Racial and Ethnic Minorities*. Institute of Education Sciences, U.S. Department of Education.

National Center for Women & Information Technology (2007). *Scorecard 2007, A Report on the Status of Women in Information Technology*. Retrieved October 30, 2008, from http://www.ncwit.org/pdf/2007_Scorecard_Web.pdf.

National Science Foundation (2002). *Science and Engineering Indicators 2002* [p. 3-13]. Arlington, VA: NSF, 2002. Retrieved October 17, 2008, from <http://www.nsf.gov/statistics/seind02/>.

Pearson, B, and C. Gordon (2008). *Women, Work and the Iowa Economy: The State of Working Iowa 2008* Part II. The Iowa Policy Project, 318 2nd Avenue N, Mount Vernon, IA 52314.

Wainer, H., and Steinberg, L.S. (1992). *Sex differences in performance on mathematics section of the Scholastic Aptitude Test: A bidirectional validity study*. Harvard Educational Review, 62(3), 323–336.

Walcerz, D. (2007). *Report on the Third Year of Implementation of the True Outcomes Assessment System for Project Lead the Way*. True Outcomes. Retrieved June 16, 2008, from <http://www.pltw.org/pdfs/AnnualReport-2007-Public-Release.pdf>.

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Description of report-writing process

At the September 2008 Council of Provosts meeting, House File 2679 of the 82nd General Assembly, Section 13, entitled *Board of Regents Mathematics and Science Collaborative Study—Women and Minorities in STEM Programs* was assigned to the newly formed Iowa Mathematics and Science Education Partnership (IMSEP). IMSEP Director Jeffrey Weld sought suggestions of faculty and staff at the Regent universities who would likely be interested in contributing to such a report. An invitation was extended to 36 faculty and staff, as well as to officials of the Board Office, Iowa Department of Education, and the Iowa Commission on the Status of Women. For efficiency, contributors were invited to involve themselves directly in the writing process or as reviewers of emergent drafts. Nine dedicated professionals chose to meet frequently via teleconference to write the report. It was sectioned and assigned to relevant teams (for example, ISU, SUI, and UNI registrars worked closely and frequently to generate the data represented in Section B). At several stages, the draft report was sent to equally dedicated reviewers who provided additional data, narrative, and editing input. It was the collective commitment to diversity in the study of science, technology, engineering, and mathematics at the Regent universities that sustained and inspired the work of this committee.

APPENDIX I

STEM Majors at the Iowa Regent Universities Grouped by CIP Code Categories

CIP CODE	Major Description
Agricultural Sciences	
010000	Agriculture
010104	Agricultural Studies
010106	Seed Technology and Business
010201	Agricultural Systems Technology
010701	Global Resources
010801	Agricultural Education and Studies
010901	Animal Science
010905	Dairy Science
011001	Culinary Science
011001	Food Science
011102	Agronomy
011103	Horticulture
011105	Pest Management, Plant Health and Protection
011199	Seed Science
019999	Sustainable Agriculture
Natural Resources	
030103	Environmental Studies
030104	Environmental Sciences
030104	Environmental Technology
030199	Biorenewable Resources & Technology
030201	Natural Resource Ecology and Management
030502	Forestry
039999	Water Resources
Computer/Information Technology	
110101	Computer Science
110103	Human Computer Interaction
110199	Computer Information Systems
110401	Informatics
110701	Computer Science, Computer Science Education
110901	Networking & System Administration
111003	Information Assurance
Personal Services	
120301	Funeral Services & Mortuary Science
Education	
130604	Educational Assessment, Research, Statistics
131301	Agricultural Education
131309	Industrial Technology, Technology Education
131311	Mathematics Teacher Education
131316	Science Teacher Education
131319	Technical Teacher Education
139999	Computer Applications in Education

Engineering

140101	Engineering
140201	Aerospace Engineering
140301	Agricultural and Biosystems Engineering
140501	Biomedical Engineering
140601	Ceramic Engineering
140701	Chemical and Biological Engineering
140801	Civil, Construction and Environmental Engineering
140901	Computer Engineering
140903	Software Engineering
141001	Electrical Engineering
141201	Applied Physics/Engineering
141301	Engineering Science
141801	Materials Science and Engineering
141901	Mechanical Engineering
142001	Metallurgical Engineering
142701	Systems Engineering
143301	Construction Engineering
143501	Industrial Engineering
149999	Engineering Applications

Engineering Related Technology

150000	Industrial/Engineering Technology
150303	Electrical, Elec & Comm Eng Tech
150399	Electrical & Electronic Tech
150403	Electromechanical Technology
150612	Industrial Technology
150613	Manufacturing Technology
151306	Industrial Tech: Machine Design & Drafting Tech.
159999	Technology: Tech Ed & Training

Human Sciences

190501	Nutrition & Food Science
190504	Food Science and Human Nutrition

Biological Sciences

260101	Biology, Biological Sciences
260102	Biomedical Sciences, General
260202	Biochemistry
260203	Biophysics
260204	Molecular and Cellular Biology
260209	Radiation Biology/Radiobiology
260210	Biochemistry, Biophysics and Molecular Biology
260299	Biochemistry and Biophysics
260301	Botany
260305	Plant Pathology
260307	Plant Physiology, Plant Biology
260407	Anatomy and Cell Biology
260499	Molecular Cellular and Developmental Biology
260502	Microbiology
260507	Immunology
260701	Zoology
260702	Entomology, Insect Science
260801	Genetics
260806	Public Health Genetics

