REPPERGER RESEARCH INTERN PROGRAM

RESEARCH PROJECT #: AFRL-RHW-24-07

Neural Mechanisms of Top-down and Bottom-up Attention

PROJECT DESCRIPTION: Whether driving an automobile, or flying an aircraft, sustained attention is crucial to ensure successful performance and avoidance of accidents in Air Force missions. Top-down attention ensures that one remains focused on the goal, while bottom-up attention allows flexibility, response to rapid changes in the environment, and quick location of relevant information. The goal of the project is to better understand neural mechanisms underlying top-down and bottom-up attentional control. The way in which these mechanisms interact, particularly under circumstances of fatigue and stress, is not well characterized. We also aim to build computational models of these mechanisms that will support efforts in real-time cognitive state monitoring, adaptive interfaces, and brain-machine-interfaces to enhance human performance. The student intern will review literature, assist with human subjects data collection in experiments on single and multi-cue decision-making, and analyze EEG and behavioral data to generate insights about the dynamics of attentional control and/or contribute to development of computational models that describe and predict attentional control. Highly competitive applicants will have some combination of the following skills/knowledge: MATLAB, python coding, EEG analysis.

ACADEMIC LEVEL: Undergraduate; Masters; Doctoral

DISCIPLINE NEEDED:
- Neuroscience
- Psychology

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

RESEARCH MENTOR: Christopher Stevens, Ph.D.
Psychology, The Pennsylvania State University, 2014

Dr. Stevens is a research psychologist in the Cognitive Models branch of the Air Force Research Laboratory. At Penn State University, Dr. Stevens's research centered on spatial reasoning and metacognitive monitoring of such reasoning. After graduating from Penn State, Dr. Stevens worked as a postdoctoral fellow at the University of Groningen, where he led the effort to develop novel computational agents for training metacognitive skills in negotiation. He now leads research in the cognitive modeling of human performance across multiple levels of analysis.
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