Diversity Statement

I am committed to diversity, broadly defined, as a firm standard we should strive for and embrace in the mission of higher education. I have been mentoring women to do research in cybersecurity, in industry and academia, training students who are minorities and underprivileged in various capacities as a mentor and a training coach, hosting high school students for summer internships, and allowing high education access to students with families, men and women. This statement documents my professional and public service towards diversity. I plan to continue my efforts in this direction, and seek innovation where needed.

Diversity in Research and Graduate Education. The gender representation in STEM is a disappointment, and in Computer Science and Engineering in particular. In the hope of making a positive change, one of my long-term goals is providing an environment characterized by equality and equity to bridge the gender gap in computer science at all stages, undergraduate, graduate, and postgraduate. I have a track-record of advising, mentoring, and collaborating with female students and colleagues during my career.

When I started my first post-Ph.D. industrial job, at Verisign Labs, I participated in a highly-successful internship program, and had the privilege of working with and mentoring two graduate students, who since graduated and launched a successful career in academia and industry: Dr. An Wang from George Mason University and Dr. Maliheh Shirvanian from the University of Alabama. My earlier experience as a hiring manager made me aware of a singular reality: when going through hundreds of resumes, it is almost certain to overlook the handful of well-qualified female applicants. Acknowledging that an equal opportunity is a key, I made it a duty to evaluate female applicants for their fitness for my position, not only based on their technical record, but also the diversity value they will bring to my team and the company as a whole. Each of their internships lasted for three months, and the outcomes of those internships are still lived today: Dr. Wang worked with me on one of my most successful research endeavors of security analytics, published together seven research papers over a period of five years, joined Case Western Reserve University as an Assistant Professor, and has been an outstanding collaborator on several joint research papers and proposals, the last of which to be submitted in a few days (NSF Medium). Dr. Shirvanian was equally exceptional: filed a joint patent on the subject of her internship, and joined Visa Research as a Senior Research Scientist upon graduation. Since I joined academia, I hired and worked with one female postdoctoral researcher, two female PhD students (one current), and three undergraduate female students (two current; including one African American and one Indian American).

Diversity in Research Functions. As an active researcher, I see first-hand the significant disparity across gender, race, and socioeconomic backgrounds in the research community through various functions. It is our moral responsibility to alleviate this disparity by engaging female and other underrepresented minorities, especially junior researchers, in essential functions of our research community. I strongly believe that our job is not done by simply advising underrepresented minorities, although an essential step, but by promoting them in the community to be ambassadors of our collective values, scientific and societal. Moreover, I believe a faithful representation of our values is through diversity, and I am very hopeful that promoting underrepresented scholars would also serve as the role model to be followed by others. As a general co-chair of ACM CoNEXT 2019, I have been striving to create an inclusive environment by involving female and underrepresented faculty as a priority. I also have been doing that with EAI SecureComm 2019, where I am the program committee co-chair; I was able to successfully recruit a senior female colleague (Prof. Wenjing Lou), who will help immensely not only with the technical quality of the conference but also with diversity. In my previous organizational engagements, I strived to create a balance by involving minority (African American) researchers as keynote speakers. I strongly believe in the role of a good example for a positive change. Per the examples above, there is no lack of exceptional qualities in the community, and giving those well qualified individuals the opportunity to be a voice is important to alleviate the disparity.

Undergraduate Research Mentorship. A key component of my research agenda has been to mentor undergraduate students and to prepare them for a career in computer science in general and in cybersecurity in particular. The hope is that I will be able to recruit some of those students to pursue graduate studies, with me or elsewhere, for a more diverse community. I have a track record of advising undergraduate students and guiding them to successfully produce research results that were published in selective conferences and prestigious journals. In the past, and while at Minnesota, I advised two undergraduate students, whose work resulted in various publications and was cited and covered by popular media, including MIT Technology Review and the Verge, among others. At SUNY Buffalo, I am advised several undergraduate

students; I advised one female undergraduate *research assistant* in my group on integrating human factors in defending against typosquatting, and supervised several other undergraduate students for their *independent research study*. At UCF, I have been very fortunate to utilize Flit-Path, an NSF-funded project with a mission statement of "recruiting, retaining, and providing scholarships and curricular and co-curricular support to academically talented students with financial need in the IT related disciplines of Computer Science, Information Technology, and Computer Engineering.". Through this amazing avenue of recruitment, I advised two female undergraduate students (Ms. Jacqueline Van Der Meulen and Ms. Destinee Stephen), and one male student (Mr. Connor Austin). Mr. Austin is currently a full-time research assistant in my group.