260901	Physiology
260906	Neuroscience
261001	Pharmacology
261004	Toxicology
261102	Biostatistics
261103	Bioinformatics and Computational Biology
261201	Biotechnology
261301	Animal Ecology, Ecology, Ecosystems
261309	Epidemiology
261399	Ecology, Evolution and Organismal Biology
269999	Immunobiology

Mathematics

270101	Mathematics
270301	Applied Mathematics
270303	Computational Mathematics
270399	Industrial Mathematics
270501	Statistics
270599	Math: Statistics & Actuarial Science

Military Sciences

280301	Military Science
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Interdisciplinary

300101	Science, Science Education
301901	Dietetics, Nutritional Sciences
302401	Neuroscience

Recreation Sciences

310501	Exercise Science
310505	Kinesiology and Exercise Science
310599	Diet and Exercise

Physical Sciences

400201	Astronomy
400401	Geological and Atmospheric Sciences
400404	Meteorology
400501	Chemistry
400599	Chemistry - Marketing
400601	Geology/Earth Science
400699	Earth Science, Geology - (Air Quality, Etc.)
400801	Physics
400802	Nanoscience & Nanotechnology
400899	Applied Physics

Medical/Health Sciences

510101	Pre-Chiropractic
510401	Dentistry
510501	Operative Dentistry
510503	Stomatology
510504	Dental Public Health
510507	Oral and Maxillofacial Surgery
510508	Orthodontics
510599	Oral Science
510602	Oral Health Science

510905	Nuclear Medicine Technology
510911	Radiation Sciences, Radiologic Technology
510912	Physician Assistant
510913	Athletic Training
511002	Cytotechnology/Cytotechnologist
511005	Clinical Laboratory Science/Medical Technology/Technologist
511101	Pre-Dentistry Studies
511102	Pre-Med/Pre-Medical Studies
511103	Pre-Pharmacy Studies
511104	Pre-Professional: Veterinary
511105	Pre-Prof: Nursing
511199	Pre-Professional Health Programs
511201	Medicine
511401	Pathology
511601	Nursing
511608	Nursing Science
511616	Clinical Nurse Specialist
511701	Pre-Professional: Optometry
512001	Pharmacy
512003	Pharmaceutics
512004	Med & Nat Prod Chemistry
512008	Clinical & Admin Pharmacy
512099	Pharmacy
512101	Pre-Prof: Podiatry
512201	Public Health, General
512202	Environmental, Occupation, and Agricultural Health
512208	Community & Behavioral Health
512211	Health Services Administration
512308	Physical Therapy & Rehab Science
512399	Rehabilitation Studies, Cardiac Rehabilitation
512401	Veterinary Medicine
512502	Veterinary Anatomy
512503	Vet Physiology & Pharmacology
512504	Veterinary Microbiology & Preventative Medicine
512505	Veterinary Pathology
512599	Veterinary Clinical Science, Veterinary Diagnostics, and Production Animal Medicine
512703	Biological/Pre-Medical Illustration
513101	Dietetics
519999	Medical, Other - (Education, Informatics, Etc.)

Actuarial Science

521304	Actuarial Science
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APPENDIX II

STEM ENROLLMENT DATA TABLES

TABLE 1: University of Iowa STEM Major Enrollment Counts

**The University of Iowa
STEM Major Enrollment Counts
by Session, Level, and Gender
Fall Census data 2000 - 2008**

Session	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total
2000	Graduate	Female	2	27	23	28	545	266	19	910
	Graduate	Male	1	17	26	40	440	490	16	1030
	Professional	Female	4	35	29	46	553	7	12	686
	Professional	Male	7	13	28	54	612	1	23	738
	Undergraduate	Female	9	28	37	78	1264	41	55	1512
	Undergraduate	Male	11	26	35	103	1595	47	83	1900
		Total		34	146	178	349	5009	852	208
2001	Graduate	Female	1	25	27	25	543	284	15	920
	Graduate	Male	1	15	26	31	432	495	26	1026
	Professional	Female	5	31	34	53	551	11	10	695
	Professional	Male	4	9	26	57	593	2	19	710
	Undergraduate	Female	7	44	46	72	1365	47	70	1651
	Undergraduate	Male	8	30	38	89	1535	44	78	1822
		Total		26	154	197	327	5019	883	218
2002	Graduate	Female	4	25	28	30	549	329	21	986
	Graduate	Male	2	9	28	24	435	501	29	1028
	Professional	Female	7	31	31	43	559	9	15	695
	Professional	Male	4	10	29	49	551	4	30	677
	Undergraduate	Female	9	37	35	77	1400	38	70	1666
	Undergraduate	Male	5	36	42	90	1572	40	70	1855
		Total		31	148	193	313	5066	921	235
2003	Graduate	Female	4	31	27	32	631	338	27	1090
	Graduate	Male	3	12	27	27	493	484	38	1084
	Professional	Female	4	27	33	36	583	7	20	710
	Professional	Male	4	15	29	38	529	7	37	659
	Undergraduate	Female	7	45	38	68	1403	26	48	1635
	Undergraduate	Male	7	39	52	86	1570	40	70	1864
		Total		29	169	206	287	5209	902	240
2004	Graduate	Female	5	40	24	41	673	348	30	1161
	Graduate	Male	1	11	30	24	530	481	35	1112
	Professional	Female	5	18	29	36	594	8	18	708
	Professional	Male	6	16	38	45	523	4	31	663
	Undergraduate	Female	10	32	35	93	1394	16	41	1621
	Undergraduate	Male	8	40	49	98	1589	43	71	1898
		Total		35	157	205	337	5303	900	226

