

Spring 2018 ECE Distinguished Seminar

Software Complexity, Hardware Security, and the Brain -- Computer Architectures as an Instrument for Understanding the Nature of Practical Computation

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Abstract

By most outside the field, and even by many of those in it, Computer Architecture is mistakenly thought to be an act of pure stepwise engineering: find a processor design that makes your software run faster than the last iteration. However the quest for better processors taken to the extreme offers some "curious side effects" -- it changes the way you see the act of computation, it forces you to really reconsider what a system should be, and perhaps can even yield insights about the natural world. In this talk I will explore three concrete problems where Computer Architecture has provided a unique and valuable lens. The first relates to the 59.5 billion dollar problem of software bugs, the second to the insidious nature of security vulnerabilities that live between hardware and software (such as Spectre and Meltdown), and the third to both the functioning of the visual cortex and the future of hardware for machine learning.

Bio

Tim Sherwood is a Professor of Computer Science and the Associate Vice Chancellor for Research at UC Santa Barbara. He is a 9-time winner of the IEEE Micro Top Pick Award, a co-founder of the hardware security startup Tortuga Logic, and the 2016 ACM SIGARCH Maurice Wilkes Awardee "for contributions to novel program analysis advancing architectural modeling and security".