Program for Women in Science and Engineering

2010-11 Annual Report

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Corporate Sponsors
Emerson Process Management
John Deere Foundation
Rockwell Collins

Services Provided
K-12 and Community College Outreach
Taking the Road Less Traveled Career Conferences
Student Role Models
Scholarships
Special Transfer Visits
Individual group visits with prospective students

Success/Retention
WiSE Learning Communities
Sophomore Success Seminar
Scholarships
Undergraduate summer research program
Support for student organizations
Academic support programs (help sessions, tutoring)
Leadership development programming

Resource to Others
Leadership on committees for other STEM or gender issues on campus and statewide
Involvement with other programs/grants on campus:
NSF Advance, Women’s Leadership Consortium, Learning Communities, etc.
A Word from the Director

Higher education as a whole is being asked to “Do more with less.” PWSE is no exception to this trend. This past year PWSE had one of its smallest staff sizes ever with the largest enrollment of students in STEM and demand for programs exceeding capacity. Therefore, PWSE staff and advisory board have spent considerable time this year reflecting on what we are doing, how we are spending our time and resources, and aligning all efforts to most effectively meet our mission and strategic plan. This assessment and reflection took many forms:

- Tough budget times call for tough decisions. One that we faced this year was the elimination of our PWSE Summer Intern Program, a hallmark program for PWSE for 24 years. This was a very difficult decision, as faculty members have a strong connection to the program, and we have success stories of women faculty members who decided on their path toward advanced degrees with their internship experience. However, the decision made at the Fall 2010 Advisory Board meeting was that PWSE could encourage student engagement in other research opportunities, generating similar types of outcomes, without the expense or staff time of running our own program.

- PWSE arranged for a full external program review to occur spring semester 2011 – a year earlier than what was originally scheduled. Given the tough decisions we have been forced to make, the need for PWSE to develop its next strategic plan, the staff and advisory board felt it was critical to conduct a full review of the program at this time. The feedback from this process will be used in the coming year to shape the priorities for the coming years.

In addition to this concerted effort on program assessment, PWSE continued to make progress on its current strategic plan. This is evident by the information shared in this annual report. However, I thought it might be helpful to share a couple of examples of progress on strategic plan priorities from this past year:

- Strategic plan priority #2: Broaden participation in PWSE programs and initiatives
  - Through the NSF sponsored SP@ISU program, PWSE has been sharing information to engage additional faculty in our programs and initiatives.
  - PWSE continues assess and develop programming to serve female STEM transfer students (an area where the external review team felt PWSE was a national leader in such programming).

- Strategic plan priority #4: Serve as a knowledge resource on issues and programming related to women in STEM
  - Served on the writing team for the statewide STEM strategic plan – The Iowa STEM Roadmap – insuring that issues related to women in STEM were included in this important document.
  - Assisted with the planning and facilitating sessions at the first statewide Diversity in STEM conference, coordinated by the Iowa Department of Education

The progress we have made during this difficult year is a testament to the dedicated staff, volunteers, and collaborators of PWSE. The people really do make the program! It is an honor to work with everyone that is helping us as we strive to achieve our vision of fully engaging women in STEM.

Karen Zunkel, PhD
Director

2010–11 by the Numbers....

- 2964 registrants for Taking the Road Less Traveled Career Conferences for 6-12 grade girls, parents, and educators
- 259 first-year students participated in the WiSE Living Learning Community and who participated in WiSE programming
- 8,891 = total number of individuals reached by outreach programming
- 26 students participated in the Sophomore Success Course (UST 201x) with over 100 more participating in second-year activities, including job shadowing, etiquette training, and networking with faculty and professionals
- $21,000 in scholarships for women in science and engineering
- Over 90 undergraduates attended workshops on “Benefits and Strategies to obtain undergraduate research experiences,” developed by PWSE and University Undergraduate Research Coordinator
- 5927 K-12 students reached by Student Role Model program, with the addition of 48 new teachers and 33 new schools.
- Over one-third of STEM bachelor degrees awarded at ISU in past year awarded to women
- PWSE staff met with 265 prospective students (total of 649 visitors including family members) during the year. A 20% increase from previous year
- 33.4% of the undergraduates enrolled in STEM fields at ISU were women
- 3813 undergraduate women enrolled in STEM fields at Iowa State and receiving e-mail updates from PWSE
Outreach Partnerships
PWSE continues to collaborate with programs across the state to offer experiential activities to stimulate the interest in STEM fields among Iowa youth. Examples of program partners and resulting programs include:

