

NANOSCALE SCIENCE AND ENGINEERING CENTERS: RESEARCH AND EDUCATION.

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ABSTRACT

The purpose of this presentation is to examine educational programs within the Nanoscale Science and Engineering Centers (NSEC), funded by the National Science Foundation in the United States. Thus first I will describe the overall program of NSEC's within the United States. I will then review the research program of Columbia University's Center for Electron Transport in Molecular Nanostructures. The Columbia Nanocenter is dedicated to the exploration of electron transport through nanoscale systems including (1) Single wall carbon nanotubes, (2) Two dimensional organic ordered systems, and (3) single molecules. The ultimate goal is the creation of a three terminal single molecule transistor device. I will give examples of recent results in characterization of single wall carbon nanotubes, transport in graphene, and single molecule device fabrication and characterization.

I will describe the educational program of the Columbia Nanocenter. Our program is organized around three central themes: Engagement, Growth, and Transition. By "Engagement" we mean drawing from and broadening the pool of talented students engaged in scientific endeavors, utilizing exciting research programs in Nanoscale Science to generate interest and focus. Our programs for "Growth" are designed to help our students grow – especially at the undergraduate level and at the graduate level. "Transition" activities help our students make the transition from the academic world into the real world of nanoscience and nanotechnology. I will discuss some of these programs and their implementation.