K-12 Outreach as a Enabler to Diversity. As a father of three children in primary education, I strongly believe that computer science education should start with K-12 to engage students' interests early. Moreover, I believe that diversity at the college and graduate level could be served by starting with K-12; a lot of the disparity is a result of lack awareness of younger students on the opportunities in STEM, and computer science in particular. Embracing this idea, my outreach included helping with workshops and camps targeting high and middle school students, as well as hosting high school students as interns in my group.

With Prof. Upadhyaya, I co-organized the UB GenCyber Camp 2016, a week-long day camp held from June 27, 2016 to July 1, 2016 at the University at Buffalo. The camp was sponsored by NSF and NSA, and attended by 33 students (8th-12th grades). Each day, the camp provided participants with hands-on computer activities to learn about different cybersecurity topics, in preparation for a simulated attack-defense competition at the end of the camp. The camp was an exemplary effort of embracing diversity, where 49% of the participants were minorities (33% were African Americans, 3%; one student, was Hispanic, and 12% were Asian Americans); 47% were females. I designed a session in the camp on malware and their risk. At UB, also, I was active with the Career Exploration Internship Program (CEIP), a NYSED approved program of internships for high school students, where I recruited Mr. Vikram Singh, an exceptional high school student who finished his internship and joined UB as an undergraduate student on a provost fellowship.

At UCF, the Center for Initiatives in STEM (iSTEM) conducts several activities in the domain of K-12 STEM Outreach, including STEM Day, Florida Engineering Education Conference (FEEC), and STEM Summer programs. My PhD students and I contributed to both STEM Summer Programs and STEM days. During the first offering of our STEM Summer Camp at UCF on June 12, 2018, we introduced an exhibition in which we demonstrated how online attacks are launched, what are their effects on users, and the possible countermeasures that can be undertaken to prevent these attacks. We also used tools available on Kali Linux to deploy Facebook phishing websites to hack accounts to demo the effect of such attacks. Additionally, we showcased some attacks on IoT devices including Alexa and other IoT gadgets, and will incorporate material on blockchain security in future offerings. The material of this summer camp was offered again during a STEM day, held on October 26, 2018 (attracted more than 50 middle and high school students).

Accessibility is a Key to Diversity. Public universities are an eye-opener for accessibility issues. Many students are not aware of accessibility services, even when they need them. Moreover, determining reasonable accommodations for those with needs—broadly defined—are left to the individual faculty, with broad guidelines from the university; a deficiency in our academic system. I have been fortunate to have amazing mentors from whom I learned a lot overtime about special accommodations, making it a staple component in my syllabus, and designing my courses to be inclusive of students with needs (deadlines, time allocations, attendance, etc.) I have been working with Student Accessibility Services on multiple success stories.

Not unrelated to the needs above is access for students with (or expecting) children. As someone who started his doctoral studies with two young children, and finished with three, I knew first-hand the burden of being a student with children. I made it a responsibility to be an advocate of accessibility for such students, whether in the classroom or in my research group, by providing the right accommodation—especially to female students—and by being a resource for my graduate students with children, where needed.

Concluding Remarks. Our strength as a society is in our diversity. Embracing our diversity by building an inclusive environment across gender, age, race, and socioeconomics, in a systematic manner, will be of paramount importance to alleviate the parity and broaden participation in computing in general and cybersecurity in particular. Acknowledging the imperfect status quo, I am committed to creating such an inclusive environment as exemplified by my track record across multiple efforts.