

Special Notice 13-SN-0020
Special Program Announcement for 2013 Office of Naval Research
Research Opportunity:
Select Topics in Materials Research Technology

I. INTRODUCTION

This announcement describes a research thrust, entitled “Select Topics in Materials Research Technology,” to be launched under the ONRBAA13-001, Long Range Broad Agency Announcement 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 the following sections of ONR BAA13-001:

Topic #1 - Powder-Processing of Large Metal Structural Components:
Section I, entitled “General Information”, sub-section 6, entitled “Research Opportunity Description”, the “Sea Warfare and Weapons Department (Code 33)” item, paragraph 2), subparagraph b, entitled “Structural Materials”.

Topic #2 - Applied Research in Scaling Promising Dielectric Films for Wound Film Capacitors:
Section I, entitled “General Information”, sub-section 6, entitled “Research Opportunity Description”, the “Sea Warfare and Weapons Department (Code 33)” item, paragraph 2), subparagraph a, entitled “Functional Materials”.

The submission of proposals, their evaluation and the placement of research grants will be carried out as described in that Broad Agency Announcement.

The purpose of this announcement is to focus attention of the scientific community on (1) the areas to be studied, (2) for dialogue amongst those interested in these areas, and (3) the planned timetable for the submission of white papers and proposals.

II. TOPIC DESCRIPTION

The selected topics in this special notice are designed to address research and technology gaps in the area of materials research technology in ONR’s current program portfolio. The program will pursue early applied research in several specific topics that complement and enhance existing programs in related areas by demonstrating and validating integrated computational materials engineering concepts to accelerate development and insertion of advanced materials for naval applications.

Objective:

The Office of Naval Research (ONR) is interested in receiving proposals on the following research topics:

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Topic #1 - Powder-Processing of Large Metal Structural Components

Topic #2 - Processing Science to Enable Scale-up of Dielectric Films for Wound Film Capacitors

The *objective* of this announcement is to encourage research and innovation in these selected topic areas and to foster technology transition that benefits future war-fighters and meets Navy needs.

The program will address technical challenges in each of the selected areas:

Topic #1 - Powder-Processing of Large Metal Structural Components:

Compared with other manufacturing options, powder processing is relatively expensive and often not a compelling choice for production. There are cases, however, where metal powders are the preferred form of the material. One example is the production of low-cost titanium alloys, and another example consists of the so-called high temperature aluminum alloys. These materials offer compelling arguments for use in manufacturing, either mechanical properties or affordability. The production of these materials into components, and certification for application, present processing and manufacturing challenges to industry. The objectives of this project are to develop the tools and models needed to design an alloy and processing scheme for a powder-metallurgy structural component, and to verify and validate those tools using the pilot-scale processing of a test component. Research and development work in the following areas. 1) Characterization of the microstructures and mechanical properties of consolidated powder-metal alloys. 2) Modeling of unit step operations associated with the production of parts from powder metals, including such simple operations as degassing, cold compaction, and sintering; but also complex operations such as plasma deposition and powder extrusion. 3) Process cost modeling, and stochastic multi-step process optimization techniques allowing multiple paths and multiple objectives.

Topic #2 - Processing Science to Enable Scale-up of Dielectric Films for Wound Film Capacitors:

Dielectric materials for wound film pulsed power capacitor applications capable of surpassing the stored energy density of the state-of-the art biaxially-oriented polypropylene (BOPP) have recently been demonstrated at the fundamental research level. In order to assess the viability of these new materials in wound film capacitors, their films must be scaled with retention of the desired electronic properties and with sufficient mechanical strength to enable handling for the multi-step capacitor fabrication process. The energy storage capability of a dielectric film can be strongly enhanced by processing-induced morphological changes and strongly decreased by processing-induced flaws and property variations. This topic will explore enabling approaches to scale and process promising dielectric films from laboratory cast or pressed thin films samples to rolls of film produced through continuous casting or extrusion based roll-to-roll processes used to produce wound film capacitors. Development of dielectric films that will yield higher energy storage densities than BOPP in kilohertz applications, have dielectric losses less than 0.3% and retain at least 90% of room temperature performance to at least 125C is desired. This program involves several interrelated tasks which include but are not limited to: (1) selection

and/or development of dielectric films with the potential for energy storage density greater than BOPP based on models for capacitor performance and costs of materials and processing; (2) development of tools and processes to assess whether the materials candidates can be processed/scaled; (3) development of tools and processes to understand/optimize processing of candidate dielectric films; (4) validation through demonstration of improved dielectric film performance in laboratory wound film capacitors. The research effort should provide improved understanding of the relationships between processing, morphology, flaws, impurities, property variation within the processed film, etc... and dielectric performance. Projects may span multiple promising dielectric materials and multiple processing approaches.

III. No events are planned

IV. WHITE PAPER SUBMISSION

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 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 Proposal (Technical and Cost volumes) will be subsequently encouraged from those Offerors whose proposed technologies 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 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 should not exceed 4 single-sided pages, exclusive of cover page, references, and resume(s) of principal investigator(s), and should be in 12-point Times New Roman font with margins not less than one inch. White papers shall be in Adobe PDF format (preferred) or in Microsoft Word format compatible with MS Office 2007.

The cover page should be labeled “White Paper for ONR 2013 Research Opportunity: Select Topics in Materials Research Technology, Topic #1 - Powder-Processing of Large Metal Structural Components” or “White Paper for ONR 2013 Research Opportunity: Select Topics in Materials Research Technology, Topic #2 - Processing Science to Enable Scale-up of Dielectric Films for Wound Film Capacitors”. The title page should include the following information: title of the proposed effort, technical point of contact, telephone number, fax numbers, and e-mail address.