Session	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total
2005	Graduate	Female	5	45	34	47	656	332	31	1150
	Graduate	Male	2	14	36	22	578	462	32	1146
	Professional	Female	5	19	31	29	591	6	23	704
	Professional	Male	4	19	37	42	526	4	33	665
	Undergraduate	Female	7	36	35	101	1454	19	35	1687
	Undergraduate	Male	10	42	50	101	1697	38	75	2013
	Total		33	175	223	342	5502	861	229	7365
2006	Graduate	Female	6	44	37	41	676	325	39	1168
	Graduate	Male	1	21	31	24	596	439	35	1147
	Professional	Female	4	23	34	36	595	5	31	728
	Professional	Male	3	16	36	48	516	5	26	650
	Undergraduate	Female	10	41	54	106	1497	26	38	1772
	Undergraduate	Male	10	41	51	117	1774	41	79	2113
	Total		34	186	243	372	5654	841	248	7578
2007	Graduate	Female	8	43	27	44	769	295	43	1229
	Graduate	Male	1	25	24	21	592	396	42	1101
	Professional	Female	4	29	32	43	556	4	33	701
	Professional	Male	3	15	35	49	551	4	31	688
	Undergraduate	Female	6	34	52	102	1507	44	53	1798
	Undergraduate	Male	9	38	48	121	1833	44	86	2179
	Total		31	184	218	380	5808	787	288	7696
2008	Graduate	Female	8	46	27	45	816	288	59	1289
	Graduate	Male	1	24	23	27	637	390	59	1161
	Professional	Female	4	31	35	57	533	6	43	709
	Professional	Male	4	21	32	49	553	3	32	694
	Undergraduate	Female	5	45	57	110	1525	65	59	1866
	Undergraduate	Male	8	43	57	129	1888	83	104	2312
	Total		30	210	231	417	5952	835	356	8031

* Graduate College enrollments do not include post-docs.

TABLE 2: Iowa State University STEM Major Enrollment Counts

**Iowa State University
STEM Major Enrollment Counts
by Session, Level, and Gender
Fall Census data 2000 - 2008**

Session	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total
2000	Graduate	Female	3	10	6	7	288	344	23	681
	Graduate	Male	0	20	22	13	633	801	50	1539
	Professional	Female	0	0	2	1	239	0	7	249
	Professional	Male	1	1	0	0	135	0	6	143
	Undergraduate	Female	13	78	90	61	2673	163	110	3188
	Undergraduate	Male	20	120	187	124	5781	399	292	6923
		Total		37	229	307	206	9749	1707	488
2001	Graduate	Female	3	14	12	9	289	346	25	698
	Graduate	Male	0	24	19	11	658	772	46	1530
	Professional	Female	1	0	4	1	226	2	24	258
	Professional	Male	1	1	0	0	130	0	10	142
	Undergraduate	Female	12	80	106	78	2681	164	125	3246
	Undergraduate	Male	14	145	201	139	5936	441	338	7214
		Total		31	264	342	238	9920	1725	568
2002	Graduate	Female	2	20	16	9	310	351	20	728
	Graduate	Male	0	22	19	15	691	805	53	1605
	Professional	Female	1	0	5	1	236	3	26	272
	Professional	Male	0	1	0	0	116	0	11	128
	Undergraduate	Female	11	89	103	80	2659	141	132	3215
	Undergraduate	Male	21	161	200	134	5916	422	351	7205
		Total		35	293	343	239	9928	1722	593
2003	Graduate	Female	3	29	13	13	316	367	25	766
	Graduate	Male	1	21	18	15	753	825	53	1686
	Professional	Female	1	0	4	0	258	3	29	295
	Professional	Male	0	1	0	0	105	1	7	114
	Undergraduate	Female	10	87	85	92	2547	109	141	3071
	Undergraduate	Male	19	153	218	126	5711	353	370	6950
		Total		34	291	338	246	9690	1658	625
2004	Graduate	Female	2	24	11	12	323	393	23	788
	Graduate	Male	0	23	17	16	717	800	53	1626
	Professional	Female	1	0	6	1	260	3	28	299
	Professional	Male	0	0	0	0	99	0	10	109
	Undergraduate	Female	10	84	93	90	2410	97	146	2930
	Undergraduate	Male	24	141	211	130	5531	300	352	6689
		Total		37	272	338	249	9340	1593	612

