

REPPERGER RESEARCH INTERN PROGRAM

RESEARCH PROJECT #: AFRL-RHW-25-04

Human AI Co-Learning for Adaptive Teaming in Space Operations

PROJECT DESCRIPTION: Future warfighting teams may not only consist of human teammates, but artificial intelligence (AI) teammates as well. In Human Autonomy Teams (HATs), humans and AI agents work together to achieve a common goal. To operate as a teammate, AI agents must have agency, a high level of autonomy, share mental models, and have interdependence with its human counterpart. This will require AI agents that are adaptive and can learn from its human teammates as well as their environment. The purpose of this project is to investigate approaches for facilitating shared mental models between humans and AI agents in space operation contexts. Our team is multi-disciplinary and consists of computer scientists, human factors specialists, cognitive scientists, and research psychologists. Together we develop approaches, models, and measures to enable AI agents to elicit human mental models and learn new knowledge through natural human interaction. Currently we are investigating how to leverage Large Language Models (LLMs), AI approaches, and cognitive science and psychology methods/measures to acquire new knowledge in AI agents in support of space activities. Through these methods, we hope to enable AI agents that are capable of learning while teaming with humans and that can quickly adapt to uncertain changing environments. For this project the mentor will work with the intern to scope a hands-on summer research project within this domain.

LEARNING OBJECTIVE: The participant will learn more about human AI co-learning/teaming literature and the research gaps in this area. The applicant will gain experience conducting research in a multi-disciplinary team to address complex and technically challenging problems. The participant will gain experience with literature reviews, experimental design, model development, requirement development, data analysis, and research presentations.

ACADEMIC LEVEL: Masters; Doctoral

DISCIPLINE NEEDED:

- Computer Science
- Human Factors
- Cognitive Science

RESEARCH LOCATION: Wright-Patterson Air Force Base, Dayton, Ohio

RESEARCH MENTOR: Jayde M. King, Ph.D.

Human Factors Psychology, Embry-Riddle Aeronautical University, 2021



Dr. Jayde King is a Research Psychologist in the 711 Human Performance Wing RHWOH the Co-Learning for Adaptive Human Machine Teaming Line of Effort. She is passionate about conducting research that investigates ways to enable teaming and co-learning between autonomous agents and humans. She has a strong background in Human Factors Psychology, Training Research, and Mental Models. Currently she leads a multidisciplinary team of Machine Learning experts, Human Factors specialists, and Cognitive Psychologists, together they are developing models to capture and transfer human expertise/knowledge to AI agents through human interaction.

Photo courtesy of the U.S. Air Force Research Laboratory.