UC SANTA BARBARA

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A Prestigious Recognition

Two professors in the UC Santa Barbara College of Engineering have been named 2019 Fellows of the Association for Computing Machinery (ACM), the world's largest educational and scientific computing society.

Giovanni Vigna, in the Department of Computer Science, was recognized for “seminal contributions to the fields of mobile code, intrusion detection, malware detection, and vulnerability analysis.” Yuan Xie, of the electrical and computer engineering department, was selected for “contributions to technology-driven computer architecture and for developing tools for its implementation and assessment.”

The two are among 58 ACM members selected as fellows for 2019.

“Congratulations to Professors Vigna and Xie for being recognized as ACM Fellows,” said Rod Alferness, dean of the UC Santa Barbara College of Engineering. “This prestigious peer recognition from the most important scholarly societies serves to underscore the important and highly application-enabling work being conducted at the college. We’re extremely grateful to have two such stellar faculty members and groundbreaking researchers as part of the College of Engineering family.”

Vigna is the director of the Center for CyberSecurity at UCSB, co-director of the Security Lab and founder of the Shellphish hacker group. In the latter role, he organizes the annual International Capture the Flag event, one of the world’s largest attack-defense hacking competitions. He also is also a co-founder of Lastline, Inc.,

which develops innovative solutions to detect and mitigate advanced malware and targeted threats.

Unlike most academic fields, where journal papers are the main medium for disseminating new research, refereed conference papers are the gold standard for new research in computer science. Four top conferences dominate in computer security, Vigna's area of expertise, and for nearly two decades Vigna has been among the top three researchers in the world in terms of number of publications presented.

Vigna's work has been cited more than 26,000 times, according to Google Scholar. One of his papers was cited more than 1,700 times, and, more than 60 of his papers have received more than 100 citations.

Through his teaching and mentorship, Vigna's influence reverberates across the industry. For example, in a current $11.7 million Defense Advanced Research Projects Agency (DARPA) undertaking, he is working with six researchers from beyond UCSB, five of whom earned their Ph.D.s in the Security Lab. The project involves developing a combined human-machine approach to software security in which a computer system can request human assistance on a problem it is not "intelligent" enough to solve.

Vigna's open-source angr binary analysis system has been downloaded more than 25,000 times from Github, and is used by such industry giants as Cisco, Intel and Qualcomm to analyze IoT firmware and identify vulnerabilities in components for which source code is not available. In 2016, Vigna received the Google Security Privacy and Anti-abuse award for his contributions to fighting malware and cybercrime.

Yuan Xie leads the Scalable and Energy-efficient Architecture Lab at UCSB. During his career, Xie has made impactful contributions to computer architecture design and design automation that exploit emerging technologies, especially three-dimensional (or "stacked") integrated circuits (3D ICs) and new nonvolatile memories (NVMs).

3D ICs offer new opportunities to achieve system-level innovation that are not dependent on scaling new technology. Unlike traditional SRAM/DRAM memory, NVMs offer the benefit of nonvolatility, retaining all data even if the device is shut down; higher-density, so that more data per square millimeter of physical memory can be

stored; and lower standby power, meaning that if a computer is left for several minutes and no action is performed, almost no energy will be used.

Xie has developed design automation toolsets — software to enhance designers' efficiency — for these new technologies and has produced prototype implementations that have inspired commercial follow-ons. He is recognized as a world leader in these two emerging technologies, and as one of very few researchers who have crossed traditional boundaries separating architecture, design automation and testing, to embrace all three.

Xie also was recently named a Fellow of the American Association for the Advancement of Science. His road to such dual global recognition could scarcely have been less likely. He was born to peasant-farmer parents in rural southeastern China, miles from the nearest settlement of any size. Life was hard in the village of Da-Ping. Its name translates as "big and flat," but Da-Ping is actually tiny and extremely mountainous, Xie recalls, and getting to school involved a long, rigorous hike.

After his first- and second-grade teacher moved from Xie's village to a small town about 60 miles away, she volunteered to host Xie, who was first in his class, so that he could attend a better school. That launched him on an educational journey that led him to earn his BS in electronic engineering at Tsinghua University and, later, his MS and PhD from Princeton.

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.