Session	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total	
2005	Graduate	Female	1	19	11	9	312	387	23	762	
	Graduate	Male	0	20	17	19	716	742	46	1560	
	Professional	Female	0	1	4	2	301	2	13	323	
	Professional	Male	0	0	0	0	103	0	5	108	
	Undergraduate	Female	10	97	87	91	2393	86	117	2881	
	Undergraduate	Male	23	136	215	125	5399	246	316	6460	
			Total	34	273	334	246	9224	1463	520	12094
	<hr/>										
2006	Graduate	Female	1	24	16	8	328	367	27	771	
	Graduate	Male	1	25	30	21	708	756	49	1590	
	Professional	Female	0	2	3	2	305	1	15	328	
	Professional	Male	0	0	0	0	107	0	4	111	
	Undergraduate	Female	10	89	98	98	2380	98	119	2892	
	Undergraduate	Male	19	127	221	141	5326	234	272	6340	
			Total	31	267	368	270	9154	1456	486	12032
	<hr/>										
2007	Graduate	Female	1	19	18	6	323	335	22	724	
	Graduate	Male	2	38	35	22	796	774	59	1726	
	Professional	Female	0	2	4	7	332	1	22	368	
	Professional	Male	0	0	0	2	114	0	8	124	
	Undergraduate	Female	13	88	95	94	2559	106	108	3063	
	Undergraduate	Male	18	134	201	146	5504	279	251	6533	
			Total	34	281	353	277	9628	1495	470	12538
	<hr/>										
2008	Graduate	Female	1	21	21	5	314	339	24	725	
	Graduate	Male	6	36	41	23	835	785	64	1790	
	Professional	Female	0	1	3	7	345	2	43	401	
	Professional	Male	2	0	0	2	114	0	12	130	
	Undergraduate	Female	12	78	101	125	2764	113	101	3294	
	Undergraduate	Male	20	127	210	144	5569	318	243	6631	
			Total	41	263	376	306	9941	1557	487	12971

* Graduate College enrollments do not include post-docs.

TABLE 3: University of Northern Iowa STEM Major Enrollment Counts

**University of Northern Iowa
STEM Major Enrollment Counts
by Session, Level, and Gender
Fall Census data 2000 - 2008**

Session	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total
2000	Graduate	Female	0	0	4	0	42	10	1	57
	Graduate	Male	0	2	2	0	55	25	8	92
	Professional	Female								0
	Professional	Male								0
	Undergraduate	Female	1	18	5	6	655	3	31	719
	Undergraduate	Male	2	20	12	12	941	16	39	1042
		Total		3	40	23	18	1693	54	79
2001	Graduate	Female	0	1	3	0	38	7	2	51
	Graduate	Male	0	1	1	0	58	25	2	87
	Professional	Female								0
	Professional	Male								0
	Undergraduate	Female	3	18	7	6	645	11	30	720
	Undergraduate	Male	1	17	7	11	918	19	38	1011
		Total		4	37	18	17	1659	62	72
2002	Graduate	Female	0	0	1	0	31	6	3	41
	Graduate	Male	0	3	1	0	49	25	1	79
	Professional	Female								0
	Professional	Male								0
	Undergraduate	Female	1	28	5	9	648	12	23	726
	Undergraduate	Male	2	25	6	20	890	23	44	1010
		Total		3	56	13	29	1618	66	71
2003	Graduate	Female	0	0	1	0	31	11	3	46
	Graduate	Male	0	2	0	0	40	25	2	69
	Professional	Female								0
	Professional	Male								0
	Undergraduate	Female	2	29	8	12	647	6	26	730
	Undergraduate	Male	6	27	6	23	894	22	40	1018
		Total		8	58	15	35	1612	64	71
2004	Graduate	Female	0	7	0	0	45	9	1	62
	Graduate	Male	0	3	0	0	45	26	6	80
	Professional	Female								0
	Professional	Male								0
	Undergraduate	Female	0	24	5	14	671	10	28	752
	Undergraduate	Male	5	26	8	20	858	23	46	986
		Total		5	60	13	34	1619	68	81

Session	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total	
2005	Graduate	Female	0	8	0	0	41	8	2	59	
	Graduate	Male	0	4	0	2	48	14	4	72	
	Professional	Female								0	
	Professional	Male								0	
	Undergraduate	Female	0	23	6	10	718	9	21	787	
	Undergraduate	Male	1	27	14	13	839	29	38	961	
		Total		1	62	20	25	1646	60	65	1879
	2006	Graduate	Female	0	2	0	0	47	7	4	60
		Graduate	Male	0	5	0	1	56	13	4	79
		Professional	Female								0
Professional		Male								0	
Undergraduate		Female	4	24	12	10	733	17	17	817	
Undergraduate		Male	1	30	12	18	859	40	37	997	
		Total		5	61	24	29	1695	77	62	1953
2007		Graduate	Female	0	2	0	0	64	12	5	83
	Graduate	Male	0	7	0	0	68	30	5	110	
	Professional	Female								0	
	Professional	Male								0	
	Undergraduate	Female	5	27	14	12	838	17	17	930	
	Undergraduate	Male	3	28	16	16	907	64	45	1079	
		Total		8	64	30	28	1877	123	72	2202
2008	Graduate	Female	0	2	0	1	79	14	1	97	
	Graduate	Male	0	4	0	0	59	33	9	105	
	Professional	Female								0	
	Professional	Male								0	
	Undergraduate	Female	3	24	17	10	792	10	21	877	
	Undergraduate	Male	5	30	12	25	984	57	45	1158	
		Total		8	60	29	36	1914	114	76	2237

TABLE 4: Iowa Regent Universities STEM Major Enrollment Counts

**Iowa Regent Universities
STEM Major Enrollment Counts
by Session, Level, and Gender
Fall Census data 2000 - 2008**

Session	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total
2000	Graduate	Female	5	37	33	35	875	620	43	1648
	Graduate	Male	1	39	50	53	1128	1316	74	2661
	Professional	Female	4	35	31	47	792	7	19	935
	Professional	Male	8	14	28	54	747	1	29	881
	Undergraduate	Female	23	124	132	145	4592	207	196	5419
	Undergraduate	Male	33	166	234	239	8317	462	414	9865
		Total		74	415	508	573	16451	2613	775
2001	Graduate	Female	4	40	42	34	870	637	42	1669
	Graduate	Male	1	40	46	42	1148	1292	74	2643
	Professional	Female	6	31	38	54	777	13	34	953
	Professional	Male	5	10	26	57	723	2	29	852
	Undergraduate	Female	22	142	159	156	4691	222	225	5617
	Undergraduate	Male	23	192	246	239	8389	504	454	10047
		Total		61	455	557	582	16598	2670	858
2002	Graduate	Female	6	45	45	39	890	686	44	1755
	Graduate	Male	2	34	48	39	1175	1331	83	2712
	Professional	Female	8	31	36	44	795	12	41	967
	Professional	Male	4	11	29	49	667	4	41	805
	Undergraduate	Female	21	154	143	166	4707	191	225	5607
	Undergraduate	Male	28	222	248	244	8378	485	465	10070
		Total		69	497	549	581	16612	2709	899
2003	Graduate	Female	7	60	41	45	978	716	55	1902
	Graduate	Male	4	35	45	42	1286	1334	93	2839
	Professional	Female	5	27	37	36	841	10	49	1005
	Professional	Male	4	16	29	38	634	8	44	773
	Undergraduate	Female	19	161	131	172	4597	141	215	5436
	Undergraduate	Male	32	219	276	235	8175	415	480	9832
		Total		71	518	559	568	16511	2624	936
2004	Graduate	Female	7	71	35	53	1041	750	54	2011
	Graduate	Male	1	37	47	40	1292	1307	94	2818
	Professional	Female	6	18	35	37	854	11	46	1007
	Professional	Male	6	16	38	45	622	4	41	772
	Undergraduate	Female	20	140	133	197	4475	123	215	5303
	Undergraduate	Male	37	207	268	248	7978	366	469	9573
		Total		77	489	556	620	16262	2561	919

Session	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total
2005	Graduate	Female	6	72	45	56	1009	727	56	1971
	Graduate	Male	2	38	53	43	1342	1218	82	2778
	Professional	Female	5	20	35	31	892	8	36	1027
	Professional	Male	4	19	37	42	629	4	38	773
	Undergraduate	Female	17	156	128	202	4565	114	173	5355
	Undergraduate	Male	34	205	279	239	7935	313	429	9434
		Total		68	510	577	613	16372	2384	814
2006	Graduate	Female	7	70	53	49	1051	699	70	1999
	Graduate	Male	2	51	61	46	1360	1208	88	2816
	Professional	Female	4	25	37	38	900	6	46	1056
	Professional	Male	3	16	36	48	623	5	30	761
	Undergraduate	Female	24	154	164	214	4610	141	174	5481
	Undergraduate	Male	30	198	284	276	7959	315	388	9450
		Total		70	514	635	671	16503	2374	796
2007	Graduate	Female	9	64	45	50	1156	642	70	2036
	Graduate	Male	3	70	59	43	1456	1200	106	2937
	Professional	Female	4	31	36	50	888	5	55	1069
	Professional	Male	3	15	35	51	665	4	39	812
	Undergraduate	Female	24	149	161	208	4904	167	178	5791
	Undergraduate	Male	30	200	265	283	8244	387	382	9791
		Total		73	529	601	685	17313	2405	830
2008	Graduate	Female	9	69	48	51	1209	641	84	2111
	Graduate	Male	7	64	64	50	1531	1208	132	3056
	Professional	Female	4	32	38	64	878	8	86	1110
	Professional	Male	6	21	32	51	667	3	44	824
	Undergraduate	Female	20	147	175	245	5081	188	181	6037
	Undergraduate	Male	33	200	279	298	8441	458	392	10101
		Total		79	533	636	759	17807	2506	919

* Graduate College enrollments do not include post-docs.

**APPENDIX III
STEM DEGREES DATA TABLES**

TABLE 5: University of Iowa STEM Major Degree Counts

**The University of Iowa
STEM Degree Counts by Session, Level, and Gender
Annual data 1999 - 2007
Sessions (Summer, Fall, Spring)**

Year	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total
1999-2000	Graduate	Female	2	6	5	12	206	50	0	281
	Graduate	Male	1	7	1	8	169	109	4	299
	Professional	Female	1	2	4	8	69	0	0	84
	Professional	Male	0	2	8	12	118	1	1	142
	Undergraduate	Female	3	0	8	20	378	12	15	436
	Undergraduate	Male	3	6	4	29	329	14	16	401
	Total		10	23	30	89	1269	186	36	1643
2000-2001	Graduate	Female	0	2	4	13	188	64	7	278
	Graduate	Male	1	3	3	9	144	113	8	281
	Professional	Female	0	8	3	7	74	0	1	93
	Professional	Male	3	3	10	10	125	1	8	160
	Undergraduate	Female	2	6	3	25	335	8	8	387
	Undergraduate	Male	0	3	8	26	316	13	12	378
	Total		6	25	31	90	1182	199	44	1577
2001-2002	Graduate	Female	0	8	4	11	210	67	5	305
	Graduate	Male	0	3	7	13	164	114	5	306
	Professional	Female	0	0	6	9	73	0	0	88
	Professional	Male	1	0	6	13	124	0	2	146
	Undergraduate	Female	1	8	13	16	333	8	14	393
	Undergraduate	Male	2	1	9	13	342	9	12	388
	Total		4	20	45	75	1246	198	38	1626
2002-2003	Graduate	Female	3	4	9	14	192	65	2	289
	Graduate	Male	0	2	6	11	135	100	5	259
	Professional	Female	0	8	7	7	67	0	0	89
	Professional	Male	1	0	4	15	103	0	3	126
	Undergraduate	Female	2	2	9	21	452	14	23	523
	Undergraduate	Male	2	3	5	24	363	5	13	415
	Total		8	19	40	92	1312	184	46	1701
2003-2004	Graduate	Female	1	4	4	14	229	93	5	350
	Graduate	Male	2	1	5	11	129	114	8	270
	Professional	Female	1	10	9	2	72	0	2	96
	Professional	Male	0	2	3	4	99	0	5	113
	Undergraduate	Female	1	7	15	15	402	11	11	462
	Undergraduate	Male	3	6	10	12	342	11	15	399
	Total		8	30	46	58	1273	229	46	1690

