



National Science Foundation
4201 Wilson Boulevard
Arlington, Virginia 22230

NSF 13-006

Dear Colleague Letter: Interdisciplinary Research in Hazards and Disasters (Hazards SEES)

DATE: October 12, 2012

Dear Colleague,

The Division of Mathematical Sciences (DMS) announces its participation in a multi-directorate NSF Program: Interdisciplinary Research in Hazards and Disasters (Hazards SEES), [NSF 12-610](#). A variety of factors are contributing to escalating personal and financial costs resulting from disasters linked to natural phenomena. The Hazards SEES Program is aimed at addressing the critical need for scientific research into the understanding of natural and technological hazards linked to natural phenomena. The objective of such research is to help mitigate the effects of hazards, and to prepare for, respond to, and recover from disasters. DMS will play an important role in this activity. The mathematics and statistics communities have been engaged in such investigations in the past, frequently with partners from other disciplines. The participation of DMS in the new solicitation is intended to broaden the involvement of these communities in larger scale investigations which will help reduce the increasing personal and financial costs of disasters brought on by natural and technological hazards. DMS recognizes the potential in its communities to address this need and anticipates DMS investigators will join with other disciplines to submit proposals which will contribute to these issues of national and global importance.

The following list provides some examples of interdisciplinary research related to hazards where mathematicians and statisticians can play a role:

- Developing interdisciplinary models that link and couple risk assessment between systems. For instance, coupling tropical cyclone predictions, ocean wave models, and surge models with damage assessment and population evacuation and dislocation models to capture the effects of cascading hazards moving from one system to another and to assess the vulnerability and risk accordingly;
- Linking seismic and wind models of hazard impacts with infrastructure and structural damage models with business interruption models, coupled with population displacement and dislocation estimation models to develop new knowledge and policies to minimize casualties and damage during a hazardous event;
- Developing improved multi-scale, time-dependent models, mathematical and statistical models, data analytics, computational simulators, and data visualization techniques that integrate physical, chemical, biological, social, behavioral, and economic data to better

understand fundamental processes related to natural hazards, forecast or predict the occurrence and consequences of these events, and to quantify the uncertainty in predictions;

- Developing techniques that optimize siting of sensors and advance techniques to assimilate current and next-generation of observations that improve forecasts of environmental contributions to hazards; and integrate these technical improvements with increased understanding of human, organizational, and community responses to these forecasts.

Further details about Hazards SEES program can be found at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504804&org=DMS&from=home

As indicated in the solicitation, Hazards SEES will support two types of awards:

Type 1: These proposals forge new or emerging interdisciplinary teams to develop ideas and approaches through either: (a) exploratory research that could, for example, mine, integrate, and synthesize existing data sets, collect limited new data, conduct modeling experiments, test new integrative approaches, and/or identify new conceptual ideas and key gaps in knowledge and methods; or (b) networking activities that would foster communication/coordination and promote new collaborations among scientists and engineers with diverse expertise across disciplinary, organizational, institutional, geographical and/or international boundaries. The inclusion of early career researchers and, where appropriate, postdoctoral researchers, graduate students, and undergraduate students in Type 1 projects is encouraged. Type 1 proposals are expected to range up to \$300,000 for up to two years.

Type 2: These proposals support interdisciplinary research to conduct major new integrated hazards research. These may include theoretical, field, laboratory, and/or modeling activities. Type 2 proposals are expected to range up to \$3,000,000 for up to four years.

We look forward to receiving creative and innovative proposals in response to this Program Solicitation and encourage you to contact us if you have any questions.

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Sincerely,

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