



Special Notice 11-SN-0003

**Special Program Announcement for 2011 Office of Naval Research
Basic Research Challenge**

**“Reduced-Order Representations for Design:
Development of Analytical and Computational Techniques for Multi-physics
Based Models of Ship Platforms and Systems”**

I. INTRODUCTION:

This announcement describes a basic research thrust, entitled “Reduced-Order Representations for Design: Development of Analytical and Computational Techniques for Multi-physics Based Models of Ship Platforms and Systems,” to be launched under the Office of Naval Research (ONR) Broad Agency Announcement (BAA), ONRBAA11-001, Long Range BAA for Navy and Marine Corps Science and Technology which can be found at <http://www.onr.navy.mil/Contracts-Grants/Funding-Opportunities/Broad-Agency-Announcements.aspx>. The research opportunity described in this announcement specifically falls under numbered paragraph 2 of the “Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (Code 31)” sub-section and numbered paragraph 2 of the “Sea Warfare and Weapons (Code 33)” sub-section. The submission of proposals, their evaluation and the placement of basic research grants will be carried out as described in ONRBAA11-001.

The purpose of this announcement is to focus attention of the scientific community on (1) the area to be studied, and (2) the planned timetable for the submission of white papers and proposals.

II. TOPIC DESCRIPTION: Reduced-Order Representations for Design: Development of Analytical and Computational Techniques for Multi-physics Based Models of Ship Platforms and Systems

Background:

The Basic Research Challenge (BRC) Program is to advance computational methods for design and optimization across a heterogeneous set of physical processes. The program will focus on development of reduced-order representations of general classes of data and physical processes, with a focus on significantly improved speed of system optimization, as well as an efficient and mathematically rigorous framework for investigation of the system "trade space". The program will integrate basic research in mathematics, optimization, physics-based modeling, and statistics.

The approach is a) to develop a rigorous mathematical and computational framework for building the lowest-dimensional model that can capture the dominant behavior of the system of interest, b) to develop new and more efficient methods for searching the design "trade space," and c) to improve the efficiency of the evaluation of the physics-based models. Topics of interest include, but are not limited to:

- methods for computing reduced-order bases (ROBs) which offer simultaneously sparsity, computational efficiency, and numerical stability, with the goal of optimal exploration of the parameter space
- global error bounds for methods for computing ROBs which offer both sparsity and stability
- efficient methods for determining the optimal dimension of the low-order representations of a given computational model

III. WHITE PAPER SUBMISSION

White papers should not exceed four (4) single-sided pages, exclusive of cover page and resume of principal investigator, and should be in 12-point Times New Roman font with margins not less than one inch. The cover page should be labeled "White Paper for 2011 Basic Research Challenge: Reduced-Order Representations for Design" and include the following information: title of the proposed effort, proposer's technical point of contact, telephone number, fax numbers, and e-mail address. The four (4) page body of the white paper should include the following information: (1) Principal Investigator; (2) Relevance of the proposed effort to the

research areas described in Section II; (3) Technical objective of the proposed effort; (4) Technical approach that will be pursued to meet the objective; (5) A summary of recent relevant technical breakthroughs; and (6) A funding plan showing requested funding per fiscal year. A resume of the principal investigator, not to exceed one (1) page, should also be included after the four (4) page body of the white paper.

Although not required, white papers are strongly encouraged for all offerors seeking funding. Each white paper will be evaluated by the Government to determine whether the technology advancement proposed appears to be of particular value to the Department of the Navy. Initial

Government evaluations and feedback will be issued via e-mail notification from the ONR Technical Point of Contact. The initial white paper appraisal is intended to give entities a sense of whether their concepts are likely to be funded.

Detailed Full Proposals (Technical and Cost volumes) will be subsequently encouraged from those Offerors whose proposed methodologies have been identified through the above referenced e-mail as being of “particular value” to the Government. However, any such encouragement does not assure a subsequent award. Full Proposals may also be submitted by any offeror whose white paper was not identified as being of particular value to the Government or from any offeror who did not submit a white paper.

For white papers that propose efforts that are considered of particular value to the Navy but either exceed available budgets or contain certain tasks or applications that are not desired by the Navy, ONR may suggest a full proposal with reduced effort to fit within expected available budgets or an effort that refocuses the tasks or application of the technology to maximize the benefit to the Navy.

White papers shall be submitted electronically to the program technical points of contact, Dr. Reza Malek-Madani at reza.malekmadani@navy.mil, Dr. Luise Couchman at luise.couchman@navy.mil and Dr. Donald Wagner at don.wagner@navy.mil. These white papers shall be in Microsoft Word or Adobe PDF format.

To ensure full, timely consideration for funding, white papers should be submitted **no later than Tuesday, 01 March 2011**. White papers received after that date will be considered as time and availability of funding permit.

The planned date for completing the review of white papers is **15 March 2011**.

IV. FULL PROPOSAL SUBMISSION AND AWARD INFORMATION

Full proposals (including one technical volume and one cost volume) should be submitted under ONRBAA11-001 by **15 April 2011**. Full Proposals received after that date will be considered as time and availability of funding permit.

ONR anticipates only **grants** will be issued for this effort. All full proposals must be submitted through Grants.gov website located at <http://www.grants.gov/>. The following information must be completed as follows in the SF 424 to ensure that the application is directed to the correct individual for review: Block 4a, Federal Identifier: enter N00014; Block 4b, Agency Routing Number: Enter the Program Office Code (i.e., 311) and the Program Officer’s name, last name first, in brackets (i.e., [Malek-Madani, Reza]). Applicants who fail to provide a Department code identifier may receive a notice that their proposal will be rejected.

ONR plans to fund eight (8) to ten (10) individual awards with a value of \$100,000 to \$150,000 per year, using Basic Research funds. However, lower and higher cost proposals will be considered. The period of performance for projects may be from one (1) to four (4) years.

Although ONR expects the above described program plan to be executed, ONR reserve the right to make changes.

Funding decisions should be made by **01 May 2011**. Projects will have an estimated grant award date of **01 June 2011**.

V. POINTS OF CONTACT

In addition to the points of contact listed in ONRBAA11-001, the specific points of contact for this announcement are listed below:

Technical Points of Contact:

Dr. Reza Malek-Madani, Program Officer, reza.malekmadani@navy.mil

Dr. Luise Couchman, Program Officer, luise.couchman@navy.mil

Dr. Donald Wagner, Program Officer, don.wagner@navy.mil

Business Point of Contact:

Lynn Christian, Contract Specialist, Email Address: lynn.christian@navy.mil