Year	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total	
2004-2005	Graduate	Female	0	9	8	12	233	88	8	358	
	Graduate	Male	0	1	9	6	169	131	11	327	
	Professional	Female	1	4	5	11	71	0	2	94	
	Professional	Male	1	3	8	12	100	0	1	125	
	Undergraduate	Female	2	6	5	17	391	9	7	437	
	Undergraduate	Male	1	9	4	21	339	8	7	389	
			Total	5	32	39	79	1303	236	36	1730
	2005-2006	Graduate	Female	3	8	10	18	318	86	10	453
Graduate		Male	1	4	5	6	177	115	11	319	
Professional		Female	3	6	5	5	73	1	0	93	
Professional		Male	2	4	11	5	90	0	5	117	
Undergraduate		Female	0	10	3	19	419	3	12	466	
Undergraduate		Male	1	6	8	23	363	7	13	421	
		Total	10	38	42	76	1440	212	51	1869	
2006-2007		Graduate	Female	1	11	12	15	266	102	10	417
	Graduate	Male	0	6	12	11	209	128	12	378	
	Professional	Female	0	3	8	5	90	0	4	110	
	Professional	Male	0	1	5	6	91	0	3	106	
	Undergraduate	Female	1	7	6	27	407	1	13	462	
	Undergraduate	Male	0	6	10	19	368	12	22	437	
			Total	2	34	53	83	1431	243	64	1910
	2007-2008	Graduate	Female	1	12	10	15	303	93	12	446
Graduate		Male	1	3	8	12	206	127	11	368	
Professional		Female	1	1	1	2	77	0	4	86	
Professional		Male	1	3	9	7	93	0	8	121	
Undergraduate		Female	3	9	10	26	446	6	15	515	
Undergraduate		Male	3	5	11	24	400	9	14	466	
		Total	10	33	49	86	1525	235	64	2002	

TABLE 6: Iowa State University STEM Major Degree Counts

**Iowa State University
STEM Degree Counts by Session, Level, and Gender
Annual data 1999 - 2007
Sessions (Summer, Fall, Spring)**

Year	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total
1999-2000	Graduate	FEMALE	1	2	7	2	83	79	4	178
	Graduate	MALE	0	5	6	6	191	213	18	439
	Professional	FEMALE	0	0	0	0	57	0	2	59
	Professional	MALE	0	0	0	0	38	0	2	40
	Undergraduate	FEMALE	2	10	17	7	464	30	13	543
	Undergraduate	MALE	1	19	30	7	1065	99	34	1255
		Total	4	36	60	22	1898	421	73	2514
2000-2001	Graduate	FEMALE	0	0	2	1	88	89	7	187
	Graduate	MALE	0	5	4	3	170	188	14	384
	Professional	FEMALE	0	0	0	0	63	0	0	63
	Professional	MALE	0	0	0	0	33	0	1	34
	Undergraduate	FEMALE	1	6	11	8	472	33	14	545
	Undergraduate	MALE	2	12	31	10	975	102	30	1162
		Total	3	23	48	22	1801	412	66	2375
2001-2002	Graduate	FEMALE	1	3	2	3	83	77	3	172
	Graduate	MALE	0	4	4	2	161	221	10	402
	Professional	FEMALE	0	0	0	0	61	0	2	63
	Professional	MALE	1	0	0	0	34	0	0	35
	Undergraduate	FEMALE	4	12	18	9	466	30	14	553
	Undergraduate	MALE	0	16	31	17	1037	72	53	1226
		Total	6	35	55	31	1842	400	82	2451
2002-2003	Graduate	FEMALE	0	0	1	1	80	95	5	182
	Graduate	MALE	0	4	7	6	194	183	10	404
	Professional	FEMALE	0	0	1	1	56	0	1	59
	Professional	MALE	0	0	1	0	33	0	3	37
	Undergraduate	FEMALE	1	4	21	9	550	47	16	648
	Undergraduate	MALE	3	10	21	19	1119	102	56	1330
		Total	4	18	52	36	2032	427	91	2660
2003-2004	Graduate	FEMALE	1	8	4	5	80	77	6	181
	Graduate	MALE	0	6	3	2	181	201	13	406
	Professional	FEMALE	0	0	1	0	61	0	4	66
	Professional	MALE	0	1	0	0	34	1	1	37
	Undergraduate	FEMALE	3	15	14	18	552	40	20	662
	Undergraduate	MALE	3	16	30	17	1050	116	44	1276
		Total	7	46	52	42	1958	435	88	2628

