

## DAGSI Research Topic

### Intelligent Dialogue System for Multiple Human-Machine Communication within Human-Machine Teaming

**NOTE:** Under the Cooperative Agreement, Technical Directorates have three options for topics. First, a topic can strictly be considered in the pool for the state allocation of funding. DASI will work across the TDs for this allocation. Second, the TD can be prepared to be a funding partner with the State of Ohio. This would include: providing additional funds to support additional recipients of a topic, or expand the proposers team to include additional members on a topic. Third, the TD may elect to fully fund a topic not selected for State of Ohio funding or to pursue University teams outside the State of Ohio. Contact [Michael.hitchcock.3@us.af.mil](mailto:Michael.hitchcock.3@us.af.mil) for questions

1. **Research Title:** Intelligent Dialogue System for Multiple Human-Machine Communication within Human-Machine Teaming

2. **Individual Sponsor:**

Dr. Nia Peters, AFRL/RHCB  
AFRL/RHCB Bldg 441  
2610 Seventh Street  
WPAFB, OH 45433-7333  
[nia.peters.1@us.af.mil](mailto:nia.peters.1@us.af.mil)

3. **Academic Area/Field and Education Level**

Psychology/Electrical or Computer Engineering/ Computer Science  
Psychology, Linguistics, Signal Processing, Spoken Language Processing, Natural Language Processing, Machine Learning (BS, MS, and PhD level)

4. **Objectives:** Human-machine teaming aims to meld human cognitive strengths and the unique capabilities of smart machines to create intelligent teams. One major problem within these teams is a lack of communication skills on the part of the machine such as the inability to know when and how to communicate information to human teammates. One scientific gap is the design and implementation of an intelligent dialogue agent that can leverage various representations of communication within teaming interactions and mimic human communications strategies that are conducive to the overall interaction and teaming tasks objectives. Another is the ability to measure and evaluate the implications of machine communication strategies with human teammates. With an agent that must monitor and attend to all communication streams to encode appropriate methods and times to engage with teammates communicating and working on an ongoing task, formalized models could be useful within the literature. The primary objective of this research is to design and evaluate an intelligent dialogue system within simple and complex human-machine collaborative teaming interactions.

5. **Description:** The design and evaluation of an intelligent dialogue systems for machine communication strategies within a human-machine teaming interactions involves various research issues to address. (1) What communication strategies can be leveraged from human teaming interactions to build an intelligent dialogue agent with similar communication strategies for human-machine teaming? (2) Are human communication strategies optimal in teaming interactions and if not, can an intelligent system improve teaming performance outcomes using different strategies? (3) What are the implications of machine communication strategies on the overall goals and objectives of the teaming tasks? The research involves the development of a working dataset to simulate collaborative human-machine interactions where the intelligent dialogue system will be integrated or identification of similar datasets, design, implementation and evaluation of the system's communication strategies, and evaluation of the implications of these communication strategies on the teaming tasks goals and objectives.
  
6. **Research Classification/Restrictions:** Research is unclassified.
  
7. **Eligible Research Institutions:** Wright State University, Ohio State University, University of Dayton, Miami University, Ohio University, University of Cincinnati and all other Ohio universities

**NOTE: Topics submitted to DAGSI must be approved for public release. Need PA Approval #**