CAREER: Task-Agnostic Worker-Assistance with Cognition-Aware Cyber-Physical Systems to Promote Ad-Hoc Worker-System Teaming

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CAREER Vision

Develop low-energy, cognition-aware cyber-physical systems that detect cognitive overload and attention-switch intent, and design adaptive neurofeedback in a task-agnostic manner

Objectives for this Proposal:

- Objective 1: Classify cognitive-load during multi-task jobs (e.g. robot-swarm control) using multi-modal bioelectrical data from wearable devices
- Objective 2: Detect attention-switch intent between unknown tasks based on multi-modal bioelectrical data
- Objective 3: Design task-agnostic neurofeedback based on outcomes from cognitive-load classifier and attention-switch intent detector.
- Objective 4: Develop an integrated educational plan with new courses at Missouri S&T, high-school visits, summer campus for K-12 students, and stakeholder workshops for training and research engagement.

Why CPS?

- **Physical:** Multi-modal physiological sensors on wearable devices
- **Cyber:** Cognitive-overload detectors, attention-switch intent detectors
- **Integration:** Neurofeedback

Alignment with CPS Flower Diagram