



USGS NSF Internship Opportunity

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- USGS Center:** US Geological Survey Idaho Water Science Center
- Project Title:** Operational remote sensing on the verge of changing water resources management
- Summary:** Have you ever thought that our nation’s satellites could be put to better use than watching you drink your fifth cup of coffee as you prepare for final exams? If so, then this is a project that you would enjoy. The hydrologic community is at a pivotal moment in the application of remote sensing into everyday decision making and we need you.
- Project Hypothesis or Objectives:** Current water resources management depends on networks of point data like snotel, precipitation, streamgages and ET stations to guide decision making such as operations of reservoir storage and releases. Yet as climate fluctuates and water becomes more scarce it is apparent that these techniques are no longer adequate. For three decades, remote sensing of hydrologic and land cover variables has been available within the research community, but rarely used for day-to-day decision making except for natural disaster response. The objective of this internship is to assemble remote sensing and point network data for two of the most important watersheds in Idaho and rethink/reshape how decisions could be made. More specifically, several reservoirs on the Snake River system depend on 1-2 snotel sites at high elevations in the Teton Mountains to manage reservoir storage. If remotely sensed snow cover were added to the two snotel sites it would provide snow melt information at the low and middle elevations which current operations requirements do not consider. Additionally, how could remote sensing of soil moisture and/or ET be fused into the understanding of Spring snowmelt and reservoir storage? This internship will explore these datasets and help determine which are the most meaningful metrics to describe Spring snowmelt under various climate conditions. Federal and state reservoir operators will use these results to start rethinking their management strategies.

Duration:	Up to 12 months
Internship Location:	Boise, ID
Field(s) of Study:	Engineering, Geoscience, Remote sensing
Applicable NSF Division:	EAR Earth Sciences, SMA SBE Office of Multidisciplinary Activities, EFMA Office of Emerging Frontiers and Multidisciplinary Activities, ENG Engineering, CISE Computer and Information Science and Engineering
Intern Type Preference:	NSF Graduate Research Fellow (GRF) via the Graduate Research Intern Program (GRIP)
Keywords:	water hydrology remote sensing GIS decision snow rain snowtel soil watershed reservoir
Expected Outcome:	The expected outcome is an initial framing of how water is transported and stored in mountain watersheds by fusing point and remote sensing data over the past three decades. This framework will guide how federal and state reservoir managers and irrigators can use the combined data networks to manage their resources. The current practice uses only limited snotel and streamgage data that is known to be inadequate. This project will help to build a new practice in the intermountain west. A well executed project will result in a journal publication. Also, any results will be considered by the Bureau of Reclamation, Idaho Department of Water Resources , and other agencies in the future management of reservoirs.
Special skills/training Required:	Ability to use GIS and manage datasets. Intermediate geostatistical understanding.
Duties/Responsibilities:	This project is intended to be run by the Intern with full access to USGS remote sensing data. With initial guidance on how to frame the project and continuing collaboration we intend for the Intern to be the primary PI executing the project. We had one GRIP student two years ago who we can provide as a reference. Given she will be a co-author on a key paper we think that the opportunity was a success for everyone.

Internal Information - Not to be posted:

Center Director Name: Kyle Blasch

USGS Responsibilities: Equipment, Facilities, Mentoring, On-boarding, Background Check, Volunteer Agreement Management

Preliminary Approval: This opportunity has my Center's approval

I already have a student in mind: Not at this time

Comments:
