Introduction

Women are vastly under-represented in America’s critical IT workforce. The 2011 US Census reveals that although half of the jobs in the U.S. are held by women, only about a quarter of technology jobs are held by women. An even more sobering fact is that the US Bureau of Labor Statistics predicts that by 2018 there will be 1.4 million open technology jobs in the United States and, at the current rate of students graduating with degrees in computer science and information systems, we will fill only 29 percent of those openings with women who graduate in computer and information systems.

Unfortunately, women are not flocking to fill those positions. Growth in the number of women pursuing IT careers has been far slower than for men. In fact, the percentage of women in the field has been decreasing since the peak of about 40% in the mid-80s, except for a small surge around 2000. While teenage girls are now using computers and the Internet at rates similar to their male peers, they are one fifth as likely to consider a technology-related career or plan on taking post-secondary technology classes than those boys.

Making these careers attractive to women is an important step toward increasing the stability and financial security of women in the workforce. This is not a “woman’s issue,” but an economy issue and a quality issue. It is an economy issue because there will be far more technology jobs available than the country can fill with the current rate of both men and women graduates. Without more people to fill the jobs, we will not be able to grow the economy; women are an underutilized resource. Further, we know from research that diverse design teams produce better products. The introduction of women to design teams provides a different perspective on the process and has been shown to improve the final product. So, women in technology is a quality issue as well.

As a department at UMSL, we are also concerned with our students and their long-term prosperity. IT jobs are stable, high-paying jobs that can help all of our students, especially women, to improve their standing in society. For all of these reasons, the Information Systems Department is determined to increase the number of women pursuing Information Systems (or Computer Science) degrees and careers.

Many researchers across the world are working to determine the cause of the scarcity of women in the field and ways to increase the women in the field. They have noted that the technology community is intimidating, especially because of the small numbers of women in computing technology. There have been many proposals of how to address the problem. By far the most promising strategy is the one incubated by Harvey Mudd College. The first step was simply to change the title of the first class student’s attempt from “Introduction to
Programming in Java” to “Creative approaches to problem solving in science and engineering using Python.” In addition, they separated those who had previous experience from those who had not to balance the discussion in those classes. Those without experience found this to be a less intimidating way to learn the material and therefore to get a better foundation on which to build their advanced classes. To further improve the environment, they implemented “Operation Eliminate the Macho Effect.” When male students showed off or dominated the discussion, they were taken aside and encouraged to continue their conversations one-on-one with the professor instead of asking in class.

The second thing that they did was to make what they learned in the classroom mean something about which they cared. The department allowed the students to do research between their first and second years. This allowed the women to pursue those aspects of computing that were of interest to them, which might be different from that of their male colleagues. They worked on projects such as Dance Dance Revolution for the elderly and educational games.

The third part of the effort was to help the women students visualize success because it is hard to get enthusiastic about a career choice in which one cannot imagine one’s self. Professors took the women students in computer science to the Grace Hopper Conference. This annual event is the world’s largest gathering of technical women in computing. Last year there were over 16,000 women in technology who attended. Maria Klawe, President of Harvey Mudd College noted “the conference is a place for students to visualize women in technology; humans who happened to be female who love computers. Not everyone looks like the dudes in the trailer for HBO’s Silicon Valley.”

The proof of the method is in the results. In just four years, Harvey Mudd moved from granting 12% of their degrees to women, to graduating 40% of the degrees to women. Other institutions such as UC Berkeley, Duke, and Northwestern have implemented the Harvey Mudd strategy and seen similar results.

As a result of the promising results, the “Mudd approach” has been designated as a “best practice;” other institutions are adopting the Mudd strategy. Since we are in a College of Business, our task is easier because we do not need to address the attitudes of the engineers. However, our students do suffer because many of them cannot visualize themselves in this career path – even when they are enrolled in the program. Last year, in an effort to replicate some of these positive experiences at UMSL, I took eight students to the Grace Hopper Celebration of Women in Computing, held in Houston Texas. Since the conference was clearly not in the department’s budget, and also not in the students’ budgets, the department ran a crowdfunding event to raise the necessary money. The approach worked far better than any of us would have guessed, but it did not cover all of the costs.

Hence, I am seeking a grant from the Women’s Leadership Council to partially help fund this year’s trip to the Grace Hopper Celebration of Women in Computing.

The Department understands that you do not cover travel for individuals. However, we think this is a special case that will benefit the University and ask you to think about the funding for “trickle down” support for the department.

What we observed for the last two years was that the women who attend the conference
returned to campus and shared everything they did and saw with the other female students. They were more present at departmental events which, in turn, attracted more women to attend. The impact on the department was palpable. However, we had no infrastructure available in the department, nor in the community, through which to channel the enthusiasm. This year we have introduced an infrastructure through which to channel the enthusiasm and, we hope, to implement more best practices both at the University and in the St. Louis Metropolitan area.

