



## Postdoctoral Fellow in Planetary Seismology

The Geophysical Institute (GI) at the University of Alaska Fairbanks (UAF) has an immediate opening for a postdoctoral fellow in the field of planetary seismology.

### *Project Description*

This project is funded by the Rapid Response Research program that is part of NASA's Established Program to Stimulate Competitive Research (EPSCoR).

Developing an understanding of the interior structure of Venus and its current level of geologic activity, particularly the nature and frequency of volcanic and tectonic events, are high priority goals of NASA's planetary exploration program. A network of seismometers could achieve these goals, but the desired observation period of at least weeks far exceeds the ~1-hour lifetimes of previous landers in the harsh Venusian surface conditions. NASA Glenn Research Center (GRC) has an ongoing engineering effort to develop a seismometer capable of surviving for an extended period in the Venus environment, and we are partnering with them to provide relevant scientific expertise (a preprint about this effort is here: <https://www.sciencedirect.com/science/article/abs/pii/S0032063319303563>). The GI houses the Alaska Earthquake Center (AEC) and a planetary science program with a focus on Venus geoscience. We will conduct a one-year program to develop a suitable catalog of Venus analog seismic events and to use the catalog to test elements of likely seismograph design and analysis. Over the grant period we will do the following: 1) Estimate the nature and level of seismicity on Venus guided by current understanding of the similarities and differences in Venus and Earth's lithospheric structure and tectonic styles; 2) Using seismic records from across Alaska, create an organized catalog that contains type examples of seismic events from various natural and man-made (e.g., mining explosions) sources that could serve as potential analogs for Venusian seismic sources; 3) Evaluate the ability to determine various aspects of Venus seismicity under potential seismometer restrictions; and 4) Test and evaluate possible mitigation strategies for current seismometer design limitations.

These efforts will be accomplished using AEC software and their data catalog, along with custom software developed during the proposed effort. The results of the proposed RRR work will advance seismometer design and testing efforts at GRC and will initiate a partnership between GRC and GI-UAF. The assessment of Venus seismicity and the events catalog will be useful for those considering other approaches to studying Venus seismicity and geologic activity. The methodologies employed and the mitigation methods developed will have applicability to seismology studies and instrument design efforts for other planetary bodies, including Earth, where power conservation and the ability to withstand extreme environmental conditions are important.



Dr. Robert R. Herrick

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