

Leveling Up: EmTech Education Providing New Pathway Opportunities in IT for Women at Any Stage of Their Careers

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ABSTRACT

Tech industry, especially, some areas within tech fields, such as Emerging Technology (EmTech), like cybersecurity, machine learning, AI, and cloud computing, are expected to experience immense increases in job opportunities in coming years. While a variety of solutions are necessary to address the growing workforce needs in the EmTech industry, one of the largest untapped talent pools is women and underrepresented students. The panel postulates the labor needs for more women in Tech could be met by actively nurturing and enticing recent graduates, early career professionals, reskilled and returning career professionals. This panel offers a discussion platform that can provide insight into the stories of Women in EmTech and further research how to improve diversity in the technology education and industry.

CCS CONCEPTS

• **Social and professional topics** → Professional topics; Computing education; Professional topics; Computing profession; User characteristics; Gender; Women.

KEYWORDS

gender, diversity, returning women, emerging technology, cloud computing, cybersecurity, machine learning, upskilling, reskilling

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1 INTRODUCTION

How many of your technology educators, classmates in technical courses, direct seniors and co-workers were women? This question shines light on multiple gaps that women fall through in employment, degree, representation, exposure, and retention. At all stages

in a woman's career, challenges are out of the norm and the path to success is often non-mainstream (e.g., mentorship, earlier exposure, addressing impostor syndrome, finding comradery). Being inclusive, can contribute to the workforce's desperation for IT professionals, provide more efficient solutions and provide role models for girls of the future.

The science, technology, engineering, and mathematics (STEM) workforce is a crucial element to America's innovative capacity and global competitiveness [1]. Nonetheless, the number of women in STEM jobs as well as degree holders continues to be underrepresented. Scholars agree of the untapped opportunity in women's workforce representation, especially in the era of the Fourth Industrial Revolution with its emergent technologies.

According to [2], women represent half of the US workforce. Despite that percentage, when segregating data by STEM majors, we find that women represent only 27% of all STEM majors, 15% in engineering, and 26% in computing/IT. According to the same statistical data, these percentages peaked around the 1990's and started to decline - especially for computing/IT majors. In cybersecurity, a lower percentage of women were seen among 2021 cybersecurity study of 4,753 individuals globally—20% overall—compared to 25% in 2020 and 30% in 2019 [3]. The study suggests that women in the emerging technology industry, such as cybersecurity, remain at only being one-fourth of the work population.

Ong, et.al. research has disaffirmed the pervasive general thinking that women, especially underrepresented minorities, are less interested in STEM fields. The researchers provided a complex set of factors that influence women in their STEM undergraduate and graduate learning journeys and experiences [4].

These factors include policy implications where educators, policy makers, and researchers should be focusing on. Furthermore, Shaw, et.al. research study suggests these lower numbers are the result of lack of negotiation skills [5]. Women are less likely to negotiate than men are and negotiate differently than men do. This correlates to the cybersecurity workforce study where one of the most important qualifications for cybersecurity professionals is strong communication skills which includes negotiation skills.

In this panel, recent graduate students, reskilled and returning career professionals with varied ethnicities and technical backgrounds will be providing anecdotal evidence and discussing roadblocks encountered during their journeys to help formulate informed decisions on which areas scholars and educators could investigate further to entice and therefore, increase the number of women in EmTech.

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2 PANELISTS

2.1 Dr. Elodie Billionniere

Dr. Elodie Billionniere (Moderator), Senior Associate Professor at Miami Dade College (MSI), is an expert in CS education who is passionate about broadening participation in computing, integrating best practices in undergraduate education, and exploring how different pedagogical practices can increase diversity in STEM/computing/tech, especially introductory courses. Over the last four years, Dr. Billionniere's research has been funded federally and through the industry to provide further opportunities to women and underrepresented populations to meet local and national workforce needs. She also recently led an NSF funded project to investigate effective strategies for women to re-enter the academic and professional pathways in EmTech. She has designed and hosted faculty development workshops to offer courses in cloud computing and cloudify existing courses in CS, cybersecurity, networking, and data analytics. Dr. Billionniere is the award recipient of the Women of Color in STEM's Education Leadership - College-Level Promotion of Education and Legacy Top Educator. She holds a Ph.D. in Computer Science from Arizona State University.