- Iowa Commission on the Status of Women - a statewide essay contest about historical women in STEM
- Technology Association of Iowa – statewide recognition of women achieving excellence in innovation in technical fields via the Women of Innovation awards program
- State Science and Technology Fair of Iowa – awards highlighting innovation and creativity
- NW Iowa Extension - Robotix train the trainer program facilitated by our Student Role Models
- Delta Academy middle school girls – meet with PWSE role models once per month throughout the academic year to discuss STEM career opportunities and experience hands-on STEM activities

Career Conferences
PWSE has been sponsoring Taking the Road Less Traveled career exploration conferences for girls in grades 6-12 each year since 1987. Six conferences were offered during FY11. The conference format includes career exploration workshops led by women working in science, engineering, and other technical fields; tours of ISU labs and facilities; and special sessions for parents and educators. This year, 2,964 participants attended the conferences. This brings the total number of participants, since program inception to 53,338.

As part of the Program Review process, PWSE staff examined what they perceived to be the expected educator and student outcomes from both adults and 6th-12th grade girls participating in the TRLT conferences. In reviewing the post-conference survey instrument there were noticeable gaps between the data currently being collected and what has been identified as expected outcomes. As a result, the survey tool will be revamped to reflect expected outcomes. A list of specific program outcomes may be accessed on our website www.pwse.iastate.edu under “Data/Assessment”.

PWSE Ambassador Program
The PWSE Ambassador program provides an additional way for undergraduates to engage with PWSE in a leadership role. Ambassadors are a small group of students who volunteer to assist PWSE by connecting with high school students during the recruitment process. Ambassadors have assisted staffing a PWSE booth at various events, met with prospective students and their families during the regular daily visits, and answered questions from students via an on-line Meebo chats. Following the prospective student visits, ambassadors send handwritten postcards to the students as a follow-up. This year we had 10 very active Ambassadors. The program is still in its infancy, so there are no formal assessment results. However, PWSE staff members note that during the prospective student visit it is helpful to have students be able to answer questions from the student perspective. The Meebo chat has been utilized infrequently so will be reviewed during the next year to determine whether it is maintained or whether an alternative communication option is preferable.

Student Role Model Program
Created to encourage K-12 students’ interest in science, technology, engineering, and math (STEM) fields, the Student Role Model program offers exciting challenges through hands-on activities facilitated by ISU undergraduate student role models. Through this program, undergraduate students majoring in a STEM degree program visit classrooms, community centers, and school fairs across the state. The role models visited 105 schools during the 2010-2011 year and reached 5927 students (including 3065 female (52%) of which 980 were minority students). There is no fee for the requesting school or organization, but the teachers are encouraged to complete a short evaluation of their experience with the ISU student role models. During the 2011-2012 academic year we are planning to reach out to districts with high minority enrollment (e.g. Marshalltown, Tama) to offer multiple (consecutive) visits for greater potential impact.

As part of the PWSE Program Evaluation, PWSE administered a formative assessment to gather information about individual role model perceptions as a result of being involved with the Student Role Model Program.

Student Role Model Assessment results indicated that:
- 60% of respondents learned to manage their time more effectively.
- 86% learned to work more effectively as a team (co-teaching).
- 87% indicated that being a student role model improved their oral communications skills.
- 93% indicated that being part of the student role model program increased their CONFIDENCE in public speaking.
- 100% indicated that being a student role model enhanced their leadership skills.
- 87% indicated that they were very satisfied with their experiences as a student role model.

