USGS NSF Internship Opportunity

Point of Contact Name:	Stacey Archfield
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USGS Center:	Integrated Modeling and Prediction Division
Project Title:	Flood Frequency Under Change
Summary:	We are seeking candidates to work on a national synthesis to attribute observed changes in floods and/or develop and test methods to adjust flood-frequency estimates for change. The specific topic of interest within these research themes are negotiable based on the intern's particular research interests and career goals. The intern will be part of a highly collaborative, inclusive, and supportive team of USGS research scientists working on a topic of high societal relevance.
Project Hypothesis or Objectives:	Flood frequency estimates are a major consideration in hydrologic design of culverts, bridges, and other infrastructure. In using historically observed floods to determine the peak design flow, the standard methods assume stationarity, in that the design flood will occur in the future with the same probability and magnitude as determined from the historical analysis. With changes to climate, land cover, snowpack, and agricultural and land drainage practices occurring across the United States, this assumption of stationarity in the observed flood record may not be valid. It is still largely unknown how on-going and future changes may translate to changes in flood frequency and magnitude and how these changes challenge the current methodology for obtaining flood-frequency estimates. This project is designed to develop a comprehensive description of flood trends and their causes (including projected future trends) and to research appropriate ways to incorporate that knowledge into flood frequency analysis.
Duration:	Up to 12 months
Internship Location:	Reston, VA
Keywords:	Climate Change, Economics, Engineering, Geology, Hydrology, Modeling, Statistics

Applicable NSF Division:	GEO (Atmospheric, Earth Sciences, Ocean Sciences, Polar Programs), SBE (Social, Behavioral, and Economic Sciences), ENG (Engineering)
Intern Type Preference:	Any Type of Intern
Duties/Responsibilities:	Explore new approaches to the estimation of flood-frequency curves under nonstationary conditions and evaluate robustness of these methods using simulation experiments and observed data. Publication of findings in the peer-reviewed literature and presentations at technical conferences.
Expected Outcome:	Results of this project have the potential to impact infrastructure design practices across the Nation. The intern will receive mentorship, opportunities to broaden their professional network, and exposure to the USGS culture, mission and research efforts.
Special skills/training Required:	Desired candidates will have a knowledge of environmental statistics and stochastic hydrology and be proficient in R. Strong writing and communication skills are also necessary. A knowledge of hydroclimatology, extreme events, and flood-frequency analysis is preferred.