Opportunity Title: Environmentally stable rechargeable batteries for flexible wearable electronics
Opportunity Reference Code: IC-17-23

Organization	Office of the Director of National Intelligence (ODNI)
Reference Code	IC-17-23
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**: Wearable electronics is a rapidly growing subject area being driven by medical, healthcare, fitness and to a lesser extent military applications and is strongly associated with the collection of 'big data', e.g. physiological data such as blood pressure, body temperature etc. Seamless integration of battery and electronics into the host garment remains one of the key challenges to fully exploiting this technology. Furthermore, batteries in wearable applications need to remain functional during normal use, e.g. folding or scrunching. In traditional battery technologies the robust packaging required to prevent damage to the cell chemistry from the environment, or damage to the surroundings (i.e. skin) by the contents of the battery, hinder the combination of battery and garment into a single entity. Environmentally stable batteries need to function correctly with minimal or no packaging over humidity and temperature ranges expected from ambient conditions. The subject of this topic is the research and development of chemistries, techniques or other strategies for the purpose of creating batteries that function, without conventional packaging, in a safe and reliable manner. A successful project might demonstrate the technology is compatible with one or more of the following: • An energy density of at least 1.5 mWh cm-^{2} • At a discharge rate of 0.05 C

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- In a temperature range of 10 – 40 °C
- For at least 50 cycles
- Operating life of at least 1 month with minimal or no packaging
- Under conditions expected in a re-usable garment
- Non-toxic and benign

Unclassified Example Approaches:

Example approaches include, but are not limited to:

- Development of battery chemistries that require no external packaging
- Techniques to coat battery components onto continuous fabric fibres using textiles processing methods
- Development of environmentally stable electrolytes that are tolerant to ambient conditions
- 'Self-healing' electrodes / electrolytes / separators

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 👁)