In addition, as a result of the formal Program Review process, the educator and role model evaluations will be updated to reflect expected outcomes.
Community College Initiatives
PWSE continued to develop initiatives and connections with Iowa community colleges, to better serve transfer students and also have a greater impact across the state. Developing relationships with students and faculty/staff in community colleges is key to the success in these efforts.

- PWSE staff members were once again key partners in the National Science Foundation SEEC grant that has created a partnership between ISU’s College of Engineering and Des Moines Area Community College (DMACC). PWSE staff and students visited classrooms and events on multiple DMACC campuses this year as a part of the program.
- PWSE continued to offer special sessions for female STEM transfer students who attended campus visit programs hosted by the Office of Admission (for transfer days and APP program days).
- PWSE submitted and received a Diversity Grant for 2011-2012 year sponsored by the Office of the Vice-President and Provost. PWSE will be partnering with Research Institute for Studies in Education (RISE) to gather insights into the programmatic needs of female STEM transfer students, allowing PWSE to modify and enhance community college transfer student programming to better meet those needs.
- PWSE On-campus Coordinator, Lora Leigh Chrystal, partnered with Nancy Woods, faculty member at DMACC Boone campus, to provide a session focused on the success and retention of students in STEM at community colleges and 4-year schools at the State of Iowa STEM Diversity Conference in April 2011.
- PWSE Ambassadors attended a STEM Career Development workshop at DMACC to provide information to prospective transfer students.

Collaborations with Admissions
Over the years, PWSE has developed a strong partnership with the Office of Admissions to assist in outreach/recruitment of women into STEM fields. When students and their families schedule their campus visit through Admissions, whether as part of an Experience Iowa State Day or an individual campus visit, they have an opportunity to meet with a PWSE staff member. In 2010-2011 during the standard 3:15 p.m. visit time, PWSE staff members met with 265 prospective students (a total of 649 visitors including family members). This is an increase of 55 students (or 21%) from the previous year. PWSE students also staff an informational booth for students/families prior to the ‘welcome’ session on all large visit days.

In addition, the Office of Admissions sent out postcards or letters to all women who applied to Iowa State in STEM fields, letting them know about PWSE and the learning community/support available for students. PWSE also receives contact information, including email addresses, for prospective students. PWSE uses these e-mail addresses to contact students about learning communities, scholarship opportunities, etc. These methods have allowed PWSE to reach out and attract record numbers of learning community students and scholarship applicants, without PWSE having to spend funds on extra promotions/mailings.

Educator Feedback on the Student Role Model Program
“I have always been very impressed with this program. I feel fortunate to have the opportunity to be involved and my students clearly benefit from it.”

“I love having the role models come into my classroom and will try to have them at least one more time this year. I think this is an awesome program and hope it continues for a long time. The kids really enjoy hearing about college life and all of their experiences.”

“Mary did a SUPERB job and I can’t wait to have her back to visit again! My kids positively loved her activities and were ALL actively engaged; she demonstrated SO many effective teaching strategies, it was like watching an experienced colleague rather than a college freshman. She is a tremendous asset to your program and we’ve already discussed a return visit! Thank you so much for making this program available.”

“I believe this to be an excellent experience for students to have these wonderful female role models excite them about Science, Engineering, etc. At the Middle School level it is especially a difficult time for female students because they are feeling pressure to not stand out as “smart”. I could definitely tell that they felt were really drawn to the female role models and that it made an impact!!”

Engaging the next generation in STEM
WiSE Learning Communities

The Women in Science and Engineering (WiSE) Learning Communities offer living and learning opportunities for women majoring in science, technology, engineering, and math (STEM). WiSE Learning Communities began in FY96 with 52 first-year students and has grown to 259 first-year students, with a large number of second-year students returning to their floors and participating in the Sophomore Success Learning Community, as well as 12 transfer students living in Frederiksen Court apartments.

