

USGS NSF GRIP Opportunity

- **USGS Center:** National Research Program, Eastern Branch
- **Project Title:** River Corridor hot spots for biogeochemical processing: a continental scale synthesis
- **Project Hypothesis or Objectives:** Rivers are the veins of the landscape, providing environmental benefits that are disproportionately high relative to their aerial extent; shedding flood waters, hosting aquatic ecosystems, transporting solutes and energy-rich materials, and storing and transforming pollutants into less harmful forms.

However, little is known about the distribution, intermittency, and overall effectiveness of biogeochemical processing in river corridors. A better characterization of hydrological and biogeochemical processing in river networks will be useful for many purposes, from prioritizing watershed management practices in different physiographic regions to clarifying regulatory authority under the Clean Water Act.

This national-scale synthesis project aims to improve characterization of river hydrogeomorphology and its cumulative influence on water quality. This addresses a critical need to quantify relationships among hydrologic transport, biogeochemical processing, ecosystem function, and societal value. The intern will develop new data sets and a practical modeling approach incorporating transport reactions occurring in river networks to identify physical and biogeochemical controls of hyporheic zones, riparian areas, and floodplains, and to quantify their cumulative effects on water and solutes. New data and models will be used to forecast outcomes for changing water quality at the scale of the nation.

The outcomes of this project will be relevant to many water quality issues affected by fate and transport of pollutants in rivers – such as nutrients released from agricultural sites, toxic metals released from mining sites, organic contaminants released from military sites, pharmaceuticals or personal care products released from wastewater sites, and chemical additives from unconventional oil and gas well sites.

- Duration:** 12 months
- Internship Location:** Reston, VA
- Area of Discipline:** hydrology, modeling, groundwater-surface water interactions, hydroinformatics and large data set analysis, water quality, biogeochemistry of riverborne contaminants
- Expected Outcome:** The outcomes of this project will be relevant to many water quality issues affected by fate and transport of pollutants in rivers – such as nutrients released from agricultural sites, toxic metals released from mining sites, organic contaminants released from military sites, pharmaceuticals or personal care products released from wastewater sites, and chemical additives from unconventional oil and gas well sites.
- Special skills/training Required:** An intern with considerable quantitative skills and interest in river corridor modeling will be most successful. In particular, some knowledge of techniques in large data set analysis including familiarity with tools such as R statistical software, Matlab, Python or other applicable software will be of considerable benefit.
- Duties/Responsibilities:** Intern will work alongside a larger project team and will put their skills to work in a supervised side project that will be a piece of the larger work. The details of the side project will take advantage of the interns specific skills and interest, and should lead toward a publication end/or involvement in publications.
- Point of Contact or Mentor:** Jud Harvey
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