2.2 Maria de Pena

Maria de Pena is a long-life learner, entrepreneur and award-winning leader with a BS in Electromechanical Engineering and MS in Organization Management and Strategic Development. Maria has over 20 years' experience in the technology, manufacturing, and defense sectors. In 2020-21, she completed a certification in Enterprise Cloud Computing at Miami Dade College. During her reskilling, Maria earned several industry certifications such as CompTIA Linux+, AWS Cloud Practitioner, AWS Solutions Architect and Google Data Analytics. As a founder of Code Explorers, an educational NGO, she has seen the need to educate K12 students in emergent technologies, especially in underrepresented communities. She developed an award-winning internship program for high school and university students interested in broadening their knowledge in emerging technologies. The university-level students had a 99% placement in tech fields just after graduation. Her aims are to entice and encourage students to see themselves as creators not mere users of technology. Maria's recent work has been exhibited at the United Nations SDG Action Week in New York City. Her interests are in AI, Machine Learning, and data science, specifically NLP, Virtual Intelligent Assistants and intelligent beings as ways to support learning and development. As a part of her bucket list, she is also an award-winning international cuisine Chef. Maria is the official tinkerer for her family.

2.3 Jenny Chen

Jenny Chen is an alumna of Miami Dade College in Computer Science, as a first-generation student she realized it is imperative to spread needed academic resources, exposure to rewarding careers and access to employment to underserved communities. Thus, her work as the former President of the Wolfson Cybersecurity Association, founding member of MDC's Women in Cybersecurity (WiCys) chapter, and the former President of the Intelligence Community Centers for Academic Excellence club, she strengthened

organizations by expanding student interest in technology, provided networking opportunities and aided students towards their first jobs. Jenny oversaw 300 members in her organizations towards academic opportunities and centralized professionals across the tech industry to educate on their trade. She is beginning her career as a Junior Customer Success Manager at Cybersecurity start-up, Lumu Technologies, aiding organizations to understand the importance of Network Detection and Response (NDR) in any cybersecurity stack. Today, Jenny is working towards her Information Technology degree while splitting her time between Colorado and Florida. Her career goal is to experience working in roles such as IT Risk & Compliance, Project management and to one day becoming an executive. With a penchant to nerd out, feel free to talk to Jenny about IT Risk & Compliance, Internet forums (ex. Subreddits, Discords) or *The Handmaid's Tale*!

2.4 Kennashka DeSilva

Kennashka DeSilva is a recent Miami Dade College graduate with a Bachelor's in Information System Technology –Cybersecurity focused. She is also a student-parent. She has earned multiple industry certifications such as CompTIA Linux+, AWS Cloud Practitioner and AWS Solutions Architect which provided her with the industry knowledge needed to strive as a technology leader and create a platform to support other students in preparing for industry certifications. Up to date, her platform has served over 104 students preparing for AWS industry certifications. The goal is to facilitate an ecosystem for onboarding under-represented communities to help close the opportunity gap and nurture a strong technology ecosystem to innovate and pursue rewarding career opportunities. She currently works as a Cloud Security Consultant at EY and is also the Founder of Women For Crypto Inc.

3 AUDIENCE

The audience for this panel is academic professionals (faculty, admin, researchers, and senior graduate students interested in broadening participation and opportunities in computing and tech domain) who have interest in exploring and developing effective initiatives for women and underrepresented groups, both two-year and four-year higher education institutions, to create a next-generation pipeline in EmTech.

4 PANEL STRUCTURE AND ROLES OF PANELIST

The planned time frame for this panel is for one hour.

- 10 mins - Opening Remarks – the moderator and panelists will introduce themselves and each provides a brief overview of their studies and work in EmTech fields.
- 30 mins - Moderator Questions for Panelists – the moderator will ask a set of questions to the panelists regarding their experiences, opportunities, challenges, and barriers to (re-)enter and persist in EmTech education and workforce. Panelists will share their stories and experiences to answer the questions.
- 15 mins - Audience Questions for Panelists – the moderator will facilitate questions from the audience to each of the

panelists. Ideally, we would use two methods to gather: (1) an online poll to gather questions, and (2) a mic in the room.

- 5 mins - Closing Remarks – the moderator and panelists will summarize key points, provide contact, and follow up details and wrap up the session.

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