



RESEARCH IN BIO/MOLECULAR SCIENCE AND ENGINEERING

The Center for Bio-Molecular Science and Engineering of the Naval Research Laboratory (NRL) conducts multidisciplinary research in biotechnology using the techniques of modern molecular biology, biophysics, chemistry, microelectronics, and engineering to fabricate biosensors, biomaterials, and advanced systems. Current research areas include:

- (1) Biophysical chemistry of membranes, proteins, DNA, and RNA.
- (2) Research into biosensors including construction of novel devices, accessories for automated reagent delivery, production of biomolecular recognition elements or configuration of bioassays for integration into the sensor. Targets of detection include explosives, pollutants, pathogens, toxic agents, and hazardous chemicals.
- (3) Systems biology, synthetic biology, genomic and proteomic analyses of microorganisms.
- (4) Synthesis, fabrication, and physical characterization of self assembled thin films and surfaces for material development.
- (5) Microwave devices, ultramicroelectrodes and electron emitters based on metallized composites. Microwave materials based on nanodimension powders and metallized composites.
- (6) Self-assembly of microstructures for advanced materials and the assessment of potential applications including: controlled release, advanced composites for electronic, structural, and thermal applications, and environmental applications.
- (7) Fabrication and integration of microfluidic components for sample processing and analysis.
- (8) Design, development, and characterization of multifunctional, multilayered assemblies for advanced applications in the areas of environmental protection and general purpose detection, and in the development of non-conventional bioreactors for performing multistep chemistries in single operation.

(9) Development of novel lithographic, patterning for fabrication or advanced biosensors processes for high resolution imaging, fabrication of advanced microelectronic or nanoelectronic devices, displays, biosensors, multilayers, or three dimensionally structured materials.

(10) Advanced materials using liquid crystals and ordered polymers, relation between molecular structure and material properties, assessment of their properties for potential applications in the areas of real time holography, ferroelectric phenomena, high resolution display, pyroelectric sensors, and piezoelectric materials, electro-optic materials, non-linear optics, and optical wave guiding.

(11) Bio-based energy harvesting and production for marine, underwater, and naval applications.

(12) Development of bioprotocols and subsequent bioinformatic analysis of DNA chip arrays.

The NRL is inviting White Papers (WP) for applied and basic research in areas closely related to and supportive of these programs. It is expected that multiple projects may result with each targeted to a particular technology or application area.

Address White Papers (WP) to baa6900@nrl.navy.mil. Allow one month before requesting confirmation of receipt of WP, if confirmation is desired. Substantive contact should not take place prior to evaluation of a WP by NRL. If necessary, NRL will initiate substantive contact.