

SPECIAL SEMINAR

# Noise, Information, and the Essence of the Quantum

WHEN  
Monday  
Sept 8  
3:30 – 4:30

WHERE  
ERC 301



**Nicholas LaRacuate, University of Illinois, Urbana**

Quantum mechanics may change the rules of computer science, as the physical laws constraining computation and communication are different than classically assumed. Theories of scalable quantum computing and Shannon regime information are however meeting realities of the Noisy Intermediate-Scale Quantum regime. I will describe our use of information theory to model state decay and decoherence, and ways in which fundamental entropy inequalities can build in noise and restrictions. We bound rates and times of decay using complex interpolation and noncommutative geometry. We connect aspects that distinguish quantum from effectively classical information and consider why noise sensitivity differs fundamentally. Finally, I will discuss ongoing collaborations with experimental groups at the University of Illinois at Urbana-Champaign.