

PROMOTION RECOMMENDATION
The University of Michigan-Dearborn
College of Engineering and Computer Science

Anys Bacha, assistant professor of computer and information science, Department of Computer and Information Science, College of Engineering and Computer Science, is recommended for promotion to associate professor of computer and information science, with tenure, Department of Computer and Information Science, College of Engineering and Computer Science.

Academic Degrees:

Ph.D.	2016	Computer Science and Engineering, The Ohio State University, Columbus, OH
M.S.	2015	Computer Science and Engineering, The Ohio State University, Columbus, OH
M.S.	2004	Computer Engineering, Western Michigan University, Kalamazoo, MI
B.S.	2002	Computer Engineering, Western Michigan University, Kalamazoo, MI

Professional Record:

2017-present	Assistant Professor, Computer and Information Science, University of Michigan-Dearborn
2011-2017	Lead R&D Engineer, Hewlett-Packard
2006-2011	Software R&D Engineer, Hewlett-Packard
2004-2006	Hardware R&D Engineer, Hewlett-Packard

Summary of Evaluation:

Teaching: Professor Bacha is an outstanding instructor who has demonstrated his devotion to educating students. He has taught a variety of course types: graduate, undergraduate, first-year, upper-level, laboratory, core, and research. His ability to optimize his teaching methodology effectively to meet students' needs and deliver high-quality courses is impressive. In teaching evaluations, his students have placed him in the top tier of his department, noting that his industry experience is particularly valuable. Professor Bacha is an innovative educator who adopts creative methodologies such as flipped classroom, active learning, and project-based learning in his classes. He also serves as senior personnel for a National Science Foundation (NSF) scholarship grant to promote research experience for undergraduate scholars.

Professor Bacha is enthusiastic about curriculum development. He served on the department undergraduate curriculum committee, and he developed two new courses that are included as key courses in our Bachelor of Science-Cybersecurity and Information Assurance (CIA) and Master of Science-CIA programs. Furthermore, he supervised 15 students (five undergraduate, seven master's, and three doctoral). Professor Bacha won the 2020 College of Engineering and Computer Science Excellence in Teaching Award.

Research: Professor Bacha has an excellent track record of publication, which includes top-tier journals and highly competitive conference proceedings. His primary research interests lie in the areas of cybersecurity, computer architecture, and energy efficiency. Specifically, his research focuses on the development of end-to-end solutions that address important challenges at the intersection of security and systems. Professor Bacha has established a national and international reputation in his field, as evidenced by his publications on top venues, important positions in the organizing committees of top conferences, and program committee membership for numerous conferences.

Professor Bacha's funding record is also impressive. He has received a highly competitive NSF research grant for a total of \$175,000, an NSF Research Experiences for Undergraduates supplement grant, as well as an NSF Student Travel Support grant for the Institute of Electrical and Electronics Engineers/Association for Computing Machinery Microarchitecture Conference. In addition, he serves as senior personnel on a large NSF scholarship grant for a total of \$1.4 million.

Finally, Professor Bacha has demonstrated industry impact through nine issued U.S. and international patents and four provisional patents. Of these patents, six of them were awarded after joining UM-Dearborn.

Recent and Significant Publications:

Abdulrahman Abu Elkhail, Nada Lachtar, Duha Ibdah, Rustam Aslam, Hamza Khan, Anys Bacha, Hafiz Malik, "Seamlessly Safeguarding Data Against Ransomware Attacks," *IEEE Transactions on Dependable and Secure Computing* (TDSC), 2022.

Abdulrahman Abu Elkhail, Rafi Ud Daula Refat, Ricardo Habre, Azeem Hafeez, Anys Bacha, Hafiz Malik, "Vehicle Security: A Survey of Security Issues and Vulnerabilities, Malware Attacks and Defenses," *IEEE Access*, 2021.

Duha Ibdah, Nada Lachtar, Satya Raparathi, Anys Bacha, "Why Should I Read the Privacy Policy, I Just Need the Service: A Study on Attitudes and Perceptions Towards Privacy Policies," *IEEE Access*, 2021.