First-Year Learning Communities

Working in conjunction with the ISU Department of Residence, WiSE sponsors nine first-year residential learning communities in six residence halls across campus. Each learning community is comprised of twenty to twenty-five women STEM majors that help to create a unique environment. Each learning community is led by two peer mentors, upper division women in STEM majors. Peer mentors play a large role in the planning and implementation of programs and activities for their individual learning community, as well as initiatives for every member of WiSE. Members of the learning communities have the opportunity to participate in a variety of social, academic, and leadership programs. In order to meet the high demand among students, the Department of Residence continues to increase the number of spaces allocated to WiSE first-year learning communities.

In the fall of 2010, WiSE sponsored seven “learning teams” for over 114 students within the overall WiSE Learning Community. The teams include:

- Two Calculus I/General Chemistry teams
- Two Calculus II and Chemistry teams
- One General Biology/General Chemistry team
- One Calculus/Chem for Engineers team
- One Calculus II/Chem for Engineers team

Second-Year Success Learning Communities

Although PWSE did not receive external support, PWSE continued the learning community for our sophomore students. The Second-year Success Learning Community offered a seminar course focusing on professional and leadership development, targeted tutoring, and a Job Shadow Program in order to better meet the needs of second-year students. A total of 26 students participated in the course (UST 201x) and learning community. These students participated in a series of optional events exclusively for second-year students which included:

- Attending cultural events and discussions
- Professional development luncheons on early careers and graduate school
- Etiquette Training Dinner

Transfer Learning Communities

Begun in the fall of 2005-06, the WiSE Learning Community expanded to include transfer students. In 2010-2011, there were 12 transfer students who lived together in Frederiksen Court with a live-in peer mentor as well as 2 transfer students who participated in the University Studies 201x seminar course, attended WiSE events, and participated in the Job Shadow Program. PWSE was able involve current transfer students as leaders for the APP student visits as prospective students made the transition to Iowa State.

Academic Support

Weekly study groups were hosted on the WiSE Learning Community floors, facilitated by WiSE peer mentors, the sessions were open to any students needing help in a science or math course with special help sessions prior to key tests. WiSE Learning Community Students also are able to receive small group tutoring through the Academic Success Center funded by PWSE. PWSE also coordinates the tutoring support provided by the College of Engineering for women undergraduates enrolled in that college. In 2010-11, 122 women received free tutoring through this partnership.

Scholarships

During FY11, 44 scholarships totaling $44,200 were awarded to female undergraduate science or engineering students through funding provided by external gifts. This brings the total amount of scholarship money awarded by PWSE to $472,815 since program inception. Scholarships awarded this past year included:

- Endowed scholarships for Janice L. Davison, Sylvia Stoeser, Laurel Ann Crowe, and Charlie Wright, Jr.
- Non-endowed scholarships awarded by PWSE to support first year and returning students in STEM fields.
- Endowed scholarships for Janice Davison, a retired science and mathematics teacher who taught in the California public school system for 40 years, left a $1 million bequest in the form of a trust and insurance policies to the Program for Women in Science and Engineering in December 2009.
Developing Leaders

Although the primary role of the peer mentors is to support the students in their team, the peer mentoring experience is also an important professional development, leadership, and student engagement opportunity for the mentors. Student development outcomes for peer mentors include:

- Development of leadership skills
- Development of leadership and career enhancing soft skills (conflict management, networking, project management, oral and written communication, etc.)

Over the past decade, PWSE has employed over 90 peer mentors for the WiSE First-year learning communities alone. Peer mentoring is assessed in two ways: students in the communities provide feedback on the effectiveness of their mentors, and mentors provide feedback to PWSE staff on the effects being a peer mentor has had on them. In a spring 2011 survey peer mentors a total of 24 mentors responded, seventeen current mentors and seven former mentors. Almost all of the students who responded to the survey indicated that they became mentors due to the positive influence of their mentor and their hope to stay connected to PWSE. A few also sought out the peer mentor position because they identified it as being a leader on campus.

- “I wanted to have the same positive influence on freshman women in science and engineering that my WiSE mentors had on me.”
- “It is great to work with a team as a leader. It gives me a lot of experience with leadership.”

