Joint School of Nanoscience and Nanoengineering

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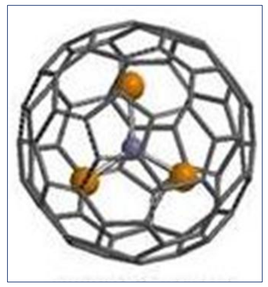
JSNN's interdisciplinary research focus is well positioned to enable high impact opportunities in emerging research areas. It offers linked access to shared state-of-the art nanoelectronics and biotechnology cleanrooms, as well as a unique nanobioelectronics cleanroom facility. The suite of analytical tools covers a range of capabilities, from visualization and drug discovery nanomaterials characterization, and includes a Carl Zeiss SMT Orion® Helium Ion microscope.

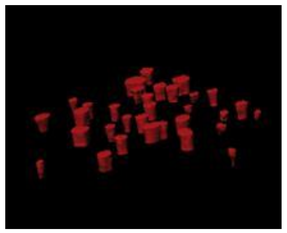
NANOBIOTECHNOLOGY

Investigates disease at the nano-bio interface using engineered nanomaterials to enable diagnosis, imaging and therapy.

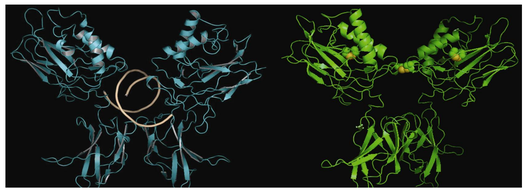
Metallo-fullerene trimetosphere (Prof. Kepley)



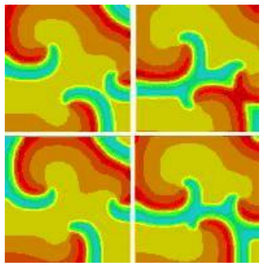
3D confocal image of QDs localization on SPRi chip after DNA hybridization. (Prof. Sandros)



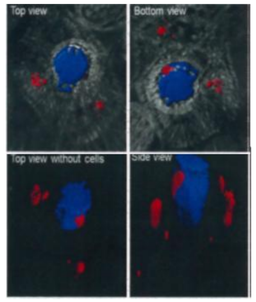
"On" (reduced, left) vs. "off" (oxidized, right) states of the DNA-binding protein NF-κB, a redox-regulated molecular switch. (Prof. Taylor)



Numerical modeling of fibrillation in microscopic 2D slice of cardiac tissue. (Prof. Starobin)



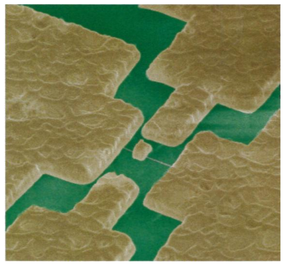
3D image of multifunctional nanoparticle for gene delivery (Prof. Sandros)



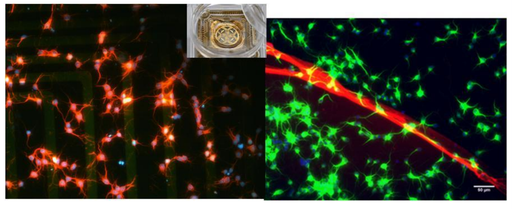
NANOBIOELECTRONICS

Explores a range of emerging technologies, from personal medical diagnostics to bio-signal propagation and optoelectronics. It leverages nanoelectronics and nanomagnetics expertise to enable useful functionality beyond CMOS technology.

Paddle oscillators for biological and chemical sensing (Prof. Hall)



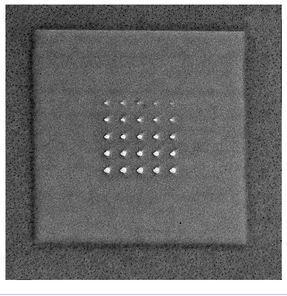
Nanobioelectronics - neural cells cultured on a electronic interface platform (Prof. Aravamuddhan)



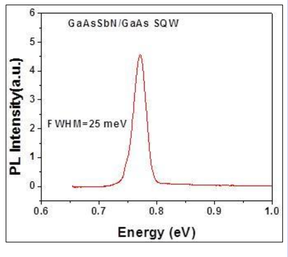
NANOMETROLOGY

Advances integrated investigational tools to fundamentally understand and characterize nanoscale phenomena for novel applications.

An array of nanopores fabricated in the center of a silicon nitride membrane that has been milled to a local thickness of ~6 nm. (Prof. Hall)



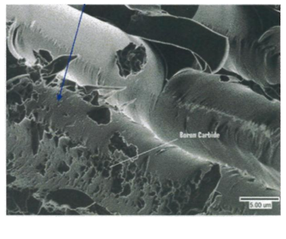
Photoluminescence spectrum of a MBE grown GaAsSbN/ GaAs SQW at room temperature with the peak position at 1.63 μm for LED device application. (Prof. Iyer)



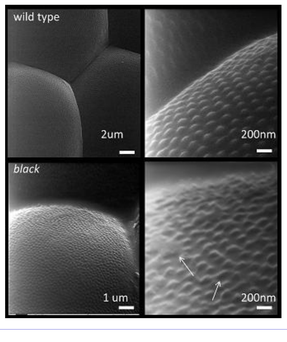
NANOMATERIALS AND NANOCOMPOSITES

Focuses on synthesis, processing, manufacturing and characterization of nanostructures, for applications ranging from novel biomimetically self-assembled nanostructures and nanocomposites for aircraft to cement.

Fractograph of Nanoengineered Fiber Composites (Prof. Kelkar)



Helium Ion Micrograph of corneal nanostructures in wild type and *black* mutant *Drosophila melanogaster* *(Prof. LaJeunesse)*



NANOENERGY

Enhances the foundational materials science of energy harvesting, storage, and use.

COMPUTATIONAL NANOTECHNOLOGY

Modeling and simulation of devices, structures, and systems, including composite materials, computational biology, and materials modeling