

Opportunity Title: Spatial Models of Ambient Sound

Opportunity Reference Code: IC-17-10

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 3/31/2017 11:59:00 PM Eastern Time Zone

Description Research Topic Description, including Problem Statement:

Recent advances in the fields of acoustic and soundscape ecology have demonstrated new applications for recording, classifying, and spatial-temporal mapping of ambient sounds and acoustic features. For example, methods for collecting and analyzing sound waves over smaller areas have proven useful for detecting and classifying fishing vessels, gun shots, truck and airplane engines, rocket blasts, and different species of animals and birds. Other research efforts, such as the Record the Earth program, have leveraged open source data and crowdsourcing to develop global soundscapes of anthropogenic and environmental sounds, and features derived from those sounds (e.g., human emotions).

Example Approaches:

Successful proposals could build on previous research to:

- Identify new sources for acoustic data collection, mapping, and ground-truthing
- Develop algorithms for categorizing classes of sounds at different spatial and temporal scales
- Develop models or acoustic signatures of places and methods for matching un-geolocated samples to potential places of origin
- Develop models that incorporate or identify relationships between acoustic data and features and other types of data (e.g., overhead imagery, videos, or ground photos)
- Identify and support novel use cases for recording, classifying, and spatial-temporal mapping of ambient sounds and acoustic features

Some approaches to these areas may be:

- Data models and scalable architectures to efficiently collect, store, and geospatially analyze acoustic and ambient sound data at multiple spatial scales.
- Creative solutions that address challenges in spatially and temporally representing features and latent attribute groups (e.g., hard boundaries



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vs. fuzzy membership).

- A framework for evaluating algorithm performance under different sampling conditions.
- Algorithm improvements – for example, recent research to model bird chirps used a deep learning algorithm to divide the chirps into syllables for robust recognition. A question could be whether this or another approach would provide a more robust algorithm (Qian, et al., IEEE Conference 2015).¹

**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](#) )