Peer mentors are required to attend a spring training event after they are hired in the spring as well as training provided by the Iowa State Learning Communities office every fall. In addition, peer mentors are required to attend weekly group meetings with their PWSE staff supervisor. The peer mentors all agreed that the amount of training they received was more than adequate. The survey of peer mentors indicated that their role as a peer mentor helped them develop professional skills that would aid them in future career and leadership opportunities.

- “The skills that are gained in this position are invaluable. The opportunity to lead and train a group of future and current leaders on campus is unique and has allowed me to blossom into a better leader myself.”
- “It particularly improves your communication, leadership, and problem-solving skills. It looks great on a resume and is a paid position. It gives you great experience planning meetings, organizing events, and managing a group.”

A summary of responses of agreement from peer mentors that the peer mentor experience positively impacted them is provided below:

**Responded Agree or Strongly Agree**

<table>
<thead>
<tr>
<th>Skill Details</th>
<th>Responded Agree or Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learned how to use my time effectively</td>
<td>95.8%</td>
</tr>
<tr>
<td>Learned to work in groups</td>
<td>91.7%</td>
</tr>
<tr>
<td>Improved my written communication skills</td>
<td>91.7%</td>
</tr>
<tr>
<td>Improved my oral communication skills</td>
<td>83.3%</td>
</tr>
<tr>
<td>Conflict resolution and management</td>
<td>91.7%</td>
</tr>
<tr>
<td>Increased my confidence leading a group of people</td>
<td>100%</td>
</tr>
<tr>
<td>Improved on problem solving skills</td>
<td>91.7%</td>
</tr>
<tr>
<td>Initiated and managed programs</td>
<td>79.2%</td>
</tr>
<tr>
<td>Learned networking skills</td>
<td>59.3%</td>
</tr>
<tr>
<td>Learned to how to communicate with a supervisor</td>
<td>95.8%</td>
</tr>
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In 2011-12, the Program for Women in Science and Engineering will be winding down on the 2007-2012 strategic plan while refocusing our efforts towards the next strategic plan. In this coming year the PWSE staff and advisory board will focus on setting the direction for PWSE moving forward, based on what we have learned from the past. A key outcome for this next year will be the development of the next strategic plan for PWSE. Staff members began the work this summer during a retreat. Using the program review and progress from the current plan as a starting point, themes for next year (and beyond) include:

- PWSE staff has been stretched too far in the recent years and we need to continue to review staff priorities to insure that programmatic offerings match our available staff size and configuration.

- PWSE signature programs (Taking the Road Less Traveled, Student Role Model Program, and Learning Communities) have assessment data that demonstrates their effectiveness and in many cases reached capacity. However, it is important that PWSE not rest on its laurels and that we continue to address issues of diversity, efficiency, and continuous improvement to make sure we achieve the most out of these programs that we can.

- During this past strategic plan we started to focus on the community college partnerships and service to transfer students. The outcomes from our efforts have been mixed. These topics will continue to be an area that we need to focus on. For FY12, PWSE has received a Women’s Enrichment Grant to delve more deeply into understanding the programmatic needs of female STEM transfer students.

- There is a potential opportunity within the ISU Foundation that would allow PWSE to revitalize and increase the engagement with corporate and private donors with the program in the coming years. PWSE will be working with the ISU Foundation this year to develop and being implementing a strategy to expand the number of companies engaged with PWSE, both programatically and financially.

- The programs PWSE offers for K-14 and undergraduate students will continue to be a major focus within PWSE. However, to achieve our mission, it will be critical that PWSE staff members continue to serve as resources and collaborators with others to extend the impact of PWSE beyond our programs.

