

Cognitive Systems & Sciences at SNL:

Application-inspired research on human behavior, cognition, and decision making for the advancement of national security

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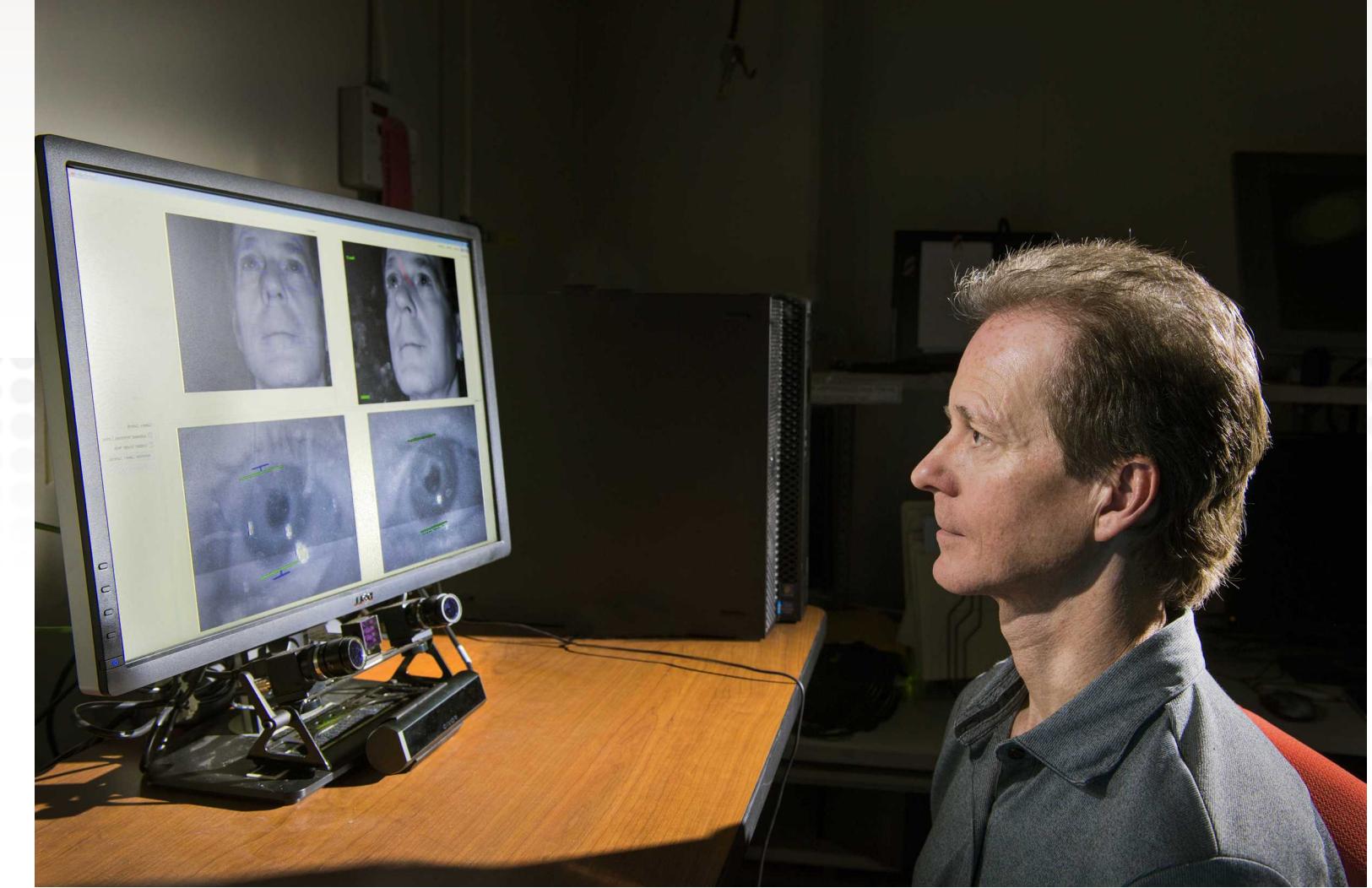
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Cognitive science can inform cyber security:

- Effectiveness of different cyber tools?
- Differences between experts and novices?
- Attributes of effective IRs or cyber teams?
- Relation between neural processes and performance?
- Influence of modifications to existing cyber structures on adversaries?



