Abstract for an Invited Paper
for the MAR09 Meeting of
The American Physical Society

**LeRoy Apker Award Talk: Electronics at the Nanoscale: Graphene, Carbon Nanotubes, and Single-Molecule Devices**

SUJIT DATTA, Department of Physics, Harvard University

Low-dimensional nanostructures are emerging as model systems for fundamental studies of quantum transport, as well as promising candidates for novel post-silicon electronic devices incorporating quantum size effects. Key examples of these include few-layer graphene, carbon nanotubes, polymer nanofibers, and even single molecules. In this talk, I will summarize my work combining experimental and computational tools to study, control, and apply molecular nanomaterials of low dimensionality – using scanning probe microscopy techniques to study electronic phenomena in few-layer graphene and carbon nanotubes, as well as to elucidate the structure of biochemically-functionalized carbon nanotubes; using computer simulations to investigate key electronic properties of single-molecule transistors; and demonstrating a straightforward chemical technique by which samples of few-layer graphene can be etched along their crystallographic directions, potentially enabling the creation of a variety of new graphene-based nanostructures.