

Society of Women Engineers (SWE) Activities Supporting Female Engineering Students

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Abstract

This paper discusses the diverse activities of the student chapter of the Society of Women Engineers (SWE) at Indiana Univ./Purdue Univ. Fort Wayne (IPFW) to promote a sense of community, self-confidence, and mentoring among women engineering, engineering technology, and computer science students. These include attending SWE National and Regional conferences, professional development events, mentoring by women engineering professionals, organizing and executing the annual Opportunity Banquet, hosting guest speakers, and participating in plant trips, social, and outreach events. The goal is to develop a sense of community and self-confidence in its members for scholastic retention and graduation in the short term as well as life long career development and fulfillment.

Introduction

A recent study on retention of women in university engineering programs concluded that students who participate, particularly those who participate in social enrichment activities, are more likely to stay in engineering programs than those who do not [1]. Another research team performed an in-depth analysis of six universities that exhibited superior performance in recruiting and graduating women and underrepresented students [2]. They identified specific themes that resulted in student retention. One of these included high support for student organizations and activities. The Society of Women Engineers (SWE) is an organization whose mission is to stimulate women to achieve full potential in careers as engineers and leaders. For the past 15 years, the student chapter of SWE at Indiana Univ./Purdue Univ. Fort Wayne (IPFW) has been one of the most active engineering organizations in the College of Engineering, Technology, and Computer Science (ETCS) at IPFW. They have been involved in a wide range of activities, including those designed for professional development, recruitment, and social interaction. The chapter is student run with faculty supervision and guidance. In addition, an industry professional serves as the organization's counselor, mentor, and role model. Funding

comes primarily from the Annual Opportunity Banquet, an event that is organized and hosted by the student chapter of SWE. A 2003 paper reported on this organization’s diverse activities that were designed to promote a sense of community, self-confidence, and mentoring among women engineering, engineering technology, and computer science students [3]. This paper discusses additional activities and direction that have been added since that time as a result of maturity and growth of the section. First, however, a brief overview of the structure and demographics of the College of ETCS at IPFW is provided to put these in context.

IPFW is a regional campus with a student enrollment of approximately 13,500. 51% of those enrolled are first-generation college students.

The College of ETCS at IPFW has an enrollment of approximately 1607 students, 14% of whom are female. The ETCS organization chart is provided in Figure 1.

