Mobile embedded systems are everywhere in our everyday lives and driving an information revolution. Hence, it is critical to defend mobile embedded system against malicious attack due to their usage in military and critical commercial applications such as telehealth, battleship, router, aircraft, etc. A hostile penetration in such facilities could cause dramatic damage. It is known that buffer overflow attacks have been causing serious security problems. More than 50% of today’s widely exploited vulnerabilities are caused by buffer overflow, and the ratio is increasing over time. I proposed a hardware/software codesign method called HSDefender to solve the buffer overflow problem. Combining hardware/compiler, HSDefender provides different levels of strength to solve two types of attacks: For the most common stack smashing attacks, HSDefender provides a complete protection. For the function pointer attack, it makes a hacker extremely hard to change a function pointer leading to his hostile code. And system is hard to be crashed even it is compromised. With little overhead, HSDefender provide an efficient method for a system integrator to check if a component has been protected. Partial of our results was published in IEEE Transaction on Computers.

Bio:
Meikang Qiu received the BE and ME degrees from Shanghai Jiao Tong University, China. He received the M.S. and Ph.D. degree of Computer Science from University of Texas at Dallas in 2003 and 2007, respectively. Currently, he is an associate professor of Computer Engineering at San Jose State University. He has worked at Chinese Helicopter R&D Institute, IBM, etc. Currently, he is an IEEE Senior member and ACM Senior member. His research interests include cyber security, embedded systems, cloud computing, smart grid, microprocessor, data analytics, etc. A lot of novel results have been produced and most of them have already been reported to research community through high-quality journal (such as IEEE Trans. on Computer, ACM Trans. on Design Automation, IEEE Trans. on VLSI, and JPDC) and conference papers (ACM/IEEE DATE, ISSS+CODES and DAC). He has published 3 books, 170+ peer-reviewed journal and conference papers (including 70 journal articles, 100 conference papers), and 3 patents. His research is supported by NSF. He has won ACM Transactions on Design Automation of Electrical Systems (TODAES)2011 Best Paper Award. His paper about cloud computing has been published in JPDC (Journal of Parallel and Distributed Computing, Elsevier) and ranked #1 in 2012 Most Downloaded Paper of JPDC. He has won another 4 Conference Best Paper Award (IEEE/ACM ICESS’12, IEEE GreenCom’10, IEEE EUC’10, IEEE CSE’09) in recent four years.