**Look to the Future**

**Financial Summary**

### Revenues
- PWSE General Fund Budget 277,413
- Iowa State University Foundation (Gifts, Grants, Earnings) 71,759
- Internal ISU Grants/Reallocations 61,430
- Greater University Funds for Excellence 52,000
- Participant Fees 35,918
- External Grants 32,040
- **Total Revenues** 530,560

### Expenditures
- Salaries 256,132
- On-Campus Programming 125,353
- Summer Intern Program
- Learning Communities
- Scholarships
- Leadership Initiatives
- Second-Year Programming
- Academic Support
- Other On-Campus Programming 101,656
- Outreach Programming
- Career Conferences
- Student Role Models
- Outreach Initiatives
- Community College Initiatives
- Administration 47,503
- Computers and Phones
- General Administration
- Program Review and Assessment
- Supplies
- Marketing
- Staff Development/WEPAN
- Advisory Board
- **Total Expenditures** 530,560

Note: represents a 13.7% decrease in expenditures from $614,453 in 2009-2010
As part of its commitment towards continuous improvement, PWSE underwent a formal external program review this past academic year. The review process included four major steps: decisions by the PWSE Advisory board and ISU administration on the scope of review, development of a self-study assessment report, a two-day visit and resulting report from a three-person review team, and discussions with ISU leadership following the review. The review team was composed of the following three individuals, all former WEPAN presidents: Beth Holloway, Purdue University, Tricia Berry, University of Texas at Austin, and Bevlee Watford, Virginia Tech. Key findings from the review team included both areas of strengths and opportunities for improvement. A few examples raised include:

Strengths:
- Taking the Road Less Traveled, Student Role Model and Learning Communities are exemplary programs
- PWSE could serve as a national leader and share models related to outreach, transfer student work, and collaborations with the Office of Admissions
- Effectively making progress on PWSE strategic plan and assisting university strategic plan
- Strong staff expertise and commitment

Opportunities for Improvement:
- Advocacy: Need to develop an strong advocate (beyond PWSE director) for the program
- Fundraising: ISU is missing opportunity and needs to enhance external fundraising
- Administrative support: PWSE needs to recapture the support position
- Resource limitations: Given budget and staff size, PWSE may need to prioritize its program even more and eliminate some programming or populations served.

The complete self study report and report from the external team are both available from Data/Assessment tab on the PWSE website.
PWSE has seen growth in the enrollment and graduation of female STEM students from Iowa State over the history of its program. Fall 2010 saw the largest enrollment of undergraduate women in STEM both in terms of numbers (3813 female students in STEM) and percentage (33.4% of STEM students were female). The following charts illustrate the growth in enrollment of women in STEM fields in terms of number of students and percentage of STEM students that are female from Fall 2000 to Fall 2010. In addition, since attracting a more diverse population of women is part of the mission, charts that highlight the growth in the number and percentage of women of color are also included. In addition to enrollment information, total bachelor degrees awarded to women in STEM and to women of color in STEM area also shown below.
Total Number of Undergraduate Women in STEM Fields
Iowa State University

Number of Women Undergraduates

Fall Semester

Undergraduate Enrollment in STEM Fields
Percentage Female
Iowa State University

Percent Female

Fall Semester
The Program for Women in Science and Engineering will enrich science, technology, engineering and math fields by engaging more women, creating the opportunity for a more competitive and diverse state, national, and global workforce.

Science, Technology, Engineering and Math (STEM) Majors at Iowa State University

Aerospace Engineering
Agricultural Biochemistry
Agricultural Engineering
Agricultural Systems Technology
Agriculture Education
Agriculture—undeclared
Agronomy
Animal Ecology
Animal Science
Biochemistry
Bioinformatics and Computational Biology
Biological Systems Engineering
Biological/Pre-Medical Illustration
Biology
Biophysics
Chemical and Biological Engineering
Chemistry
Civil/Environmental Engineering
Computer Engineering
Computer Science
Construction Engineering
Culinary Science
Dairy Science
Dietetics
Earth Science
Electrical Engineering
Engineering—undeclared
Environmental Science
Forestry Food Science
General Pre-Veterinary Medicine
Genetics
Geology
Global Resource Systems
Horticulture
Industrial Engineering
Industrial Technology
Insect Science
Kinesiology and Health
Materials Engineering
Mathematics
Mechanical Engineering
Meteorology
Microbiology
Nutritional Science
Physics
Plant Health and Protection
Pre-Biological/Pre-Medical Illustration
Pre-Computer Science
Preparation for Human Medicine
Pre-Professional Health Programs
Software Engineering
Statistics

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