Reconsidering Computing from the Gates Up

Abstract:
Software continues to "eat the world", but all software is ultimately implemented through the carefully orchestrated motion of bits through memory and logic gates. A reconsideration of these basic logic primitives can lead to surprising results not just for the purposes of making faster hardware but because doing so sheds new light on all of the systems that build on top of them. In this talk I will explore two concrete problems where such "reconsideration" has led to surprising results. The first problem has to do with an insidious class of security vulnerabilities that live between hardware and software (such as Spectre and Meltdown). The second deals with problems of optimization and classification under extremely tight energy constraints. In both instances we show that radically new classes of computing devices are not only possible but practical.

Bio:
Tim Sherwood is a Professor of Computer Science and the Associate Vice Chancellor for Research at UC Santa Barbara. He is a 10-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".

Details:
Wednesday, February 12, 2020 at 3:00 pm
Engineering Hall 4610