

CSEE&T 2017 Panel Proposal

How to Enhance Diversity in Software Engineering Programs?

Hossein Saiedian

School of Engineering
The University of Kansas
Lawrence, Kansas, USA

Grace A. Lewis

Software Engineering Institute
Carnegie Mellon University
Pittsburgh, PA, USA

Andrew B. Williams

School of Engineering
The University of Kansas
Lawrence, Kansas, USA

I. Panel Members

Hossein Saiedian, DEI (Diversity, Equity, Inclusion)
Faculty Fellow, The University of Kansas, USA

Grace A. Lewis, Founding Member of Women
@SCS, Carnegie Mellon University, USA

Andrew B. Williams, Associate Dean for Diversity,
Equity, and Inclusion, School of Engineering, The
University of Kansas, USA

II. Panel Members' Statements

Hossein Saiedian. According to the Bureau of Labor Statistics, an estimated 1.4 million new jobs in computing will be available by 2020. Top among these opportunities are software engineering positions (programming, application development, software testing, etc.). However, the number of African-American and women pursuing such exciting positions is either dropping or staying very low. In particular, while African-Americans make about 13 percent of the US population, only a small percentage are awarded undergraduate degrees in a computing field (e.g., computer science or software engineering) that could lead to software engineering positions. Furthermore, a substantially smaller number are awarded MS degree in such fields.

Given the availability of many exciting undergraduate programs (in computer science, software engineering, or even in IT), it is now the best time for such individuals to consider the computing disciplines and for institutions to broaden their

admission and participation into these exciting fields. But we have to plant the seed: such prospective students need our openness, welcoming arms, assistance, mentorship, and guidance, so they become more knowledgeable of the tremendous opportunities. Our students recruiting approaches must also change. To do so, our panel participants will discuss and debate ideas to promote software engineering paths for such audience. The discussion will include topics such as how to overcome barriers to education and careers in software engineering students for underrepresented students, how to expose such individuals to relevant and timely contents in software engineering (or computer science) that will position them for career success, etc., how to recruit and how to retain such students.

I personally advocate for partnership with the local and regional institutions that are historically known to have a larger percentage of underrepresented students (and that includes both school districts as well as regional colleges that offer associate degrees). The purpose of the partnership is to establish a defined pipeline and pre-advising connection. I have also proposed two- or three-day workshops at the University of Kansas (KU) for students from these institutions. The objectives of the workshops is:

- Discuss career opportunities in IT (such as software engineering) and the major shortage of labor with such expertise
- Discuss internal (mental) barriers to careers in IT (such as software engineering) for underrepresented students.

- Expose Participants to relevant and timely content in IT (computer science, software engineering, computer engineering, and IT) that will position them for success.
- Establish pre-advising academic plan for students interested in IT and an early KU experience to plant the seeds for personal college planning.
- Acquaint participants with at least one successful professional (our alumni) with relevant personal experience/background.

Through the above efforts, I believe we are able to enhance diversity in our program. I will discuss this and additional efforts during the panel.

Grace A. Lewis. After getting her undergraduate degree in Software Systems Engineering in Cali-Colombia in a 50/50 male/female class, Grace Lewis was shocked to see that she was one of only two females in her Master of Software Engineering class at Carnegie Mellon University. Based on her experience, she believes that a cause for this difference is the very flexible curriculum in high school in the US, in which it is not mandatory to be exposed to STEM courses. Therefore, we need to be more creative and proactive in exposing students to computer science and software engineering early. She also believes in the value of very active and visible university groups, such as Women @SCS at Carnegie Mellon University, of which she is proudly a founding member. Based on recent research by Frieze and Quesenberry [1] which she fully supports, these groups are much more effective at creating a change in culture and conditions in the environment, as opposed to the more traditional focus on gender and gender differences, which have the risk of compromising academic integrity.

Andrew B. Williams. How to Enhance Diversity in Software Engineering Programs: K-12 students and teachers are often the focus of programs to enhance the diversity of students in computer science. The forgotten component in these efforts are parental awareness of the benefits and pathways for software engineering (computer science) education and careers. Low-income, first generation, and underrepresented minorities often do not have role models in the software engineering and information technology fields. K-12 coding

camps should create materials and programs to expose parents to the benefits and pathways so they will be enthusiastic supporters of their children's pursuit of software engineering education and careers.

[1] Frieze, Carol, and Jeria L. Quesenberry, "From difference to diversity: including women in the changing face of computing." In *Proceeding of the 44th ACM Technical Symposium on Computer Science Education*, pp. 445-450. ACM, 2013.