

Attachment 1 – DAGSI Research Topic Template

1. **Research Title:** Models of Human Decision-Making in Complex Operational Environments

2. **Individual Sponsor:**

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

PhD in Human Factors Psychology, Computational Cognitive Modeling

4. **Objectives:** Develop and test cognitive models to estimate latent internal states, quantify uncertainty, and model dynamic interactions between individuals and their complex environments. Leverage existing theory, simulation tools, and behavioral, physiological, and contextual data to create models that are both computationally robust and psychologically meaningful.

5. **Description:** Although substantial progress has been made in computational cognitive modeling of human decision-making and behavior, understanding how humans navigate multifaceted task goals and complex decisions remains a challenge for cognitive modeling and human factors scientists. For example, many existing approaches assume stationary strategies, cognitive states, and environmental conditions throughout the decision-making process. In practice, however, decisions are made in dynamic settings where cognitive workload, fatigue, expertise, task demands, and operational context evolve over time, resulting in corresponding fluctuations in human priorities, decision-making strategies, and behavior.

Research in this area seeks to develop theoretical and computational frameworks that characterize how the human decision process adapts to changing internal and external conditions. Of particular interest are models capable of representing latent cognitive and behavioral states, learning from sequential observations, integrating contextual information, and capturing temporal changes in decision strategies. Such models have the potential to improve prediction of human behavior while providing insights into the mechanisms of adaptive decision-making.

6. **Research Classification/Restrictions:** None.

7. **Eligible Research Institutions:** Open to all research institutions in Ohio.