

**Office of Science
Financial Assistance
Funding Opportunity Announcement
DE-PS02-09ER09-21**

***Computational Science Research
for Ice Sheet Modeling***

The Office of Advanced Scientific Computing Research (ASCR) of the Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving applications for Computational Science/Applied Mathematics (AM)/Computer Science (CS) research to accelerate scientific and computational breakthroughs that can improve the representation of ice sheets and their dynamics in state-of-the-science Climate Models. Applications should complement DOE SC funded climate modeling efforts and evidence partnerships and/or collaborations with such efforts in the model of the DOE SC SciDAC (Scientific Discovery through Advanced Computing) Program.

Content Guidelines:

Applications should justify the impact of the proposed computational science research on advancing dynamical ice sheet modeling at the petascale for improved understanding and prediction of global climate. Topics and content may include incorporation of scalable and parallel petascale solvers and unstructured or structured grids into coupled models that include ice sheet dynamics; performance and load balancing studies that improve scalability and performance; uncertainty quantification and verification/validation, as well as parallel I/O and technologically robust petascale data archival, retrieval, management and visualization techniques and tools.

Structure and Organizational Guidelines:

- (i) Applications should show clear evidence of collaborations and/or partnerships with BER-ASCR funded SciDAC Projects and/or BER funded climate modeling efforts and enhance these efforts.

- (ii) Applications should clearly articulate management plans for the project and communication procedures for the collaborations and/or partnerships.

More information on this announcement is provided in the Supplementary Information below.

APPLICATION DUE DATE: May 26th, 8 PM Eastern Time

Formal applications submitted in response to this Announcement must be received by May 26, 2009, 8:00 p.m. Eastern time, to permit timely consideration of awards. **You are encouraged to**

transmit your application well before the deadline. APPLICATIONS RECEIVED AFTER THE DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.

ATTENTION - CHANGE IN SUBMISSION REQUIREMENT EFFECTIVE March 12, 2009

The Office of Science is now requiring all financial assistance applications be submitted through the Department of Energy e-Center (IIPS) <http://doe-iips.pr.doe.gov/>. Applicants will still need to visit the Grants.gov website <http://www.grants.gov/> to download the required Application Package (forms), by clicking on "Apply for Grants" and searching for the Funding Opportunity Announcement.

For Instructions on the Use of IIPS visit this web page, IIPS Instructions.
<http://www.sc.doe.gov/grants/iips-Instructions.html>

Registration Requirements: There are several one-time actions you must complete in order to submit an application through Grants.gov (e.g., obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, register with the Central Contract Registry (CCR), register with the credential provider, and register with Grants.gov). See <http://www.grants.gov/GetStarted>. Use the Grants.gov Organization Registration Checklist at <http://www.grants.gov/assets/OrganizationRegCheck.doc> to guide you through the process. Designating an E-Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in the CCR registration process. Applicants, who are not registered with CCR and Grants.gov, should allow at least 21 days to complete these requirements. It is suggested that the process be started as soon as possible.

FOR FURTHER INFORMATION CONTACT: Lali Chatterjee, Telephone: (301) 903- 7379;
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SUPPLEMENTARY INFORMATION:

One of the largest uncertainties in current climate assessments is the rate of sea level rise arising from rapid dissipation of ice sheets as pointed out in the joint ASCAC-BERAC Report in March 2008. The report, which can be viewed at <http://sc.doe.gov/ascr/ASCAC/Reports/JointASCAC-BERACReport.pdf> identifies the need to include fully dynamic ice sheet models and ocean/ice shelf interactions to assess the rate and magnitude of sea level rise due to rapid ice sheet melting as a high priority for climate models.

This announcement is seeking applications that strengthen current research investments jointly funded by ASCR-BER in the SciDAC program, or individually by either Office in the area of interactive ice sheet dynamics in climate models. Research areas may include land and sea ice, motion and dynamics of mountain glaciers, and/or breaking of the polar ice sheets.

Suggested tasks should include (but are not limited to) one or more of the following:

- (i) Create innovative algorithms or adapt existing ones for proper inclusion of interactive ice sheet modeling into climate codes. Challenges include developing parallel and scalable elliptic and other solvers, use of unstructured grids or specific geometries, achieving high single node performance, scaling to thousands of nodes and tens-of-thousands of processors, and portability across computer architectures.
- (ii) Undertake performance engineering studies that test and improve coupling and performance of ice sheet dynamics code components, their inter connections and their interfacing with the more extensive climate codes.
- (iii) Create or adapt sophisticated data management and visualization techniques and tools including parallel I/O, data sharing and data management techniques to advance ice sheet dynamics modeling.
- (iv) Identify and undertake verification and validation studies and uncertainty quantification to strengthen the reliability, analysis and prediction capabilities of computational climate modeling codes that include dynamic ice sheet representation.
- (v) Develop frameworks for code parallelization and scaling for ice sheet dynamics that could be adaptable and/or transferable to other climate model code components.

Additional information about the ScIDAC Program and projects can be found at:

<http://www.scidac.gov> and information about ASCR and BER can be found at:

<http://sc.doe.gov/ascr/> and http://www.sc.doe.gov/ober/CCRD_top.html respectively.

Collaboration and Communication

The application should identify potential collaborations or other interactions that will facilitate the exchange of ideas and dissemination of information among research centers in industry, universities, and/or laboratories. Synergistic collaborations with researchers in Federally Funded Research and Development Centers (FFRDCs), including the DOE National Laboratories, are also encouraged, though no funds will be provided to these organizations under this Announcement. Further information on preparation of collaborative applications may be accessed via the internet at: <http://www.sc.doe.gov/grants/Colab.html>

ESTIMATED FUNDING

It is anticipated that up to \$3 million total will be available for multiple awards for this announcement in Fiscal Year 2009. Proposers may request project support for up to three years. All awards are contingent on the availability of funds and programmatic needs. DOE is under no obligation to pay for any costs associated with the preparation or submission of an application. DOE reserves the right to fund, in whole or in part, any, all or none of the applications submitted in response to the Announcement.

MERIT REVIEW CRITERIA

Applications will be subjected to scientific merit review (peer review) and will be evaluated against the following evaluation criteria, which are listed in descending order of importance codified at CFR 605.10(d):

1. Scientific and/or Technical Merit of the Project, including its relationship to other ongoing research. (This will include evaluation of the required partnership criteria indicated above)
2. Appropriateness of the Proposed Method or Approach
3. Competency of Applicant's Personnel and Adequacy of Proposed Resources; and
4. Reasonableness and Appropriateness of the Proposed Budget.

The evaluation process will include program policy factors, such as the relevance of the proposed research in terms of the announcement and the agencies' programmatic needs. Note that external peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. Both Federal and non-Federal reviewers may be used, and submission of an application constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

The Catalog of Federal Domestic Assistance (CFDA) number for this program is 81.049, and the solicitation control number is ERFAP 10 CFR Part 605.

Posted on the Office of Science Grants and Contracts Web Site
May 1, 2009.