That infrastructure is achieved through the introduction of a new class fall semester called Women in IT. The class material and assignments will parallel experiences available to at the conference to broaden the students' perspectives of issues and possible solutions. The result will provide the students skills with which to identify and implement activities intended to increase the numbers of women attracted to, successful with, and retained in the IT field here at UMSL (thus providing the “trickle down” benefit for the campus).

We seek funding for support of three students, who are enrolled in the Women in IT seminar, to attend the Grace Hopper Celebration this Fall. The symbiosis of participation in the class and the conference should help students to create successful programs to attract and retain more women in IT at UMSL.

The class content will be structured so that attendees will be exposed to trends and issues early in the semester so they can get the most from the conference. In turn, practical lessons they learn at the conference will help the students complete final projects in the class. To be more specific, the class will be divided into three segments: 1) the rich history of women in computing, including what they achieved and how their contributions have been erased from much of the history of computing; 2) the trends of women in computing since the mid-70s and associated theories of why the declines might be occurring; and 3) an investigation of what could be done at UMSL or in metropolitan schools to improve the representation of women in the field here.

Students will have completed the first two segments of the curriculum just about the time of the Hopper conference. They will be knowledgeable about contributions of women as well as factors that lead to the reduction of women in computing so they can get more from the conference. At the same time they will be primed with a heightened sense of women at UMSL to select the best sessions at the conference through which they can gain ideas.

Once the students have returned from Hopper, they will take what they have learned (both in class and at the conference) the have many creative ideas about what could be done at UMSL and in the metropolitan area. This will help them with the final project for the class—to develop a plan for expanding current activities UMSL and/or pre-collegiate programs in the area.

Hence, we propose funding from the Women’s Leadership Council will actually be an investment in the future of the IS Department at UMSL, particularly in attracting more women to the field and to the University.

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1 The class did not “make” in 2016 because too few students enrolled. We plan to have a more aggressive marketing plan this year. Dr. Sauter will be the professor offering the Women in IT class in the Fall.
**Budget**

The Conference will be held in Orlando Florida. Based on the experience from last year, we believe the per student cost will be about $1,500. That breaks down as:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Conference Registration</td>
<td>$350</td>
</tr>
<tr>
<td>Transportation</td>
<td>$450</td>
</tr>
<tr>
<td>Ground Transportation</td>
<td>$40</td>
</tr>
<tr>
<td>Hotel</td>
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</tr>
<tr>
<td>Meals</td>
<td>$150</td>
</tr>
<tr>
<td>Hotel Tips</td>
<td>$10</td>
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This is an approximate cost because we have not bought airline tickets or reserved rooms in a hotel, which may vary from past years. The budget is somewhat higher than the expenses last year for two reasons. First, the hotel costs are higher both because this is a more expensive venue, and we are putting fewer people in each room. Students last year found it very uncomfortable to sleep in the same bed as a stranger (we had four students in each room). This budget puts only two people in a room so they can each have a bed. Secondly, we did not cover most meals last year. It is hard to predict when and where food will be provided at the conference because the food is associated with vendor receptions and it may not be possible to get invitations to these receptions at the right time. We are hoping to minimize these costs, however.

Hence, we are asking for $4,500 to fund three of the students to the Conference. As with last year, we will use crowdfunding to raise the bulk of the additional money. This will be supplemented with gifts to this program. Finally, we have encouraged students who have an interest in attending the conference to apply for Hopper scholarships, which, if accepted, will pay the student’s registration fee.

**Advertising and Selection**

Last year, we advertised for students through our departmental discussion group (listserv). We found eight good students who were enthusiastic and we stopped looking. This year we will branch out somewhat to ensure we share the opportunity with all students in the program. Of course, we will advertise it multiple times via the listserv. In addition, we will ask faculty both to announce the opportunity in class and to nominate students who might be interested in or value such an opportunity. We will seek students who are active in our IS Programming Club and/or our IS Mentoring Program. We will use posters near the places in which IS students tend to have their classes. Frankly, we do not anticipate having difficulty finding students who will be interested; we have had students asking about this since January.

We have an application form that requires the student to write a paragraph about why she believes she would be a good candidate to take to the conference, and require letters of recommendation from faculty. This is a fairer process because it allows students whom I do not know well to be considered for the project.

**Evaluation**

The evaluation last year was done in focus groups. Students were asked the best thing about the conference and the worst thing about the conference, the logistics and process. We received great ideas from the students, many of which are the basis of changes adopted for this
proposal. In addition, they shared what they learned as input for the class to be held next fall on Women in IT.

This year we will have a more formal evaluation regarding more of the sessions and logistics. In addition, the class participants will need to use what they learned to create programs for the department and K-12 education.