

# Equipping and Empowering Faculty through Professional Development to Create a Future-Ready Workforce in Emerging Technologies

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## ABSTRACT

Tech industry, especially, some areas within tech fields, such as Emerging Technology (EmTech), like cybersecurity, data science, mobile development, 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. Clearly, HBCU and MSI hold great potential to broaden participation in EmTech because of their more diverse student populations, access to a large number of underrepresented students, and closer faculty-to-student interaction. However, faculties at these institutions, who are at the forefront of developing required skills in students are often overlooked. Faculties at these institutions need help designing and implementing effective and evidence-based instruction materials to develop skills that are in high-demand in the EmTech industry. The goal of this panel is to offer a platform that can provide insight into the development of faculty professional development programs in EmTech in traditional institutions and within the context of HBCU and MSI.

## CCS CONCEPTS

Social and professional topics → Computing education programs

## KEYWORDS

Emerging Technologies; Re-entry; Data Literacy; Cloud Literacy

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## 1 Introduction

Although computing occupations increasingly dominate the

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workforce, the computing discipline does not attract sufficient and diverse students to meet societal workforce needs. The disparity of women and underrepresented professionals in the technology field is quite evident. Although there has been a push towards bringing individuals of marginalized gender and race into tech, one untapped population that is less represented in the tech field are women and underrepresented students who are interested in entering the tech field. Many HBCU and MSI throughout the nation offer various computing and technology degrees that enable women and underrepresented groups to develop skills that are necessary for the tech industry. Some areas within tech fields, such as Emerging Technology (EmTech), like cybersecurity, data science, mobile development, ML, AI, and cloud computing, are expected to experience increases in job opportunities more quickly than traditional areas [1].

While a variety of solutions are necessary to address the growing workforce needs in the EmTech industry [2, 3], faculties and instructors who are at the forefront of developing required skills in underrepresented students are often overlooked. It is very important to design and deliver professional development opportunities for faculties and instructors at HBCU and MSI so they can train their student population effectively to enter the professional pipeline in EmTech. This faculty professional development should focus on newer technologies, equipping them with novel teaching and evidence-based research strategies so they can help students from all backgrounds interested in EmTech to successfully acquire skills for employability in high demand in a short period. Hence, this panel will focus on providing faculties at different kinds of institutions with the knowledge to train more women and underrepresented students to enter the EmTech profession. It explicitly addresses the large and persistent underrepresentation of women and minority students entering EmTech and how their representation can be improved by training the faculties who are at the frontline of preparing students for the real-world.

## 2 Panelists

**Dr. Farzana Rahman (Moderator)**, Associate Professor at Syracuse University, is an expert in CS education who is passionate about broadening participation in computing, integrating best practices in undergraduate research, and exploring how different pedagogical practices can increase diversity in Computing, especially introductory computing courses. Over the

last five years, Dr. Rahman's research has been funded federally and through the industry to explore the impact of active learning pedagogy in undergraduate CS courses, the effectiveness of online and inverted classrooms, broadening participation of URM students in computing. She has designed and delivered faculty development workshops for SLAC and 2-year community colleges to offer courses in mobile application development and secure mobile computing. Dr. Farzana is the winner of the Google ExploreCSR award, Syssters PIO (Pass-It-On) award, NCWIT Extension Services (NCWIT ES-UP) grant, and NCWIT educator grant. She was a faculty of James Madison University and Florida International University (an MSI).

**Dr. Elodie Billionniere**, Associate Professor at Miami Dade College (MDC), leads efforts to raise cloud literacy in partnership with top cloud providers to meet the workforce demand. With her NSF-funded project, Dade Enterprise Cloud Computing Initiative (DECCI), she developed and implemented a professional development program through AWS Academy that trains faculties to teach courses part of the new cloud computing academic pathways using a problem-based learning approach [4]. With nine certified faculties, MDC became a national leader in cloud computing education and the higher education institution with the most Solutions Architect accredited faculties in the nation. Dr. Billionniere's recent NSF-funded project, Emerging Cloud Hub Opportunities (ECHO) aims to enhance cloud literacy at MDC with multi-cloud technology education, specifically in DevOps and Data Analytics, by providing faculty with additional professional development opportunities and industry certifications.

**Dr. Ann Quiroz Gates** is the Vice Provost of Faculty Affairs at the University of Texas at El Paso. She holds the AT&T Distinguished Professorship and served as the Chair of the Computer Science Department (2005-2008 and 2012-2020) and Associate VP of Research and Sponsored Projects (2008-2012). Gates is the Executive Director of the Computing Alliance for Hispanic-Serving Institutions (CAHSI), one of NSF's eight National INCLUDES Alliances that promote the importance of inclusion and equity in advancing innovation and discovery. She also directs the NSF-funded CyberShARE Center of Excellence that advances interdisciplinary education and research. Gates was a founding member of the NSF Advisory Committee for Cyberinfrastructure and served on the Board of Governors of IEEE-Computer Society 2004-2009. Gates was a member of the Naval Research Advisory Committee (2016-2018), AAAS Board appointed Committee on Opportunities in Science (2014-2017), and past member of the Computer Science Accreditation Board (2011-2013). Gates received the 2021 Alfredo G. de los Santos Jr. Distinguished Leadership Award, 2015 Great Minds in STEM's Education award, CRA's 2015 A. Nico Habermann Award, the 2010 Anita Borg Institute Social Impact Award, and 2009 Richard A. Tapia Achievement Award for Scientific Scholarship, Civic Science, and Diversifying Computing. She was named to Hispanic Business magazine's 100 Influential Hispanics in 2006 for her work on the Affinity Research Group model.

**Dr. Felesia Stukes**, is an assistant professor of Computer Science at Johnson C. Smith University (JCSU) in Charlotte, NC. She joined JCSU in the fall of 2017 as the first African American faculty in the Department of Computer Science and Engineering. In 2019, she founded The Social Computing Lab where her research is situated at the intersection of communities and technology, using computer models and data science to explain social phenomena. Her work has emphasized responsiveness to the employer and market needs through extensive work with advisory boards, alignment with national certifications, program assessments, and faculty development. More recently, Dr. Stukes directed an NSF-funded project to develop an interdisciplinary minor in Data Science. This project enhanced college faculty and K-12 educator knowledge, teaching, and research in Data Science through workshops and industry partnerships. Dr. Stukes is a recipient of the 2020 IBM Global University Faculty Award and Co-Leads the HBCU Data Science Consortium.

The panelists each bring a different experience in designing and developing professional development for faculties at HBCU and MSI. The following are potential questions for the panelists:

- How important the roles of faculties are in preparing future workforce for EmTech fields?
- What sort of professional development initiatives are available across the EmTech fields?
- What sort of pedagogy can better train faculties at HBCU and MSI to offer courses related to EmTech fields?
- What are the challenges for faculties at HBCU and MSI to train their students for EmTech fields?
- How important is the continuous learning in the EmTech fields to broaden the participation of women in the tech field?
- How can faculty professional development be designed so it can be delivered at scale?

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