

USGS NSF GRIP Opportunity

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 USGS Center:	Crustal Geophysics and Geochemistry Science Center
 Project Title:	Development of a secondary ionization time-of-flight mass spectrometer
 Project Hypothesis or Objectives:	The objective of this project is the development of a secondary-ionization time-of flight mass spectrometer that would provide earth scientists with valuable analytical capabilities not currently available at the USGS. The project comprises three main phases; the first phase involves building and testing a modular time-of-flight mass spectrometer system (already purchased). The second phase involves designing, building, testing and developing the secondary-ionization front-end for the instrument. The third phase of the project involves the exploration of potential applications of the instrument.
 Duration:	12 months
 Internship Location:	Denver, CO
 Field(s) of Study:	Analytical instrumentation principles, design and development. The applications of this instrument span a wide range of fields of study such as, Earth science, Minerals, Environmental Health, Paleoclimate and Climate change.
 Expected Outcome:	The project will provide the USGS and the greater scientific community with an instrument that can be used to provide analytical capabilities that are currently only accessible through few other research institutes. The potential applications of the instrument extend over a wide range of fields of research and include elemental composition analyses, compound-specific analyses and isotope ratio analyses of a huge range of solid samples. The project will provide the intern with a unique opportunity to develop original instrumentation and will allow them the opportunity and means to acquire a wide range of practical skills and a

fundamental understanding of analytical instruments and measurements. The intern will also have opportunities to expand their professional network and will gain valuable work experience through their exposure to USGS researchers and their research projects.

● **Special skills/training Required:**

The only expectation of the Fellow is that they have an avid interest in instrumentation and a willingness to learn the skills necessary to build and develop instrumentation. The intern will be provided with expert instruction in the fields of instrument design, electronics, vacuum systems, precision/vacuum welding, control systems, programming and more as required.

Clearly, a predisposition toward applied science/physics might be advantageous.

● **Duties/Responsibilities:**

The Fellow will be working with an instrumentation expert to design, build and develop a state-of-the-art analytical mass spectrometer. The Fellow will be involved in all aspects of the project and will be provided with the instruction and guidance necessary and will be encouraged to work on elements of the project independently where appropriate.