USGS NSF GRIP, GSP Opportunity

Point of Contact Name:	Josh Koch
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USGS Center:	Alaska Science Center
Project Title:	Nutrient and weathering sources in a sub-arctic glacial basin
Summary:	This unique opportunity supplements a long-term glacier-climate-hydrology program with in-depth geochemical observations. Join our diverse team as we work to unravel biophysical connections present in southcentral Alaska's alpine glacier ecosystem.
Project Hypothesis or Objectives:	Glaciers exert strong control on stream discharge and dissolved and particulate solute loads, with implications for riverine and oceanic ecosystems. To date, glacial influence has been considered in temperate glacial systems in southeast Alaska and polar systems in Antarctica and Greenland, but observations in other areas are sparse and thus interpretations rely on substantial extrapolations. Robust understanding of a range of glacial basins is critical to predicting changes to glacial mass and stream discharge and chemistry, especially given the speed at which the Arctic is warming and changing. In 2016 the USGS glaciology group will begin measuring geochemical fluxes from glacial and non-glacial source waters in a basin that is approximately 50% ice covered, in order to inform predictions of how catchment export will shift with climate change. We will focus on major biogeochemical constituents, including carbon content and quality, major ions, trace metals, and water isotopes. These measurements will complement glacier mass balance and streamflow observations used to characterize temporal changes in the glacier volume. Project results will improve our understanding of how climate-forced changes in hydrology will impact the downstream ecosystems of coastal Alaska.
Duration:	Up to 12 months
Internship Location:	Anchorage, AK
Field(s) of Study:	Geoscience, hydrology, biogeochemistry, geochemistry, glaciology

Applicable NSF Division:	AGS Atmospheric and Geospace Sciences, EAR Earth Sciences, OCE Ocean Sciences, PLR Polar Programs
Intern Type Preference:	Either Type of Intern
Keywords:	glaciers, global change, glaciology
Expected Outcome:	The research will directly contribute to our understanding of how changes in climate are likely to perturb surface water flow and delivery of nutrients and weathering products from glacial basins to downstream ecosystems. In particular, these results may highlight how nutrient fluxes may evolve under expected changes from snow to rain during the winter season. We expect that the internship will result in a solute flux and/ore chemical evolution model as well as a manuscript of publication quality.
Special skills/training Required:	A bachelor's or master's degree in Earth science is a prerequisite. Background and experience in hydrology, biogeochemistry and/or geochemistry is desired. Scientific computing skills are central to this position. Experience with scientific programming languages such as MATLAB or Python is a plus. Glaciological field work may be an option, but is not required.
Duties/Responsibilities:	The intern will work with a strong team of USGS and academic scientists to process and interpret hydrologic, water quality, and geochemical data to be collected during summer 2016. One expected outcome will be a solute flux and/or chemical evolution model. It is expected that the later portion of the experience will be focused on manuscript preparation.