

**Opportunity Title:** Predictive Intelligence: Using Machine Learning for Hostage

Recovery

**Opportunity Reference Code:** ICPD-2020-08

**Organization** Office of the Director of National Intelligence (ODNI)

**Reference Code** ICPD-2020-08

### 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.

Additional information about the IC Postdoctoral Research Fellowship Program is available on the program website located at:  
<https://orise.ora.gov/icpostdoc/index.html>.

If you have questions, send an email to [ICPostdoc@ora.gov](mailto:ICPostdoc@ora.gov). Please include the reference code for this opportunity in your email.

**Application Deadline** 2/28/2020 6:00:00 PM Eastern Time Zone

### Description

**Research Topic Description, including Problem Statement:**

Human recovery and rescue takes a large amount of time and resources. Research is needed to design a machine learning (ML) system that is capable of mining a variety of data sets to perform predicative analysis and generate accurate human travel probabilistic forecasts. Currently, individuals can be tracked using devices such as surveillance cameras, GPS applications, and others techniques. These techniques typically cannot predict the ultimate destination of the individual with consideration to human behavior traits. If the individual transits an area absent of accessible technology the challenge is compounded. Ultimately, the desire is to have an artificial intelligence (AI) system that can learn human movement behavior, together with a variety of data sets to enhance the timeliness and accuracy of intelligence forecasts to lead to precise predictions of the entrance point, travel path, and final destination of a specific person. This would allow for a search and rescue team to find individuals with minimal time and limited resources.

An approach could use an AI algorithm to “learn” human behavior through the input of a variety of data sets, so if an individual is in a location absent of accessible tracking technology, a destination prediction, transit path, and start point (if unknown) could still be generated. Utilizing disparate data sources to include physical signatures, unique disturbances, environmental factors, imagery and behavioral components can lead to a holistic view. One example would be to use a three-stage discovery process to identify the predictive human movement behavior for intelligence forecasting such as: stage 1 - use historical data and expert input; stage 2 – create model, use machine learning, and enhance adaptable model; stage 3 use prediction to identify the elements of human behavior.

**Postdoc will be responsible for finding datasets.**




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**Example Approaches:**

When a person goes missing, humans must investigate and retrace the individual's steps by asking key witnesses and looking for evidence – this can be very time consuming and may further jeopardize the safety of the person. The goal of this proposal is to develop a ML algorithm to make recommendations using a broad range of events, using elicited, weight, and combined judgements of analysts. Use past performance, meta-knowledge, expertise, cognitive style, as well as other predictive attributes to generate a probabilistic forecast for real events. A particular use case is pinpointing the location of a person by where they have been last, and by using AI to determine a confidence interval and the likelihood of where they will be. Therefore, a rescue team could conduct a search to exactly pinpoint the location of the individual using predictive analytics. Use machine learning to sift through massive amounts of data can reveal insights into an individual's exact location.

**Relevance to the Intelligence Community:**

Developing a ML algorithm capable of not only tracking personnel for search and rescue/personnel recovery operations, but providing a prediction of their destination, would provide rescue personnel a means to rapidly intercept and extract individuals.

**Key Words:** Hostage Recovery, Human Rescue, Artificial Intelligence, Machine Learning, Predictive Analytics, Search and Rescue, Personnel Recovery, Intelligence Collection, Big Data, Deep Learning, Prediction, Neural Network

## Qualifications









**Postdoc Eligibility**

- U.S. citizens only
- Ph.D. in a relevant field must be completed before beginning the appointment and within five years of the application deadline
- Proposal must be associated with an accredited U.S. university, college, or U.S. government laboratory
- Eligible candidates may only receive one award from the IC Postdoctoral Research Fellowship Program

**Research Advisor Eligibility**

- Must be an employee of an accredited U.S. university, college or U.S. government laboratory
- Are not required to be U.S. citizens





## Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (12 )
  - **Communications and Graphics Design** (2 )
  - **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 )

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- **Other Non-Science & Engineering** (2 )
- **Physics** (16 )
- **Science & Engineering-related** (1 )
- **Social and Behavioral Sciences** (27 )