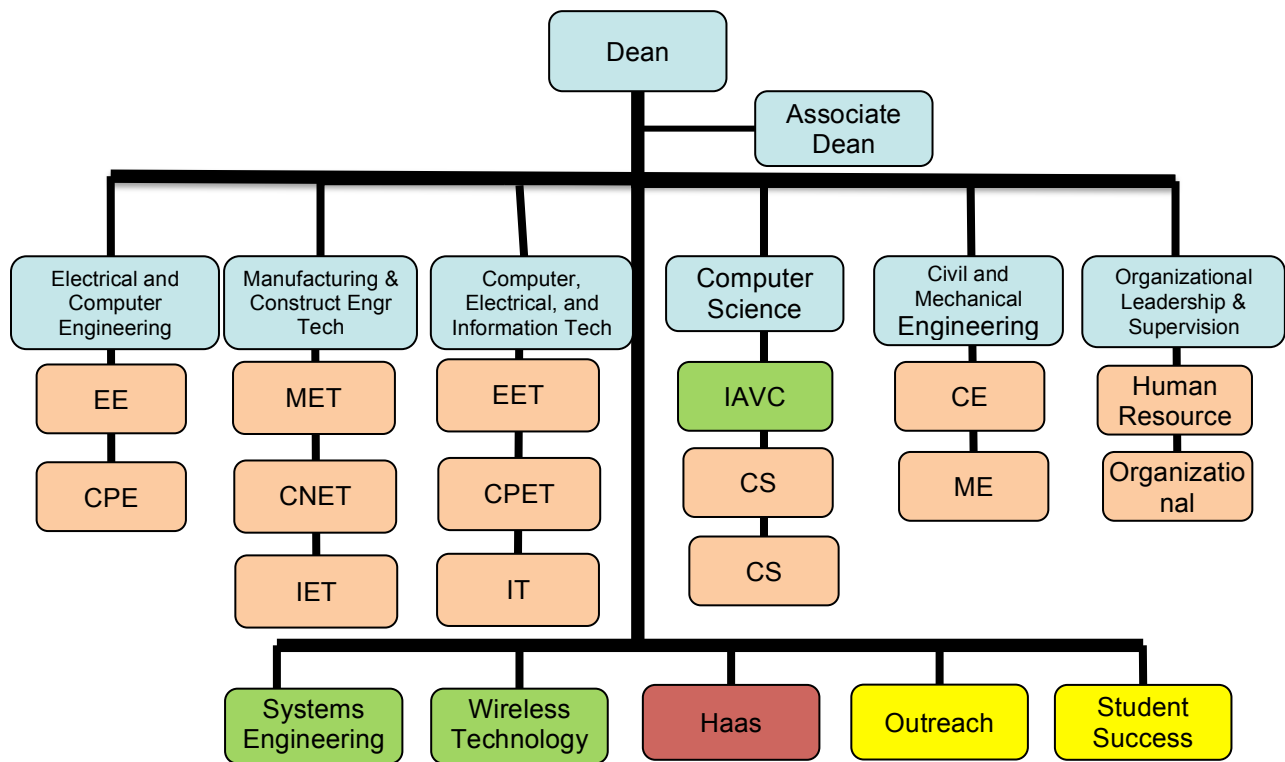


Figure 1. Organization Chart for the College of Engineering, Technology, and Computer Science at IPFW

Attendance at National and Regional Conferences

Among the most popular events of the IPFW student SWE chapter are the trips to the SWE National and Region H conferences. To be eligible for an all-expense paid trip to these conferences, IPFW students are required to become members of the national SWE organization. Consistently, the number of national SWE members in the IPFW section is dictated by the number of students sent to these conferences, which attests to the popularity of these excursions. In addition to the fun, fellowship, networking and professional development opportunities these trips provide, many of the students have obtained employment through the large career fairs at these conferences. Students are encouraged to have their resume updated and reviewed by IPFW Career Services prior to attending the conference. On one occasion, a signature from Career Services was mandatory before allowing IPFW students to register for the conference. Prior to attending the most recent conference, students were instructed to submit a plan of action regarding sessions and activities to be attended. Upon returning, the students were asked to present a 5 minute presentation of their experience. Furthermore, a new policy was implemented for the most recent conference attended. The students were required to sign up for 4 hours of volunteering at the conference, which reduced their registration fee. With the money saved, SWE was able to pay for the students to attend the Celebrate SWE banquet at the conference. Thus, this provided a two-fold advantage – not only were the students forced to become more engaged in the conference by volunteering, but it also enabled them to participate in the Celebrate SWE banquet, which they had not been able to attend in the past. Table 1 lists the number of IPFW participants sent to these conferences between 2002 – 2015. Note that the numbers fluctuate. This is due to the fact that, generally, more students can be sent to conferences within driving distance of IPFW than those requiring air travel, and on occasion, the number of participants was limited, due to financial or other restrictions. Figure 2 is a photo of the 13 students, including 9 women and 4 men, who attended the 2013 SWE National Conference in Baltimore, MD. To fund these trips, the Annual Opportunity Banquet was initiated in Fall 2003. The resulting funding has enabled SWE to send students, all expenses paid, to these conferences.

Table 1. IPFW Students Sent to SWE Conferences

Type of SWE Conference	Location	Date	No. of IPFW students attending
National	Detroit, MI	2002	13
National	Birmingham, AL	2003	4
National	Milwaukee, WI	2004	10
National	Anaheim, CA	2005	7
Region H	Ames, IA	2006	4
National	Kansas City, MO	2006	6
Region H	Chicago, IL	2007	6
National	Nashville, TN	2007	2
Region H	Peoria, IL	2008	3
National	Baltimore, MD	2008	5
Region H	Indianapolis, IN	2009	7
National	Long Beach, CA	2009	9
Region H	Urbana, IL	2010	8
National	Orlando, FL	2010	11
Region H	Ann Arbor, MI	2011	7
National	Chicago, IL	2011	12
Region H	Madison, WI	2012	11
National	Houston, TX	2012	5
Region H	Minneapolis, MN	2013	8
National	Baltimore, MD	2013	13
National	Los Angeles, CA	2014	4
Region H	Notre Dame, IN	2015	7



Figure 2. IPFW Students Attending SWE National Conference, Baltimore, MD, Fall 2013

New Student Orientation

The previous paper [3] discussed recruitment of new members at the Student Orientation Advising Registration (SOAR) organization fair. However, a more efficient method for recruiting new engineering, engineering technology, and computer science students has been implemented. SOAR at IPFW has been replaced by New Student Orientation (NSO), which is a mandatory on-campus orientation for all first-year students. Faculty members in the individual departments of the College of ETCS host the students that day and assist them in registering for classes. SWE provides each of these faculty members with a sign-up sheet to present to those interested in learning more about the organization. The result is a list of interested students whose contact information can immediately be added to the SWE listserv, which is used to keep members informed of upcoming events. In addition, the ETCS college administration provides SWE a list each year of all female students enrolled in the college. These students are all sent an email invitation to the picnic that occurs prior to the start of fall semester classes. Furthermore, each student on the list is called by phone by one of the SWE officers and personally invited to attend.

