


**Opportunity Title:** Resource Allocation of Distributed Heterogeneous Resources  
**Opportunity Reference Code:** IC-16-27

<b>Organization</b>	Office of the Director of National Intelligence (ODNI)
<b>Reference Code</b>	IC-16-27
<b>How to Apply</b>	<p><b>Create and release your Profile on Zintellect</b> – Postdoctoral applicants must create an account and complete a profile in the on-line application system. <b>Please note: your resume/CV may not exceed 2 pages.</b></p> <p><b>Complete your application</b> – 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.</p>
<b>Application Deadline</b>	4/15/2016 6:00:00 PM Eastern Time Zone
<b>Description</b>	Resource allocation is an on-going challenge for both government and commercial activities. Research is needed to explore, develop, and characterize methods to solve complex resource allocation problems. For example, what are the best techniques and methods to employ to achieve optimal scheduling for resources and agents among complex, distributed heterogeneous resources?

### Example Approaches

Candidate approaches could investigate techniques to discover the relative value of each agent in a network of distributed agents to a given set of tasking with the goal of setting a global exchange rate for driving the entire network towards a global optimum. Approaches could consider the time required to determine the value of each agent with a goal of minimizing the convergence time. The use of training sequences to discover the value of each agent is acceptable. Approaches should be sufficiently flexible to allow for agents to enter and leave the network asynchronously and still provide robust solutions. Initial research should assume a single global enterprise objective function to optimize, but allow for extension to multiple objective functions that vary from task to task.

Auction based techniques are one example of a possible approach to address the resource allocation challenge. Auction based techniques are known to be effective for scheduling distributed agents to solve complex resource allocation problems. However, these techniques require a common currency for agents to effectively bid on new tasks and achieve any sort of optimal scheduling result. Enforcement of a global exchange rate between all agents is a common solution, but is impractical when the network of agents is highly dynamic and the

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correct exchange rate associated with a particular agent is either unknown or subject to change over time. A possible approach to exploring this area could be for a user to be able to discover the value associated with a given agent to a given task over time and use this to weight the bids appropriately to achieve a desired optimal result.

**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 )