Kristin Barber, Anys Bacha, Li Zhou, Yinqian Zhang, Radu Teodorescu, Isolating Speculative Data to Prevent Transient Execution Attacks, *IEEE Computer Architecture Letters* (CAL), 2019. (Best Paper Award)

Service: Professor Bacha's service record is exemplary, both within the university and in the cybersecurity field. Highlights include serving on several department committees including P&T criteria review and curriculum committee, as well as a college-level visioning committee. He also organized a Dearborn Cybersecurity Day in 2019. Professor Bacha has served on the organizing committee for numerous conferences.

External Reviewers:

Reviewer A: "...[Professor Bacha's] SpecShield paper from PACT 2019, provided one of the earliest defenses against a new and important class of vulnerabilities that affects virtually all modern processors (speculative execution attacks). This attack class was announced in early 2018 and caused significant disruptions across the computing landscape because the vulnerability originated from the hardware, and is therefore difficult to mitigate. ... Bacha's

solution, unlike other early solutions that started appearing, completely mitigates the problem, rather than targeting specific components of the CPU. It prevents disclosure of speculatively fetched data until the value is no longer speculative, completely preventing the vulnerability at a modest cost to performance. This contribution is already considered one of the important potential solutions in this space, and in my opinion an excellent contribution that will influence thinking and future processor designs.”

Reviewer B: “...Dr. Bacha is among the experts in the area of computer architecture security, as shown by his high quality [sic] publications. Computer Security is a hot area for research. Researchers in that area are highly recruited by many top Universities [sic]. I believe that if Dr. Bacha was on the academic job market, he would be sought after by many computer science departments due to the scarcity and high importance of quality researchers in this area.”

Reviewer C: “We are in an exciting period in computer architecture research, with the potential to have high impact in multiple sub-areas, including accelerators and security. Prof. Bacha is an active player in these sub-areas. Especially in the security area, he works on a range of problems, all of which can have very high societal impact. His research explores the topics of ransomware, cryptojacking, cold boot attacks, authentication, user interfaces for privacy, and speculative execution attacks/defenses. This is indeed a very broad range of security topics, and some of these are topics that very few other architecture groups are exploring. As such, I find Prof. Bacha’s research portfolio extremely novel and he will likely have no trouble attracting a diverse group of graduate and undergraduate students to his research program.”

Reviewer D: “I’m very impressed by Dr. Bacha’s research and technical depth. He makes great contributions [sic] to the cybersecurity field....”

Reviewer E: “Overall, Anys Bacha is an up and coming technical leader in our field. His research portfolio is full of challenging problems with a special focus on computer security which is critically shaping the computer systems of the future. His work will have a great impact on our field. I am happy to give Dr. Bacha my strongest recommendation.”

Reviewer F: “Dr. Bacha has consistently made solid research contributions to the field of computer architecture design. His findings published in International Symposium on Computer Architecture (ISCA) 2013 highlights how timing errors introduced by process variations and circuit aging can be overcome using firmware-based modifications instead of expensive hardware changes. This work has received wide citation from the research community.”

Reviewer G: “...[Professor Bacha] owned [sic] a great number of patents, which shows his significant effort on technology transfer. His funding record is good. Being able to secure a single-PI NSF grant is impressive. He has significant industry working experience, which I believe gives him advantages in identifying critical research problems and teaching courses from practical angles.”

Summary of Recommendation: Professor Bacha is an innovative scholar making significant contributions in the important field of cybersecurity. He is an excellent teacher and mentor; and he is a leader who contributes both in external and internal service. It is with the support of the College of Engineering and Computer Science Executive Committee that I recommend Anys Bacha for promotion to associate professor of computer and information science, with tenure, Department of Computer and Information Science, College of Engineering and Computer Science.



Ghassan Kridli, Dean
College of Engineering and Computer Science



Domenico Grasso, Chancellor
University of Michigan-Dearborn

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