Stevens Institute of Technology

Nanotechnology Graduate Program

Aligned Arrays and Multilayer Superstructures of Single Walled Carbon Nanotubes for High Performance Thin Film Electronics

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Babbio Bldg, Room 122, Time 11am

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The excellent electronic, thermal and mechanical properties of single-walled carbon nanotubes (SWNT), together with the ability to deposit them from solution onto wide ranging classes of substrates, create opportunities for their use in various areas of electronics, from heterogeneously integrated systems for high speed communications devices to large area distributed circuits for flexible displays. In these cases, organized arrays or random networks of pristine SWNTs can provide high quality effective thin film semiconductors for devices such as thin film transistors (TFTs). This talk describes our work in this area, and highlights (1) methods for self aligned growth of large scale, perfectly aligned arrays of perfectly linear SWNTs, (2) chemistries for selective functionalization of metallic tubes to eliminate their contribution to the electronic properties of these arrays, (3) techniques for building high performance, transparent thin film type transistors using the SWNTs for all of the current carrying layers of the devices. We conclude by summarizing the advantages and disadvantages of this type of SWNT approach to electronics and remaining challenges.

John A. Rogers obtained BA and BS degrees in chemistry and physics from the University of Texas, Austin in 1989, and SM degrees in physics and in chemistry in 1992 and the PhD degree in physical chemistry in 1995 from MIT. From 1995 to 1997, Rogers was a Junior Fellow in the Harvard University Society of Fellows. During this time he also served as a Director for Active Impulse Systems, a company based on his PhD research that he co-founded in 1995 and which was acquired by a large company in 1998. He joined Bell Laboratories as a Member of Technical Staff in the Condensed Matter Physics Research Department in 1997, and served as Director of this department from 2000-2002. He is currently Founder Professor of Engineering at University of Illinois at Urbana/Champaign, with appointments in the Departments of Materials Science and Engineering, Electrical and Computer Engineering, Mechanical Science and Engineering and Chemistry. Rogers research includes fundamental and applied aspects of nano and molecular scale fabrication, materials for large area electronics and unusual photonic systems. He has published more than 150 papers, and has ~60 patents, more than 30 of which are licensed or in active use. His research has been recognized with many awards including the Harvard University Robert B. Woodward Scholar Award (2001), American Chemical Society's Team Innovation Award (2002), and the Xerox Distinguished Lecturer (2006). He is a Fellow of the American Physical Society, and serves on several Editorial Boards, including those for Applied Physics Letters, Journal of Applied Physics and Nano Letters.

Light refreshments will be served prior to seminar

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