Annual Opportunity Banquet

To provide funding, the student chapter of SWE organizes and hosts the Annual Opportunity Banquet. The event serves as the primary fundraiser for the organization, enabling them to send members to the SWE National and Regional Conferences, which greatly enhance their undergraduate experience. On occasion, travel funds (up to \$2500) supplied by IPFW Student Government have augmented SWE's operating expenses. Table 2 lists the annual funds raised by SWE since 2003, primarily through the Opportunity Banquet. But, the importance of this event to SWE members, ETCS students, the College of ETCS, IPFW, and local industry far exceeds that of fundraising. This event has grown to be the largest in the College of ETCS. It includes a career fair, networking dinner, renowned keynote speaker, and an engineering trivia game with awarding of door prizes. Figure 3 is a photo from the 11th Annual Opportunity Banquet [4] which took place on March 28, 2014. There were approximately 212 in attendance, including students, faculty, and staff as well as industry representatives from 27 corporate sponsors. Table 3 lists the corporate sponsors for the 11th Annual Opportunity Banquet. Table 4 lists the keynote speakers for the Opportunity Banquets from 2003 – 2014. For those speakers charging speaking fees, funding is generally provided by IPFW Student Government. However, the visit of Nobel Laureate Dr. Paul Lauterbur was funded by Fort Wayne Radiology.

Table 2. Funds Raised by SWE

Year	Amount
2014	\$ 14,213.61
2013	\$ 10,651.00
2012	\$ 10,591.30
2011	\$ 18,281.25
2010	\$ 9191.33
2009	\$ 14,200.00
2008	\$ 11,100.00
2007	\$ 11,876.00
2006	\$ 8780.00
2005	\$ 5175.00
2004	\$ 3149.00
2003	\$ 14,038.42

The Opportunity Banquet requires months of planning. Table 5 itemizes the tasks to be accomplished and the associated time frame. Note that many of the student tasks are designed to be accomplished over the holiday break, so as to have minimal impact on the students' academic responsibilities. During the planning process, SWE members develop public speaking, leadership, and teamwork skills by organizing the event. At the banquet, countless ETCS students have been inspired to continue in pursuing their degrees, others developed networking and interview skills, and many have received employment offers. Often IPFW graduates who attended the event as students return in subsequent years to represent their companies, collect resumes, and speak with current students.

The success of the event is largely due to the outstanding support of the faculty, staff, and students in the College of ETCS at IPFW. The dean attends every year and provides introductory remarks to those in attendance. Many faculty and chairs also attend the event. The dean and several of the department chairs sponsor students to attend. ETCS faculty allow SWE members to visit their classes to promote the event to students. The Freshman Engineering Coordinator prepares students for the banquet by discussing with them networking techniques. The webmaster posts regular updates about the event on the IPFW Engineering department website. Thus, the attitude of the administration sets the tone for the whole unit, and this collaborative environment is conducive to success.

Table 3. Corporations sponsoring 11th Annual Opportunity Banquet, March 28, 2014

Adaptive Micro-ware
BAE Systems
Busche
City of Fort Wayne
Design Collaborative
Engineering Resources, Inc.
Exelis Corporation
Exelis Failure Analysis Solutions
Fort Wayne Metals
Franklin Electric
Goldshield Fiberglass
Kokosing Construction Co., Inc.
Logikos
Martin Riley Architects – Engineers
Micromatic, LLC
Northeast Indiana Society of Women Engineers
Nucor Building Systems
Parker Hannifin
Raytheon
Regal-Beloit
Scientific & Biomedical Microsystems
Shambaugh & Son. LP
Tuthill
Ultra Electronics – USSI
U. S. Navy
Vertex, LLC
WaterFurnace International
Wayne Combustion Systems



