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Individual Differences and Human Variability

S&T Campaign: Human Sciences
Human Behavior

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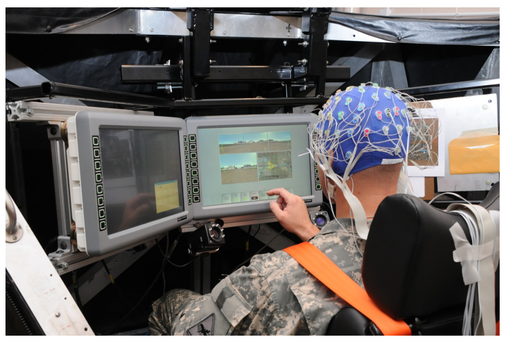
Research Objective

- To understand the underlying properties, principles, and mechanisms governing the differences between individual humans as well as difference within the same individual based on state changes (e.g., fatigue, stress).
- To develop new methods, algorithms, and capabilities for predicting individual performance within a range of settings from small units to societies that can augment performance, training, and system design.

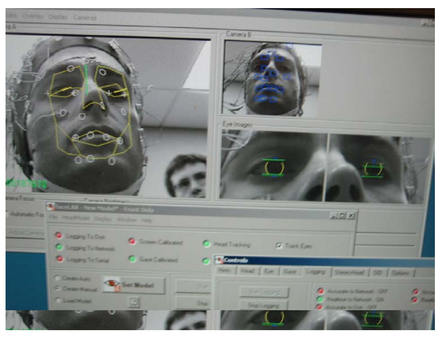
Challenges

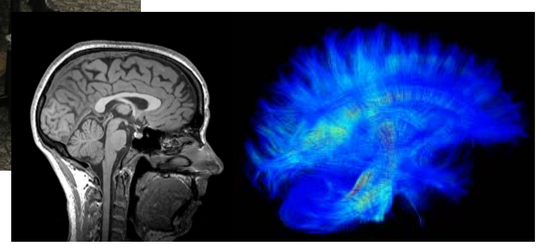
- Robust measurement techniques for low SNR in real-world, dynamic environments
- Integrating data from multiple research sites and standardizing the data to support big data analysis approaches
- Developing new methods to detect dynamic changes in performance at multiple time scales



ARL Facilities and Capabilities Available to Support Collaborative Research

- Unique laboratory facilities at APG, MD:
  - Mission Impact for Neurotechnology Design (MIND) Laboratory
  - Cognitive Assessment, Simulation, and Engineering Laboratory (CASEL)
  - Soldier Performance and Equipment Advanced Research (SPEAR) Facility
  - Brain Imaging and Experimental Research Suite (BIERS)
  - DoD Supercomputing Resource Center (DSRC)
- Unique expertise:
  - Access to unique, military relevant, and often one-of-a-kind data and data collection opportunities
  - Knowledge of translating basic science research to applied settings, including technology development
- Unique experimental datasets:
  - Database (N>600) of participants performing real-world tasks, including driving, target detection, etc.
  - Large-scale study of cognitive resilience and fatigue (N>150) with data on brain connectivity, sleep monitoring, behavioral performance, and blood chemistry





Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration

- Innovative methods for state detection from physiological measurements
- Techniques for multimodal data integration
- Advanced computational and statistical analysis approaches for big data projects

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