

NSF SUPPORT OF TROPICAL CYCLONE RESEARCH

Michael C. Morgan

Atmospheric and Geospace Sciences Division, NSF



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Outline

- Mechanisms
- Programs
- Ongoing and future opportunities
 - NSF's Hazards SEES
 - NSF RAPID program
 - NSF-NOAA Visiting Scientist Program
 - National Ensemble Project
 - Prediction and Resilience against Extreme **EVENTS**
(PREEVENTS)

NSF's investments in building capacity

- Support for students, post-docs, and faculty through unsolicited and solicited proposals, and NCAR
- Support for undergraduates (REUs)
- Support for graduate students (GRFs)
- Support for post-doctoral researchers (PRFs)
- Support for early career faculty (CAREER)
- Support for Rapid Response Research (RAPIDs)

NSF programs supporting tropical cyclone relevant research

- Geosciences
 - Atmospheric and Geospace Sciences (P: PDM, CLD)
 - Ocean Sciences (D)
 - Earth Sciences (D)
- Engineering
 - Hazard Mitigation and Structural Engineering (P)
 - Infrastructure Management and Extreme Events (P)
- Social, Behavioral, and Economic Sciences
 - Geography and Spatial Sciences Program (P)

AGS Investments



Hazards SEES

- The overarching goal of NSF's Hazards SEES program is to catalyze well-integrated *interdisciplinary* research efforts in hazards-related science and engineering ... to improve the understanding of natural hazards [...], mitigate their effects, and to better prepare for, respond to, and recover from disasters = preventing hazards from becoming disasters.
- Hazards SEES aims to make investments in strongly interdisciplinary research that will reduce the impact of such hazards, enhance the safety of society, and contribute to sustainability.

Hazards SEES seeks to:

- (1) advance understanding of the fundamental processes associated with specific natural hazards and technological hazards linked to natural phenomena, and their interactions;
- (2) better understand the causes, interdependences, impacts and cumulative effects of these hazards on individuals, the natural and built environment, and society as a whole; and
- (3) improve capabilities for forecasting or predicting hazards, mitigating their effects, and enhancing the capacity to respond to and recover from resultant disasters.

Hazards SEES seeks to:

- **Type 1:** These proposals forge new or emerging interdisciplinary teams to develop ideas and approaches through either: (a) exploratory research; or (b) networking activities that would foster communication/coordination and promote new collaborations among scientists and engineers with diverse expertise across disciplinary, institutional, and/or international boundaries.
- **Type 2:** These proposals support interdisciplinary research to conduct major new integrated hazards research. These may include theoretical, field, laboratory and/or modeling activities.

Hazards SEES Awards

- **Type 1:** Real-time geospatial infrastructure modeling for disaster response and rapid recovery: Craig Glennie, Univ. of Houston
- **Type 2:** In hot water and harm's way: Modeling to promote regional resilience to repeated heat waves and hurricanes: Seth Guikema, JHU
- **Type 2:** Hazard prediction and communication dynamics in the modern information environment: Rebecca Morss, NCAR
- **Type 2:** Dynamic integration of natural, human, and infrastructure systems for hurricane evacuation and sheltering; Rachel Davidson, Univ. of DE

Rapid Response Research (RAPID)

- The RAPID funding mechanism is used for proposals having an urgency with regard to availability of, or access to data, facilities or specialized equipment, including quick-response research on natural or anthropogenic disasters and similar unanticipated events.
- PI(s) must contact the NSF program officer(s) whose expertise is most germane to the proposal topic before submitting a RAPID proposal.

RAPID examples

- Post-Sandy: to understand the roles of social networking and mobile technology in decision-making regarding whether, when, and how to evacuate during large-scale evacuation events.
- Post-Sandy: research is needed to find out what actually happened in the forecast communication process and make recommendations for improvement. Results gathered will contribute to investigating ways for improving storm forecast communication to promote public safety and reduce hurricane costs. If the increasing ability of the NHC to make accurate storm surge forecasts is to translate into saving lives and lessening the damage and need for recovery so costly to government, the forecast communication and government response process must be understood and improved.
- Post-Sandy: project to collect perishable storm surge and structural damage data in three communities caused by Hurricane Sandy. The research will document storm surge and structural damages in three communities in the New Jersey coastal area that are located within 12 km along the coast. The collected data will improve our fundamental understanding of surge propagation over a developed coast and can produce effective coastal hazard mitigation strategies.

Opportunities within AGS and NSF

- **AGS Dear Colleague Letter**
 - *NSF/NCEP Visiting Scientist DCL is published:*
 - <http://www.nsf.gov/pubs/2013/nsf13117/nsf13117.jsp>
- **NSF solicitations**
 - *Solicitation due dates:*
 - http://www.nsf.gov/funding/pgm_list.jsp?org=NSF&ord=date

NSF-NCEP sponsored Visitor Program

- **Goal:** To provide the AGS PI community and their research groups access to NCEP models, data, and talented staff while concomitantly fostering the transfer of basic research to operations
- **Mechanism:** Dear Colleague Letter to PI community last fall highlighting this opportunity of supplements to existing NSF awards.

Visiting Scientist Opportunity

NSF

- PI reviews NOAA spreadsheet for focus areas relevant to their grant
- Contacts their cognizant program director to discuss intent
- If agreed, PI makes contact with the NCEP POC



NCEP

- NCEP POC and PI discuss compatibility and logistics.
- If agreed, PI writes draft supplemental request to submit to NCEP.
- NCEP POC gets Center Director approval and provides letter of intent to collaborate
- If approved by Center Director, PI submits supplemental request and NCEP POC letter of intent to collaborate to NSF



- NSF program director makes recommendation to support or decline request
- If approved, notification sent to NCEP by cognizant NSF program director.



VSO Begins!!

GOAL: A university-based national ensemble

To advance the national ensemble prediction capability by:

1. providing the tools necessary to accelerate research: a large, real-time ensemble database, tools to verify and interrogate ensemble output;
2. increasing accessibility and participation of the university community to this enterprise;
3. providing the non-atmospheric science community a sense of how uncertainties in prediction might be tapped for economic and societal benefit