Opportunity Title: Magnon algorithmics
Opportunity Reference Code: IC-17-26

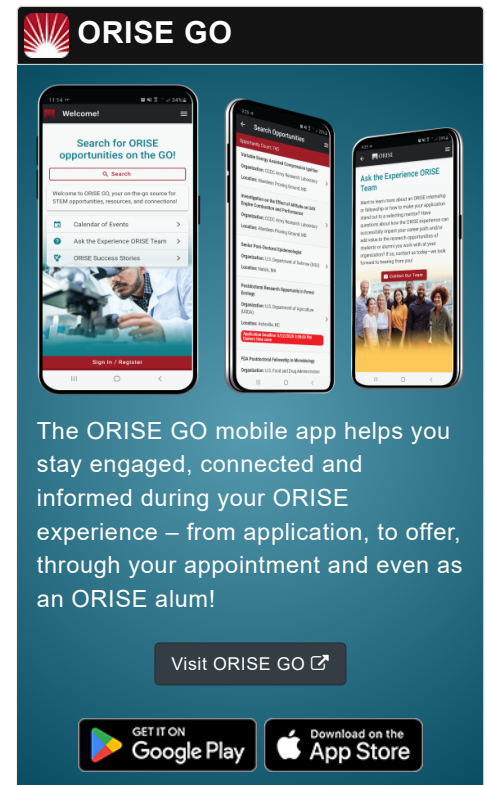|	
Organization	Office of the Director of National Intelligence (ODNI)
Reference Code	IC-17-26
How to Apply	**Create and release your Profile on Zintellect** – Postdoctoral applicants must create an account and complete a profile in the on-line application system. **Please note: your resume/CV may not 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:**

Magnonic devices using magnetic waves rather than electrical signals are capable of forming circuits with significantly lower power requirements than electronic devices. While magnonic circuits can be used to mimic conventional electronic logic circuits, they have radically different characteristics and the most efficient circuits will not be those which simply transpose existing logic designs. The research programme could develop an understanding of magnonic computation, a classification of existing algorithmic methods and the development of new algorithms well adapted to the specific character of this class of devices.

Example Approaches:

An initial approach might explore a deeper understanding of magnonic circuitry at the functional level, drawing on ideas from signal processing and digital logic. In particular it would be of value to understand the role of Fourier Transform circuits --- if these can be developed then there is the possibility of transposing ideas from quantum algorithmics as well.

Magnonic circuits offer the possibility of controlled gates and hence the analogues of FPGA (Field Programmable Gate Array) devices; they also allow superposition in the frequency domain and parallel or SIMD (Single Instruction Multiple Data) type processing. Algorithms which exploit these characteristics would be of interest.

A theoretical approach might consider whether there is a new complexity class structure associated to magnonic circuits.

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Application domains include signal processing; signature detection in digital streams; massively parallel search on data sets and streams.

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 👁)