The 4-page body of the white paper should include the following information:

- (1) Principal Investigator(s);
- (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.

Resume(s) of the principal investigator(s), not to exceed 1 page per principal investigator, should also be included after the 4-page body of the white paper.

White papers shall be submitted to the ONR 332 secure upload site: <https://onroutside.onr.navy.mil/aspprocessor/332Materials/> and using the naming convention specified below.

Please use the following naming convention to ensure routing to the appropriate topic author(s):

- Format: 13-SN-0020_Topic #_Topic ONR POC_Brief Description_Your Name_DateSubmitted
- Example: 13-SN-0020_Topic 1_Mullens_White Paper_JSmith_23DEC2012

To ensure full, timely consideration for funding, white papers should be submitted **no later than** 25 JUL 2013. 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 12 SEP 2013.

V. FULL PROPOSAL SUBMISSION AND AWARD INFORMATION

Full proposals should be submitted under **ONRBAA13-001** by 17 OCT 2013. Full Proposals received after that date will be considered as time and availability of funding permit.

ONR anticipates that both grants and contracts will be issued for this effort.

Full proposals for contracts should be submitted in accordance with the instructions at Section IV, Application and Submission Information, item 2.b, Full Proposals and item 6, Submission of Full Proposals for Contracts, Cooperative Agreements, and Other Transactions. The Technical Proposal/Content shall be single spaced and not exceed 20 pages. The cover page, resumes, bibliographies, project schedule, and table of contents are excluded in the page count.

Full proposals for contracts shall be submitted to the ONR 332 secure upload site:

<https://onroutside.onr.navy.mil/aspprocessor/332Materials/> and using the naming convention specified below. Each document should be uploaded individually to the site.

Please use the following naming convention to ensure routing to the appropriate topic author(s):

- Format: 13-SN-0020_Topic #_Topic ONR POC_Brief Description_Your Name_DateSubmitted
- Example: 13-SN-0020_Topic 1_Mullens_Technical Proposal Content_JSmith_23DEC2012

Full proposals for grants should be submitted in accordance with the instructions at Section IV, Application and Submission Information, item 5, Submission of Grant Proposals through Grants.gov. All full proposals for grants must be submitted through 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 three (3) digit Program Office Code and the Program Officer’s name as shown below:

Topic #1: “332 (Mullins, William)”

Topic #2: “332 (Armistead, Paul or Anderson, Michele)”

All attachments to the application should also include this identifier to ensure the proposal and its attachments are received by the appropriate Program Office.

Topic #1:

ONR plans to fund up to two (2) awards with an approximate value of up to \$2,500,000 per award for a total period of performance of 36 months. Although the tools and techniques envisioned to result from this project are of wide utility, ONR expects that focus on a single component or product will impose the inter-tool compatibility and communications necessary for a truly integrated design toolset. For that reason, each proposed project must address the full topic area; must concentrate on the design and manufacture of a relevant component or product of potential military interest; and must include a diverse group of team members with experience in component or product design, along with significant capabilities in powder production and consolidation, process modeling, and materials structure/property relationships consistent with the topic description.

Topic #2:

ONR plans to fund up to two (2) awards with an approximate value of up to \$2,500,000 per award for a total period of performance of 36 months. Each proposed program must address the full topic with team members with significant capabilities in film processing, capacitor design and manufacturing, process modeling, and materials structure/property relationships consistent with the topic description.

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

Funding decisions should be made by 14 NOV 2013. Selected projects will have an estimated award date of 03 APR 2014.

VI. SIGNIFICANT DATES AND TIMES

Event	Date	Time
Recommended White Paper Submission Date*	25 JUL 2013	1400
Notification of White Paper Valuation*	12 SEP 2013	
Recommended Full Proposal Submission	17 OCT 2013	1400
Notification of Selection: Full Proposals *	14 NOV 2013	
Awards *	03 APR 2014	

Note: * These are approximate dates.

VII. POINTS OF CONTACT

In addition to the points of contact listed in ONRBAA13-001, the specific points of contact for this announcement are listed below:

Technical Points of Contact:

Topic #1: Dr. William Mullins, Program Officer, Code 332, william.m.mullins@navy.mil
 Topic #2: Dr. Paul Armistead, Program Officer, Code 332, paul.armistead@navy.mil
 Alternate Technical Point of Contact for Topic #2: Dr. Michele Anderson, Program Officer, Code 332, michele.anderson1@navy.mil

Business Point of Contact:

All Topics: Ms. Heather Land, Contract Specialist, Code 253, heather.land@navy.mil

VIII. SUBMISSION OF QUESTIONS

Any questions regarding this announcement must be provided to the Technical Points of Contact and/or the Business Point of Contact listed in Section VII above. All questions shall be submitted in writing by electronic mail.

Answers to questions submitted in response to this Special Notice will be addressed in the form of an Amendment and will be posted to the following web pages:

- Federal Business Opportunities (FEDBIZOPPS) Webpage – <https://www.fbo.gov/>
- Grants.gov Webpage – <http://www.grants.gov/>

- ONR Special Notice Webpage - <http://www.onr.navy.mil/Contracts-Grants/Funding-Opportunities/Special-Notices.aspx>

Questions regarding **White Papers or Full Proposals** should be submitted NLT two weeks before the dates recommended for receipt of White Papers and/or Full Proposals. Questions after these dates may not be answered.