NAVAL SEA SYSTEMS COMMAND

COMPUTATIONAL MATHEMATICS & STATISTICS • DIRECTED ENERGY • SENSORS AND MATERIALS

ADVANCED SCIENCE & TECHNOLOGY

DIVISION

NAVAL SURFACE WARFARE CENTER, DAHLGREN DIVISION

Our Mission

Performs scientific research and technology development to support military and national needs. Improves technical capabilities and advances scientific understanding in response to present and anticipated requirements. Helps prepare the military for the future by addressing technology needs, establishing required scientific efforts, and guiding emerging technologies. The division focuses science and technology efforts to promote research and development needed for future surface warfare systems, directed energy weapons, electromagnetic systems, detectors, computational sciences, nano-materials, and pulsed power technologies.

Overview

The Advanced Science and Technology Division conducts research to advance technologies in the areas of future surface warfare systems, directed energy weapons, electromagnetic systems, detectors, nano-materials and pulse power technologies with applications to the Navy's surface warfare. The Division also supports the development and analysis of innovative warfare systems and concepts in the areas of mathematical and computational sciences and technology. This includes work in such areas as advanced image processing and analysis, applications of non-parametric probability density distributions, theory of quantum dynamical machines, and advanced computational statistics.

Research Areas:

The Advanced Science and Technology Division performs research in the following areas:

Computational Mathematics and Statistics Branch

Mission

Conducts research and technology development to advance and apply state-of-the-art computational technologies in the areas of statistics, mathematics and computer science. Includes work in such areas as advanced signal and image processing, complex information analysis, knowledge discovery, classical and computational statistics, computational fluid dynamics and nonlinear dynamics.

Focus Areas

- Data Mining and Knowledge Discovery
- Network Science and Applications of Random Graphs
- Sensors, Signals and Image Processing
- Computer and Network Security
- Classical Statistics
- Mathematics and Pattern Recognition
- Physics-Based Modeling

Directed Energy Branch

Mission

Performs research, development, and prototyping of directed energy systems and countermeasures. Develops technologies associated with the generation, detection, and control of electromagnetic energy including optical and plasma devices, RF and microwave technologies, high-voltage short-pulse systems, and state-of-the-art optical/electrical diagnostics. These efforts support the understanding and development of pulsed high-power electrical sources, lethal and non-lethal directed energy, new optical systems, electromagnetic modeling and protection techniques, and electronic attack technologies.

Focus Areas

- Directed Energy
  - HPM/CHPM
  - RF Sources
  - Solid State, Fiber and FEL Laser
- Pulsed Power
- Computational Electromagnetic Physics & Analysis
- Diagnostic Tools

Sensors and Materials Branch

Mission

Performs research, development, and prototyping of detectors and sensor technologies associated with advanced solid-state materials, improved semiconductor interfaces, optical and quantum sensors, and nanotechnology concepts applied towards the detection and identification of physical, chemical and biological phenomena. Performs experimental and theoretical efforts focused on pulsed power systems, high-power switching, and energy storage techniques for high power devices such as launchers and weapons.

Focus Areas

- Sensor Characterization and Analysis
- Quantum Sensors and Processing
- Nano-technology
- High Power Switching
- Pulse Power Systems

NAVSEA WARFARE CENTERS DAHLGREN

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