

AIAD #10849

Research Opportunity: Both Faculty and Cadet

ORGANIZATION/PROJECT SPONSOR

Organization: ARL-ARO

Organization POC: Dwight Woolard

Organization POC email: dwight.woolard@us.army.mil

Organization POC Phone: 919-549-4297

Organization POC FAX: 919-549-4310

Location of Sponsoring Directorate or Division: Research Triangle Park, NC

PROJECT

Title: Fundamental Exploration of the Electronic/Photonic Sensing Properties of Hybrid Biological-Organic Functionalized Nanoscaffolds

Description: Fundamental research investigations into the electronic and photonic properties of a novel class of hybridized DNA-based nanoscaffolds that will be strategically functionalized by organic molecular switches and synthetic DNA-abiotic capture. These novel functionalized materials will allow for the electro-photonic transduction of information regarding the microscopic mechanisms occurring within antibody mimics, and provide new insights for biomimetics innovations in the future. The specific research opportunity of the Faculty or Cadet will be to engage in the physical modeling and design of novel organic molecular switches and/or biological molecular switches. There are two options for the focus of the research. The first option is to apply existing quantum chemistry software (e.g., Gaussian or GAMESS) to derive the conformational and electronic properties of the base molecules. The second option is to apply phenomenological electron dynamical models to predict the conductivity properties of the molecular switches under study. Since the research project is a collaboration between the ARO POC's research group at N.C. State University and Fordham University, the Faculty/Cadet researcher can choose to work at either location.

ARL/Army Benefit: CB agent Detection and Medical Diagnostics.

Background Required: Quantum mechanics and/or quantum chemistry

Security clearance required: None

Capacity: One or two

Duration: Prefer a 4 week or greater period during the block 23 May – 8 August

Block Preference: 23 May – 8 August