



# Probability & Statistics



OFFICE OF NAVAL RESEARCH



### ***The ONR Connection***

The Office of Naval Research (ONR), established by an act of Congress in 1946 to continue the basic scientific research that contributed so much to the technological advances needed to win World War II, is the first federal agency established to support a wide range of scientific work in universities. ONR currently coordinates, executes, and promotes the science and technology programs of the U.S. Navy and Marine Corps through universities, government laboratories, and nonprofit and for-profit organizations.

ONR executes its mission in six Technical Departments, the Naval Research Laboratory (NRL), an International Field Office headquartered in London with an office in Tokyo, the Naval Science Assistance Program (NSAP), and the Naval Reserve Science & Technology Program; works with industry to improve technology manufacturing processes while reducing fleet costs; and fosters continuing academic interest in relevant naval science from the high school through post-doctoral levels.

Under the Information, Electronics & Surveillance's Mathematical, Computer, and Information Sciences Division is the Probability and Statistics (P&S) focus area. The P&S focus area is concerned with basic research in two subjects: Probability—a mathematical framework to represent the likelihood of phenomena with uncertain outcomes and Statistics—the process of collecting data and extracting and presenting the information contained in the data. Currently, there are four specific focus areas under the ONR's P&S arena: Command and Control, Image Processing for Automatic Target Recognition, Mine Countermeasures and Minefield Detection, and Nonlinear Filtering and Target Tracking. Each year, the P&S area funds basic research in these four areas.

### ***Current Probability and Statistics Focus Areas***

- ***Command and Control***

Funding for several projects focusing on basic research in command and control systems including the development of probabilistic frameworks and scalable algorithms for situational awareness, change and anomaly detection for command and control, sequential decision-making for situational awareness, and methods for assessing algorithm performance.

- ***Image Processing for Automatic Target Recognition***

Funding for several projects focusing on research to address problems in automatic target recognition (ATR). These include research to combine region of interest identification, spatial scan statistics, and random shape analysis for improved ATR; development of new approaches in image analysis that combine multiresolution/multiscalable methods for improved image segmentation; and development of algorithms to fit multiple scale random field models from data taken at the boundary of a region based on wavelet transform ideas.

- ***Mine Countermeasures and Minefield Detection:***

Funding for several projects at various universities that focus on the detection of mines and minefields from images and video. Current projects include the development of a unified theory to recognize random shapes, the detection of minefields in an area with clutter, and locating underwater mines in the littoral zone.

- ***Nonlinear Filtering and Target Tracking***

New projects are no longer being funded. Current and previous research is/was focused on improved Kalman filters, on-line tracking algorithms, and algorithms that track the target before detection. These algorithms have been successfully transitioned to industry and the Navy.

### ***How To Apply for Funding***

Applications for funding from a relevant program should be submitted as a white paper to the scientific officer. Programs and contacts can be found on the web at [http://www.onr.navy.mil/sci\\_tech/](http://www.onr.navy.mil/sci_tech/).

If the white paper meets program specifications, the program scientific officer will request a full proposal for further consideration.

### ***Information Resources***

- ***Special Program Resources***

**Navy Small Business Innovation Research (SBIR/STTR)**

<http://www.navysbir.brtrc.com/>

**Minority Institution and Other Special Programs**

[http://www.onr.navy.mil/sci\\_tech/industrial/#corporate](http://www.onr.navy.mil/sci_tech/industrial/#corporate)

**Other ONR Business Opportunities**

[http://www.onr.navy.mil/02/bus\\_op.htm](http://www.onr.navy.mil/02/bus_op.htm)

- ***P&S Resource Link***

Each quarter, the Probability and Statistics Program publishes an e-mail newsletter containing information on research progress, transition opportunities, funding possibilities, and other relevant information. To receive this newsletter, please send an e-mail to Dr. Wendy Martinez at [Wendy\\_Martinez@onr.navy.mil](mailto:Wendy_Martinez@onr.navy.mil) or visit our web site at [http://www.onr.navy.mil/sci\\_tech/information/ProbStatsMain.htm](http://www.onr.navy.mil/sci_tech/information/ProbStatsMain.htm) to subscribe.

### ***Upcoming Conferences, Meetings, Seminars***

Each year, ONR's P&S group participates in various functions to meet the general public and potential researchers at universities and laboratories, including the following:

- **Interface**—for more information, please contact <http://www.galaxy.gmu.edu/stats/IFNA.html>
- **Joint Statistical Meetings**—for more information, please contact <http://www.amstat.org/meetings/index.html>
- **U.S. Army Conference on Applied Statistics**—for more information, please contact <http://rpstl.arl.mil/isb/acas/>



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