Year	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total	
2004-2005	Graduate	FEMALE	0	8	5	2	93	86	2	196	
	Graduate	MALE	1	5	4	3	198	220	13	444	
	Professional	FEMALE	1	0	2	0	44	2	15	64	
	Professional	MALE	0	0	0	0	24	0	5	29	
	Undergraduate	FEMALE	1	3	10	9	529	43	26	621	
	Undergraduate	MALE	1	23	36	26	1040	94	59	1279	
	Total			4	39	57	40	1928	445	120	2633
	2005-2006	Graduate	FEMALE	1	4	3	2	100	97	8	215
Graduate		MALE	0	8	3	8	225	176	10	430	
Professional		FEMALE	0	0	2	0	74	1	5	82	
Professional		MALE	0	0	0	0	23	0	1	24	
Undergraduate		FEMALE	1	17	24	11	523	21	22	619	
Undergraduate		MALE	5	31	38	18	1130	74	74	1370	
Total			7	60	70	39	2075	369	120	2740	
2006-2007		Graduate	FEMALE	0	5	2	1	85	96	7	196
	Graduate	MALE	0	3	4	7	199	167	11	391	
	Professional	FEMALE	0	0	0	0	70	0	4	74	
	Professional	MALE	0	0	0	0	23	0	0	23	
	Undergraduate	FEMALE	2	18	17	23	488	18	27	593	
	Undergraduate	MALE	3	19	43	17	1048	43	59	1232	
	Total			5	45	66	48	1913	324	108	2509
	2007-2008	Graduate	FEMALE	1	7	4	4	96	74	8	194
Graduate		MALE	0	7	5	1	188	166	15	382	
Professional		FEMALE	0	0	2	1	69	0	2	74	
Professional		MALE	0	0	0	0	28	0	4	32	
Undergraduate		FEMALE	2	11	24	13	460	25	30	565	
Undergraduate		MALE	5	22	29	26	1041	53	52	1228	
Total			8	47	64	45	1882	318	111	2475	

TABLE 7: University of Northern Iowa STEM Major Degree Counts

**University of Northern Iowa
STEM Degree Counts by Session, Level, and Gender
Annual data 1999 - 2007
Sessions (Summer, Fall, Spring)**

Year	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total
1999-2000	Graduate	FEMALE	0	0	0	0	15	4	0	19
	Graduate	MALE	0	0	0	0	11	9	0	20
	Professional	FEMALE								
	Professional	MALE								
	Undergraduate	FEMALE	1	3	2	0	113	2	3	124
	Undergraduate	MALE	0	1	3	2	183	3	5	197
		Total	1	4	5	2	322	18	8	360
2000-2001	Graduate	FEMALE	0	0	1	0	8	6	1	16
	Graduate	MALE	0	0	1	0	15	10	2	28
	Professional	FEMALE								
	Professional	MALE								
	Undergraduate	FEMALE	1	2	2	0	110	0	6	121
	Undergraduate	MALE	0	0	3	3	192	1	13	212
		Total	1	2	7	3	325	17	22	377
2001-2002	Graduate	FEMALE	0	0	1	0	16	5	1	23
	Graduate	MALE	0	0	1	0	18	7	3	29
	Professional	FEMALE								
	Professional	MALE								
	Undergraduate	FEMALE	1	3	2	0	112	1	6	125
	Undergraduate	MALE	0	0	2	2	187	0	2	193
		Total	1	3	6	2	333	13	12	370
2002-2003	Graduate	FEMALE	0	0	0	0	19	2	1	22
	Graduate	MALE	0	0	0	0	16	6	0	22
	Professional	FEMALE								
	Professional	MALE								
	Undergraduate	FEMALE	0	2	0	1	107	5	5	120
	Undergraduate	MALE	0	2	0	1	187	2	12	204
		Total	0	4	0	2	329	15	18	368
2003-2004	Graduate	FEMALE	0	0	1	0	10	3	0	14
	Graduate	MALE	0	0	1	0	13	7	2	23
	Professional	FEMALE								
	Professional	MALE								
	Undergraduate	FEMALE	1	1	2	1	95	2	4	106
	Undergraduate	MALE	0	2	1	2	182	4	8	199
		Total	1	3	5	3	300	16	14	342

Year	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total
2004-2005	Graduate	FEMALE	0	0	1	0	11	6	2	20
	Graduate	MALE	0	2	0	0	16	10	0	28
	Professional	FEMALE								
	Professional	MALE								
	Undergraduate	FEMALE	0	2	1	2	111	3	4	123
	Undergraduate	MALE	1	2	2	3	200	2	10	220
	Total		1	6	4	5	338	21	16	391
2005-2006	Graduate	FEMALE	0	4	0	0	16	3	1	24
	Graduate	MALE	0	0	0	0	14	8	2	24
	Professional	FEMALE								
	Professional	MALE								
	Undergraduate	FEMALE	0	5	0	2	113	1	6	127
	Undergraduate	MALE	0	5	2	4	184	2	7	204
	Total		0	14	2	6	327	14	16	379
2006-2007	Graduate	FEMALE	0	2	1	0	16	1	0	20
	Graduate	MALE	0	3	0	0	15	2	1	21
	Professional	FEMALE								
	Professional	MALE								
	Undergraduate	FEMALE	0	3	2	1	112	0	1	119
	Undergraduate	MALE	0	4	0	3	169	8	9	193
	Total		0	12	3	4	312	11	11	353
2007-2008	Graduate	FEMALE	0	0	0	0	23	3	1	27
	Graduate	MALE	0	3	0	0	20	6	3	32
	Professional	FEMALE								
	Professional	MALE								
	Undergraduate	FEMALE	0	0	2	1	141	4	2	150
	Undergraduate	MALE	1	1	1	3	169	4	7	186
	Total		1	4	3	4	353	17	13	395

