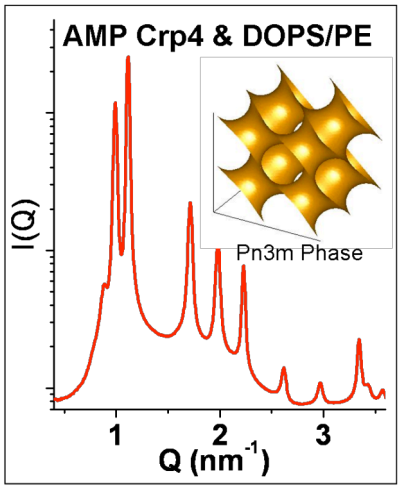
NANOHOUR

Wednesday, October 7, 2009 3:00 pm
Beckman Institute - Room 3269

Towards design rules for antimicrobials and cell-penetrating peptides

Nathan Schmidt – Dept of Materials Science and Engineering, Physics, and Bioengineering

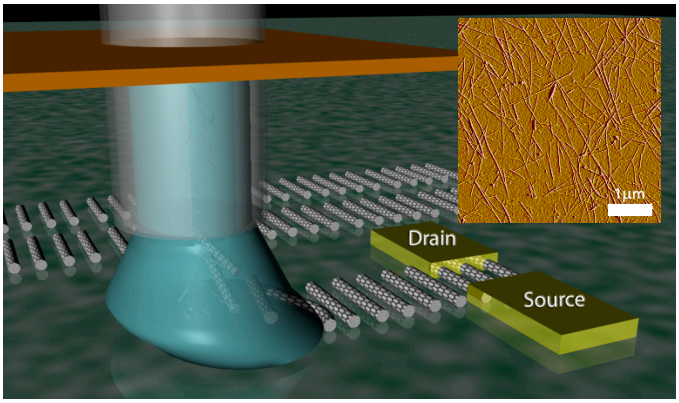


Antimicrobial peptides comprise a key component of innate immunity for a wide range of multicellular organisms. It has been shown that natural antimicrobial peptides and their analogs can disrupt and lyse bacterial membranes but not eukaryotic membranes. This class of molecules is complementary to cell-penetrating peptides which can traverse cell membranes without killing the cell. We use synchrotron small angle x-ray scattering (SAXS) to examine the relationship between membrane composition and peptide induced changes in membrane curvature and topology. By comparing the membrane phase behavior induced by these different peptides we will discuss the importance of amino acid composition and placement on membrane rearrangement.

Towards Moore's Law Scaling: Mechanical Meniscus Alignment and Placement of Carbon Nanotubes

Josh Wood – Dept of Electrical Engineering

Effective, large-scale alignment of single-walled carbon nanotubes (SWNTs) is necessary to make them a potential replacement for next-generation CMOS tran-sistor technology. While techniques exist to align SWNTs during growth or dielectrophoresis, no technique to date can align SWNTs on a large-scale while controlling SWNT density and using chirally pure SWNTs. We present a novel, top-down alignment technique using mechanical action by meniscus movement between two surfaces of different wetting dynamics. Our theoretical predictions show that SWNT alignment depends critically on receding contact angle, meniscus velocity, and fluid surface tension; these parameters optimize our alignment technique. The SWNTs have an average alignment of 94.35±37.94° relative to the meniscus motion direction, with an average density of ≈12 SWNTs/μm^2. We also can scale our technique to a larger, manufacturing-type process by using a capillary-tube array.



SWNTs in fluid aligned by meniscus movement with transistor electrodes. *Inset:* AFM image of well-aligned SWNTs on H-Si(111).

Coffee and cookies will be served

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