

**Opportunity Title:** Infrasound as a Geophysical Probe Using Earth as a Venus

Analog

**Opportunity Reference Code:** 0137-NPP-NOV23-JPL-PlanetSci

**Organization** National Aeronautics and Space Administration (NASA)

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**Application Deadline** 11/1/2023 6:00:59 PM Eastern Time Zone

**Description** The overall objective of this research is to demonstrate the feasibility of using sensitive barometers to detect infrasonic signals from seismic and explosive volcanic activity on Venus from a balloon platform. Because of Venus' dense atmosphere, seismic signatures from even small quakes (magnitude ~3) are effectively coupled into the atmosphere. The seismic signals are known to couple 60X more efficiently into the atmosphere than on Earth. The amplitude of the pressure wave relative to ambient increases with height. It was found that almost no attenuation below 80 km on Venus for frequency < 1 Hz. Whereas wind noise is a major source of background noise for terrestrial infrasonic arrays, it is anticipated that the balloon platform, which drifts with winds, will be capable of very sensitive measurements with low noise. State-of-the-art modeling results indicate that infrasound waves generated by Venus quakes faithfully replicate Rayleigh waves from quakes.

The candidate will apply techniques for discriminating upward propagating waves from a seismic event by making measurements with two or more infrasonic sensors using very sensitive barometers on a tether deployed from the balloon in a series of earth-based tests. The researcher will demonstrate and validate the technique using an artificial infrasound source in a deployment from a hot air balloon on Earth and then extend it with longer duration flights in the troposphere and stratosphere.

The research program will demonstrate an entirely new technique for studying the seismicity and interior structure of Venus. As such, it is directly relevant to the NASA's Strategic Goals, which calls for the development of techniques for this application.

**Location:**

Jet Propulsion Laboratory  
Pasadena, California

**Field of Science:** Planetary Science

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**Applications with citizens from Designated Countries will not be accepted at this time, unless they are Legal Permanent Residents of the United States.** A complete list of Designated Countries can be found at: <https://www.nasa.gov/oiiir/export-control>.

Eligibility is currently open to:

- U.S. Citizens;
- U.S. Lawful Permanent Residents (LPR);
- Foreign Nationals eligible for an Exchange Visitor J-1 visa status; and,
- Applicants for LPR, asylees, or refugees in the U.S. at the time of application with 1) a valid EAD card and 2) I-485 or I-589 forms in pending status

**Eligibility Requirements**

- **Degree:** Doctoral Degree.