



Prof. Avik Ghosh

(Electrical Engineering, University of Virginia)

*Quantum transport and the future of
electronics*

Friday, Nov. 6

2:30 P.M.

210 Robeson Hall

Modern day electronics is rapidly reaching nanometer dimensions where atomistic, quantum and many-body effects dominate. Textbook concepts such as Ohm's Law for current flow and Fourier's Law for heat flow are now proven to be incomplete, and the future of electronics seems to depend critically on the fascinating world that lies beyond. Fundamental physical and chemical concepts are needed to understand how a graphene or a molecular transistor would behave as a logic element, or how one maybe able to encode information more efficiently for low power device and circuit operation, and most fundamentally, how electrons flow through nanomaterials and interfaces through a combination of interference pathways and localized many-body states. In this talk, I will provide an unified overview on how to model current flow through various nanostructures, how our computational simulations measure up with available experiments, how they advance our fundamental understanding of non-equilibrium quantum physics, and how we could utilize this understanding and quantitative modeling to do potentially useful electronics.
