

Opportunity Title: Electromagnetic field applications to subsurface research

Opportunity Reference Code: IC-16-14

Organization Office of the Director of National Intelligence (ODNI)

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How to Apply **Create and release your Profile on Zintellect** – Postdoctoral applicants must create an account and complete a profile in the on-line application system. **Please note: your resume/CV may not exceed 2 pages.**

Complete your application – Enter the rest of the information required for the IC Postdoc Program Research Opportunity. The application itself contains detailed instructions for each one of these components: availability, citizenship, transcripts, dissertation abstract, publication and presentation plan, and information about your Research Advisor co-applicant.

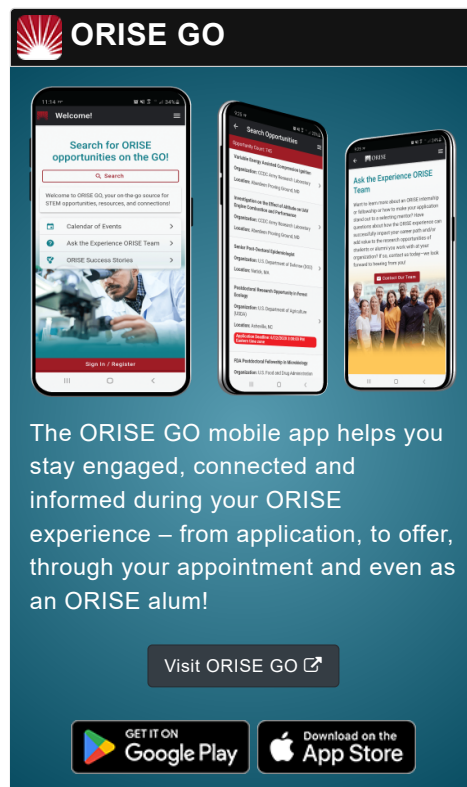
Application Deadline 4/15/2016 6:00:00 PM Eastern Time Zone

Description The goal of this project is to develop geophysical methods for subsurface characterization. Geophysicists have used electrical and magnetic methods to explore the subsurface with varying degrees of success for some time. However, typically these methods are used for mineral exploration, and often require large arrays of hardware and long collection and processing times. Electromagnetic gradiometry studies, for example, have applied magnetotelluric principles to detect manmade subsurface structures (Stolarczyk et al, 2005, Defense and Security, pp. 994-1001; McKenna et al., 2013, IEEE Transactions on Geoscience and Remote Sensing 51:1, pp. 132-139), however these methods require a local EM source to illuminate the subsurface target. It may be possible to use natural ELF/VLF radio waves, or and ELF/VLF source generated remotely at a facility such as the High-frequency Active Auroral Research Program (HAARP) in Alaska. We are interested in applications of EM methods for soil and rock characterization, determination of depth to bedrock, void detection, and groundwater characterization and/or assessment of subsurface municipal infrastructure.

Example Approaches

Proposals may be focused on theoretical, fabrication, or experimental aspects of geophysical applications of electromagnetic measurement. As such, a successful proposal could address one or more of the following questions or goals:

- Development of EM methods to rapidly detect secondary EM fields emanating from subsurface structures using natural or remote primary field generators (e.g., HAARP).
- Development of methods to rapidly process EM data to determine soil properties, depth to bedrock, or subsurface

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hydrology.

- Development of methods to assess municipal subsurface infrastructure (e.g., utility conduits, storm sewers)
- Exploration into the integration of EM detectors into small UAS platforms or other devices for use by a single person on foot.

**Eligibility
Requirements**

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
 - **Business** (11 )
 - **Chemistry and Materials Sciences** (12 )
 - **Communications and Graphics Design** (6 )
 - **Computer, Information, and Data Sciences** (16 )
 - **Earth and Geosciences** (21 )
 - **Engineering** (27 )
 - **Environmental and Marine Sciences** (14 )
 - **Life Health and Medical Sciences** (45 )
 - **Mathematics and Statistics** (10 )
 - **Other Non-Science & Engineering** (13 )
 - **Physics** (16 )
 - **Science & Engineering-related** (1 )
 - **Social and Behavioral Sciences** (28 )