

UNH Materials Science Seminar

11:10-12:00, Thursday, Feb. 7, 2008

Kingsbury Hall S145

University of New Hampshire

Nanopore sensors for DNA measurements using silicon technology

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DNA sequencing remains a laborious and expensive process, limited by practical concerns to short segments. Previously, the human genome was thought to be mostly the same for each person, but recent work has suggested vast differences, resulting in a need for widespread sequencing. Si nanotechnology can be used to measure DNA sequences; DNA can be electrostatically pulled through small, 2-5 nm diameter pores in thin membranes. If the apertures are configured with electrodes, it is in theory possible to measure the impedance of each leg of DNA as it transits the aperture and determine the sequence for that strand. Experiments have been made with 2-3 nm apertures, drilled in an electron microscope, which show DNA transit. Fabrication is underway to make nanopore electrode structures. This is complicated by the wet chemistry, which requires an electrolyte solution in conjunction with the Si electrode structure. Results and implications will be shown for DNA transit as well as options for sequencing. Novel device implications will also be explored.

Stephen Rossnagel is a Research Staff Member at IBM, starting there in 1983 following a PhD in physics at Colorado State University with Harold Kaufman on ion beam and sputtering technology. He has worked extensively on sputtering, plasma sources, Atomic Layer Deposition (ALD), interconnect technology and new materials. He has published 150 papers and chapters, 5 books, edited 2 book series and has 20 or so patents. He was President of the AVS, as well as Program Chair for the Annual Symposium, and is currently Treasurer. He received the Peter Mark award of the AVS (1990) and will receive the Bunshah Award from the Advanced Surface Engineering division (ICMCTF) in April 2008. He has held previous positions at Princeton University and the Max Planck Institute in Garching.

Host: Professor James Harper x1962