Figure 3. SWE-Sponsored 11th Annual Opportunity Banquet, March 28, 2014

Table 4. Opportunity Banquet Keynote Speakers

Year	Speaker	Description of Speaker
2014	Raymond Castner	Research Engineer and Technical Lead for Supersonic Propulsion, NASA Glenn Research Center, Cleveland, OH www.linkedin.com/pub/raymond-castner/63/751/b71
2013	Sue Leone	Americas Director, Supplier Technical Assistance, Ford Motor Company www.linkedin.com/pub/sue-leone/8/8a9/19a
2012	Mikel Miller, Ph.D.	Chief Scientist, Munitions Directorate, Air Force Research Lab www.af.mil/AboutUs/Biographies/Display/tabid/225/Article/108626/dr-mikel-m-miller.aspx
2011	Larry Roberts, Ph.D.	Led the team that designed and developed ARPANET http://en.wikipedia.org/wiki/Lawrence_Roberts_(scientist)
2010	Justin Sanchez, Ph.D.	Expert in development of brain-machine interfaces www.bme.miami.edu/nrg/faculty/faculty_list.htm
2009	Margaret Rhea Seddon, M.D.	Former NASA Astronaut http://en.wikipedia.org/wiki/Margaret_Rhea_Seddon
2008	Brad Edwards, Ph.D.	Father of the modern space elevator www.space.com/356-elevator-man-bradley-edwards-reaches-heights.html
2006	Paul Lauterbur, Ph.D.	Nobel Laureate and Inventor of MRI http://en.wikipedia.org/wiki/Paul_Lauterbur
2005	Robert “Hoot” Gibson	Former NASA Astronaut and Space Shuttle Commander http://en.wikipedia.org/wiki/Robert_L._Gibson
2004	Donald Willis	Engineer, Philanthropist, and Co-Founder of the company sold to General Dynamics in 2002. http://people.equilar.com/bio/donald-willis-command-system-/salary/185339#.VJRVAAsABA
2003	Margaret Ringenberg	WWII WASP pilot featured in Tom Brokaw’s book <i>The Greatest Generation</i> http://en.wikipedia.org/wiki/Margaret_Ringenberg

Table 5. Tasks in Preparation for 11th Annual Opportunity Banquet

Date	Activity
March 2013	Reserve venue
May – August 2013	Secure keynote speaker & arrange funding
Sept 30, 2013	Send invitation letters to corporate sponsors
Nov. 15, 2013	Early registration deadline for corporate attendees
Dec. 2013 – Jan. 2014	Send confirmations to corporate registrants
Dec. 2013 – Jan. 2014	Solicit floral centerpieces and door prize donations from area businesses
Dec. 2013 – Jan. 2014	Prepare Engineering Trivia Game
Dec. 2013 – Jan. 2014	Create tickets and fliers
Dec. 2013 – Jan. 2014	Prepare preliminary banquet program
Jan. 2014	Post fliers, publicize event to students, & sell tickets
Jan. – Feb. 2014	Arrange for a caterer and pay deposit
Mar. 7, 2014	Final registration deadline for corporate attendees
Mar. 21, 2014	Last date for student, faculty, and general public ticket sales
Mar. 24, 2014	Prepare banquet seating assignments and name badges
Mar. 25, 2014	Finalize banquet program, & print, assemble, staple
Mar. 26, 2014	Practice speeches
Mar. 28, 2014	Host event
May 2014	Send thank you notes to corporate and business sponsors

Collaboration with NE IN Professional SWE Chapter

Since Fall 2006, when the Northeast Indiana (NE IN) Professional SWE chapter reactivated, the IPFW student section has shared a mutually beneficial collaboration with them. They have served as mentors to the students. One of the professional members has served as the counselor to the student section, often assisting in transportation to national and regional conferences. The student chapter has participated in yearly Professional Development Events hosted by the professional section. The professional section has provided unwavering support for the students' Annual Opportunity Banquet, regularly sending corporate attendees and donating money for door prizes. Each year, they sponsor several SWE student member upgrades to professional member for graduating seniors. In this way, their chapter benefits from the new professional members, who often become active in the professional section upon graduation. Recently, the NE IN professional section and the student section collaborated on a Girl Scout Outreach event. The ability to pool resources strengthened the effort.

Shadowing Experiences for Potential Students

High school students who have expressed interest in engineering have been invited to come to campus to attend classes for a day with an engineering student host. All students who have participated in such an experience have subsequently enrolled in the engineering program at IPFW. Although this has been arranged on a case-by-case basis, a more formal shadowing program is being developed.

Annual Picnic

Each year, before the start of fall semester classes, SWE hosts a picnic for the women in the IPFW college of ETCS. All women enrolled in the college of ETCS are sent an invitation letter and also receive a follow-up phone call to personally invite them. Incoming freshmen are especially encouraged to attend. Due to the timing of the event prior to the start of classes and the evening before Freshman Fest, the event is among the highest attended for the year. At the picnic, the new officers are introduced, and they present the activities planned for the academic year.

Conclusions

SWE has developed a well-structured organization that strives to serve all IPFW female engineering, engineering technology, and computer science majors. Its goal is to develop a sense of community and self-confidence in its members for scholastic retention and graduation in the short term as well as life long career development and fulfillment. Among the active IPFW SWE participants over the last 15 years, over 95% have graduated in engineering, engineering technology, or computer science majors, which is perhaps indicative of the success of the effort.

References

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