TABLE 8: Iowa Regent Universities STEM Major Degree Counts

**Iowa Regent Universities
STEM Degree Counts by Session, Level, and Gender
Annual data 1999 - 2007
Sessions (Summer, Fall, Spring)**

Year	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total
1999-2000	Graduate	FEMALE	3	8	12	14	304	133	4	478
	Graduate	MALE	1	12	7	14	371	331	22	758
	Professional	FEMALE	1	2	4	8	126	0	2	143
	Professional	MALE	0	2	8	12	156	1	3	182
	Undergraduate	FEMALE	6	13	27	27	955	44	31	1103
	Undergraduate	MALE	4	26	37	38	1577	116	55	1853
	Total		15	63	95	113	3489	625	117	4517
2000-2001	Graduate	FEMALE	0	2	7	14	284	159	15	481
	Graduate	MALE	1	8	8	12	329	311	24	693
	Professional	FEMALE	0	8	3	7	137	0	1	156
	Professional	MALE	3	3	10	10	158	1	9	194
	Undergraduate	FEMALE	4	14	16	33	917	41	28	1053
	Undergraduate	MALE	2	15	42	39	1483	116	55	1752
	Total		10	50	86	115	3308	628	132	4329
2001-2002	Graduate	FEMALE	1	11	7	14	309	149	9	500
	Graduate	MALE	0	7	12	15	343	342	18	737
	Professional	FEMALE	0	0	6	9	134	0	2	151
	Professional	MALE	2	0	6	13	158	0	2	181
	Undergraduate	FEMALE	6	23	33	25	911	39	34	1071
	Undergraduate	MALE	2	17	42	32	1566	81	67	1807
	Total		11	58	106	108	3421	611	132	4447
2002-2003	Graduate	FEMALE	3	4	10	15	291	162	8	493
	Graduate	MALE	0	6	13	17	345	289	15	685
	Professional	FEMALE	0	8	8	8	123	0	1	148
	Professional	MALE	1	0	5	15	136	0	6	163
	Undergraduate	FEMALE	3	8	30	31	1109	66	44	1291
	Undergraduate	MALE	5	15	26	44	1669	109	81	1949
	Total		12	41	92	130	3673	626	155	4729
2003-2004	Graduate	FEMALE	2	12	9	19	319	173	11	545
	Graduate	MALE	2	7	9	13	323	322	23	699
	Professional	FEMALE	1	10	10	2	133	0	6	162
	Professional	MALE	0	3	3	4	133	1	6	150
	Undergraduate	FEMALE	5	23	31	34	1049	53	35	1230
	Undergraduate	MALE	6	24	41	31	1574	131	67	1874
	Total		16	79	103	103	3531	680	148	4660

Year	Level	Gender	Native American	African American	Asian American	Hispanic American	White	Non Citizen	Other/not reported	Total	
2004-2005	Graduate	FEMALE	0	17	14	14	337	180	12	574	
	Graduate	MALE	1	8	13	9	383	361	24	799	
	Professional	FEMALE	2	4	7	11	115	2	17	158	
	Professional	MALE	1	3	8	12	124	0	6	154	
	Undergraduate	FEMALE	3	11	16	28	1031	55	37	1181	
	Undergraduate	MALE	3	34	42	50	1579	104	76	1888	
			Total	10	77	100	124	3569	702	172	4754
	2005-2006	Graduate	FEMALE	4	16	13	20	434	186	19	692
Graduate		MALE	1	12	8	14	416	299	23	773	
Professional		FEMALE	3	6	7	5	147	2	5	175	
Professional		MALE	2	4	11	5	113	0	6	141	
Undergraduate		FEMALE	1	32	27	32	1055	25	40	1212	
Undergraduate		MALE	6	42	48	45	1677	83	94	1995	
		Total	17	112	114	121	3842	595	187	4988	
2006-2007		Graduate	FEMALE	1	18	15	16	367	199	17	633
	Graduate	MALE	0	12	16	18	423	297	24	790	
	Professional	FEMALE	0	3	8	5	160	0	8	184	
	Professional	MALE	0	1	5	6	114	0	3	129	
	Undergraduate	FEMALE	3	28	25	51	1007	19	41	1174	
	Undergraduate	MALE	3	29	53	39	1585	63	90	1862	
			Total	7	91	122	135	3656	578	183	4772
	2007-2008	Graduate	FEMALE	2	19	14	19	422	170	21	667
Graduate		MALE	1	13	13	13	414	299	29	782	
Professional		FEMALE	1	1	3	3	146	0	6	160	
Professional		MALE	1	3	9	7	121	0	12	153	
Undergraduate		FEMALE	5	20	36	40	1047	35	47	1230	
Undergraduate		MALE	9	28	41	53	1610	66	73	1880	
		Total	19	84	116	135	3760	570	188	4872	