



**National Science Foundation**  
4201 Wilson Boulevard  
Arlington, Virginia 22230

**NSF 10-039**

## **Dear Colleague Letter: Opportunities for the Mathematical and Physical Sciences in Earth System Modeling solicitation**

Dear Colleague,

Through new funding opportunities for innovative and interdisciplinary research, the National Science Foundation will expand the scientific community's engagement in climate research ([http://www.nsf.gov/pubs/2010/nsf10040/nsf10040.jsp?WT.mc\\_id=USNSF\\_80](http://www.nsf.gov/pubs/2010/nsf10040/nsf10040.jsp?WT.mc_id=USNSF_80)), a National priority.

The scientific quest to understand and predict climate variability and change is among the most pressing and daunting challenges of our time. Through the recently announced Decadal and Regional Climate Prediction using Earth Systems Models (EaSM) solicitation ([http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=503399&org=NSF&sel\\_org=NSF&from=fund](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503399&org=NSF&sel_org=NSF&from=fund)), NSF seeks to support interdisciplinary research that advances the state of climate prediction. Transformative and timely progress may depend on harnessing fresh thinking from communities new to this area of research. The mathematical and physical sciences underpin fundamental processes governing earth systems; scientists from the MPS community, partnering with researchers from other disciplines, can bring innovative perspectives that may enable advances in sophistication and accuracy in understanding and modeling these processes, for example leading to improvement in decadal and regional climate prediction.

Interdisciplinary proposals are solicited to develop the next-generation Earth System Models that include coupled and interactive representations of ecosystems, agriculture working lands and forests, biogeochemistry, atmospheric chemistry, the water cycle, land ice, and human activities. The overall solicitation goals are to:

- achieve comprehensive, reliable global and regional predictions of decadal climate variability and change through advanced understanding of the coupled physical, chemical, biological and human processes that drive the climate system;
- quantify the impacts of climate variability and change on ecological, agricultural and human systems, and quantify the feedbacks from these systems to climate;
- maximize the utility of available observational and model data for impact and vulnerability assessments through up/downscaling activities; and
- effectively translate model results and associated uncertainties into the scientific basis for well-informed human adaptation to and management decisions for climate change.

Two categories of proposals will be entertained in this competition. Type 1 proposals (up to \$300,000/yr for up to 3 years) are for incubator and capacity/community-building activities that foster new forays into this exciting frontier. Type 2 proposals (above \$300,000/yr for 3-5 years) are for collaborative inter/multidisciplinary activities, and are well suited for investigators who are already engaged in this research.

Grand challenges such as these cannot be met in isolation. Diverse teams of experimental, theoretical, modeling and computational researchers are required to advance the field of Earth System Modeling. We encourage the mathematical and physical sciences communities to consider contributing fresh ideas to this important area through this exciting opportunity for transformative research and education.

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