



## **APPLICATIONS OF MOLECULAR BIOLOGY, BIOCHEMISTRY, ANALYTICAL CHEMISTRY AND ADVANCED LASER TECHNIQUES**

The Naval Research Laboratory (NRL) Chemistry Division conducts research in a number of areas related to detection of biological, chemical and other hazardous materials or conditions. In addition, the Division conducts research in developing tools and methods to transfer, preserve and characterize and optimize the performance of chemical and biological based materials.

Areas of primary interest include:

- 1) Characterization of environmental processes and their application to remediation and restoration technologies;
- 2) Detection, sampling and characterization of chemical and biological agents, toxic metal ions and explosives;
- 3) Unique analytical chemistry tools for more efficient and cost effective sample processing;
- 4) Genetic- and molecular biological-based tools; (4a) techniques for the preservation and characterization of cells, tissue and biomaterials; (4b) methods for printing environmental biological and chemical material;
- 5) Improved and alternative fuel sources that include hydrogen fuel cells, solid oxide fuel cells and microbial fuel cells;
- 6) Atmospheric propagation of femtosecond pulses;
- 7) Electromagnetic induction sensors and analysis for detection and classification of unexploded ordnance;
- 8) Advanced laser and optical techniques, including novel plasmonic systems, optical diagnostics, remote sensing, and materials-based optical signatures;

9) Microfluidic structures with application to microchip separations, sampling, detection and pumping;

10) Chemometrics;

11) Volume sensing through image analysis and machine vision; 12) Reactive multi-functional coatings;

13) High throughput culturing of unculturable and/or environmentally derived microorganisms;

14) Lithium ion battery safety diagnostics; and

15) Advanced power system analysis and optimization

Key words describing these research interests include, but are not limited to: chemical sensors, biosensors, biosurfactants, gene probe technology, biofilms, freeze-drying, lyophilization, cryopreservation, contaminated sediments, corrosion and biofouling, remote sensing, methane hydrates, carbon cycling, laser pressure, optical techniques, biocollector, MTADS, capillary electrophoresis, microchip, laboratory-on-a-chip microfabrication, microfluidics, video-based detection, machine vision, workspace monitoring, damage control, multivariate analysis, mobility fuels, thermal stability, antioxidants, and metal catalysis. NRL is interested in receiving proposals which address innovative technologies or fundamental approaches related to these research areas.

Address White Papers to [code6110@nrl.navy.mil](mailto:code6110@nrl.navy.mil). Allow one month before requesting confirmation of receipt of White Paper, if confirmation is desired. Substantive contact should not take place prior to evaluation of a White Paper by NRL. If necessary, NRL will initiate substantive contact.