



USGS NSF GRIP, GSP Opportunity

● Point of Contact Name:	William Farmer
● Point of Contact Email:	wfarmer@usgs.gov
● USGS Center:	Office of Surface Water
● Project Title:	Evaluation of the National Streamgauge Network to Support Surface Water Characterization
● Summary:	How can our national streamgauge network evolve to meet changing demands in the coming fifty years? This is an opportunity to explore the varied uses of the U.S. Geological Survey's National Streamgauge Network and understand how it can be used to support water management across the country and how it can be more effectively designed.
● Project Hypothesis or Objectives:	<p>Quantified surface water characteristics are essential to responsible and informed management of water resources. Robust surface water characterizations support the development of water management policies, the design of infrastructure and the awareness of changing hydrology. The U.S. Geological Survey is renowned for its National-domain network of streamgages and surface water monitoring. These networks provide the direct measurements to support surface water characterization across the country, at both monitored and unmonitored locations. Changing demands and challenges facing society at large have expanded the functional role of surface water characterization. As populations grow and development expands, it is essential that the streamgauge network grow and evolve intelligently.</p> <p>Using tools from spatial statistics and econometric analysis, this project is designed to explore the current usage and coverage of the National streamgauge network. By understanding the temporal and spatial coverage, we hope to explore the suitability of the network to the needs of developing populations. Research will be driven by questions such as: What degrees of uncertainty are present in the current network structure? Can revised use or deployment of streamgages improve uncertainty characterizations? How are streamgages distributed relative to populations and infrastructure</p>

demands? How could the network be improved to support unmonitored characterization?

Duration: Up to 12 months

Internship Location: Denver, CO

Field(s) of Study: Engineering, Geoscience, Hydrology

Applicable NSF Division: EAR Earth Sciences

Intern Type Preference: Either Type of Intern

Keywords: streamgauge networks; hydrologic data; statistical analysis; network design; resources distributions; statistical hydrology

Expected Outcome: The final product will be an internal or external publication summarizing the utility and operational support provided by the national streamgauge network and how it might be improved to face new challenges. This goal will support continued professional development of the intern. This work ties in to ongoing work of the USGS Office of Surface Water and will allow USGS to accelerate progress in this priority area.

Special skills/training Required: The successful candidate will have experience in computer programming (R is currently used, but other languages are useful) and geospatial data manipulation. Furthermore, the ideal candidate will have training in watershed hydrology and an awareness of methods for transferring information across gaged and ungaged locations. Familiarity with big data manipulation is encouraged.

Duties/Responsibilities: The intern will be responsible for exploring a wide range of streamgauge information, including streamgauge locations and records, in conjunction with an analysis of infrastructure projects and population distributions. Looking both regionally and nationally, the intern will develop computer scripts to examine how network design affects the utility of surface water characterizations and the relevance to water management decisions.

Internal Information - Not to be posted:

Center Director Name: Robert Mason

USGS Responsibilities: Equipment, Facilities, Mentoring, On-boarding, Background Check, Volunteer Agreement Management, supplementary training in statistical analysis and streamgage management

Preliminary Approval: This opportunity has my Center's approval

I already have a student in mind:

Comments:
