



NATIONAL SCIENCE FOUNDATION
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NSF 18-052

Dear Colleague Letter: Space Weather Operations-to-Research Proposals

March 9, 2018

Dear Colleague:

The Atmospheric and Geospace Sciences and Astronomical Sciences Divisions are supporting the National Space Weather Action Plan (SWAP) by calling for proposals to either of two existing programs as part of a 1-year pilot program that will facilitate operations to research (O2R) activities needed to improve space weather prediction. O2R covers a broad range of activities designed to ultimately improve operational capabilities and fundamental research related to these needs. This can include testing, evaluating, and enhancing operational models.

The [National Space Weather Action Plan \(SWAP\)](#) released by the National Science and Technology Council describes actions that are needed to improve the understanding of, forecasting of, and preparedness for space weather events. An overarching theme of the SWAP is the need for collaboration amongst the research and operational communities. A key aspect of this collaboration is the research to operations (R2O) and operations to research (O2R) pipeline. Recognizing the challenges related to this pipeline, SWAP Actions 5.6.1 and 5.6.2 call upon agencies, including the National Science Foundation (NSF), to support efforts to facilitate the transition of space weather data and modeling capabilities to the Nation's space weather prediction providers and provide feedback from prediction providers to the research community on new research activities needed to improve the operational models.

NSF, the National Aeronautics and Space Administration (NASA), and the National Oceanic and Atmospheric Administration (NOAA), are conducting independent pilot activities to support O2R investigations. For this initial 1-year pilot program the agencies have identified the following focus area for research and development to advance solar wind and solar wind disturbance models:

- Improve forecasts of the background solar wind, solar wind structures, and coronal mass ejections using solar and solar wind data and models, if possible employing data assimilation techniques.

The models used by NOAA are available for this research and development. NOAA currently uses the Wang-Sheeley-Arge (WSA) and the Enlil model for its operational forecasts of the solar wind and the propagation of coronal mass ejections from the Sun to Earth. Research is solicited that

targets improved forecasting capabilities. This could involve, for example (but not exclusively), using observations to improve the initialization of the models (e.g., the background solar wind and coronal mass ejections), to update model runs during their execution, or to select from a set of ensemble runs. This research could utilize existing versions of the models, available either at NOAA Space Weather Prediction Center or the NASA-NSF funded Community Coordinated Modeling Center (CCMC), or collaborations could potentially be formed with the WSA and/or Enlil model owners to investigate modifications to the model source code. Proposed research involving modifications to the models must be arranged with the model owners, and the details of the arrangements must be clearly described in the proposal. Any modifications to the WSA and/or Enlil models must be made available to the CCMC, which is the current repository for the development versions of these models, and for use in NOAA operations.

Investigators are reminded that NSF's primary role in developing space weather readiness for the nation is in the support of basic research that advances fundamental understanding of space weather and related processes. This includes the generation of solar storms, their propagation through the interplanetary medium, and their impact on the near-Earth space environment. NSF-supported community members draw upon that research in the development of models for these space weather processes. These models often utilize observations from NSF's persistent ground-based observational platforms, among others, to test and further refine our community's understanding of space weather. Among the goals of these NSF-funded research activities are to benefit society and contribute to the achievement of specific desired societal outcomes, such as improving space weather predictive capabilities.

As previously mentioned, NASA is conducting on behalf of itself and NOAA an independent program supporting space weather O2R investigations related to the focus area. Investigators are encouraged to see if their proposed research topic is better aligned with NASA and NOAA's role and goals before submitting proposals to the NSF. Program officers at NSF will check with counterparts at NASA to ensure that no duplicative awards are made.

NSF will begin initial consideration of proposals 60 days after the release of this Dear Colleague Letter. Proposals addressing the focus area and aligned with NSF's role in the space weather program can be submitted to either the Solar Terrestrial Research (STR) Program or the Solar and Planetary Research Grants (SPG) Program, as appropriate. All proposal titles should begin with the words "Space Weather O2R:". Funding may be requested for one year and a maximum amount of \$250K.

It is anticipated that in FY2018 the total amount of funding for this pilot program will be \$500K. It is anticipated that up to two awards will be supported with an average award size of \$250K. Proposals will be reviewed using standard NSF procedures per the [NSF Proposal and Award Policies and Procedures Guide](#).

Sincerely,

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