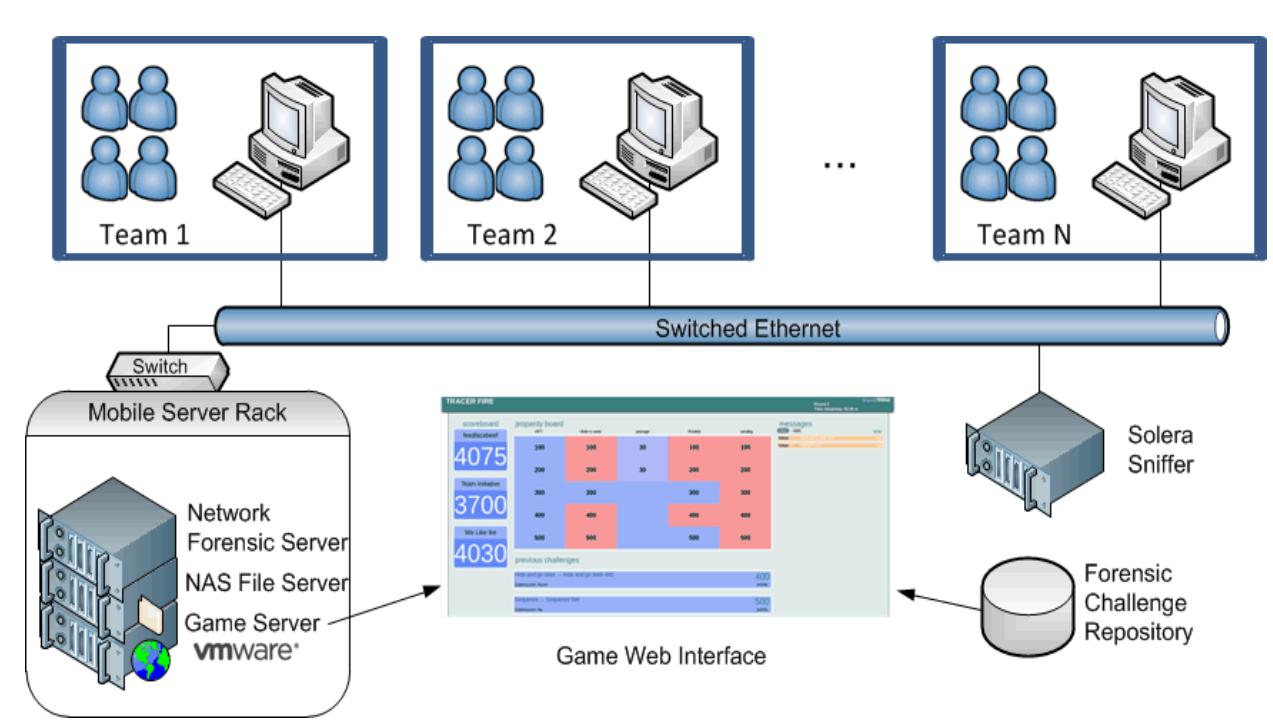
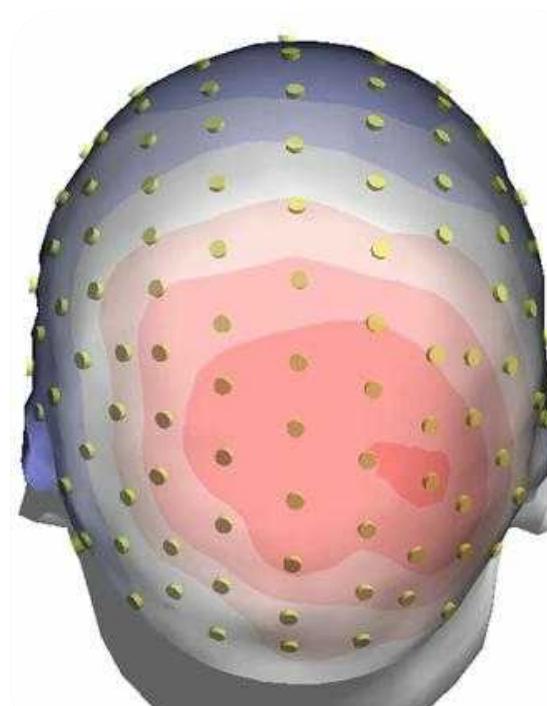
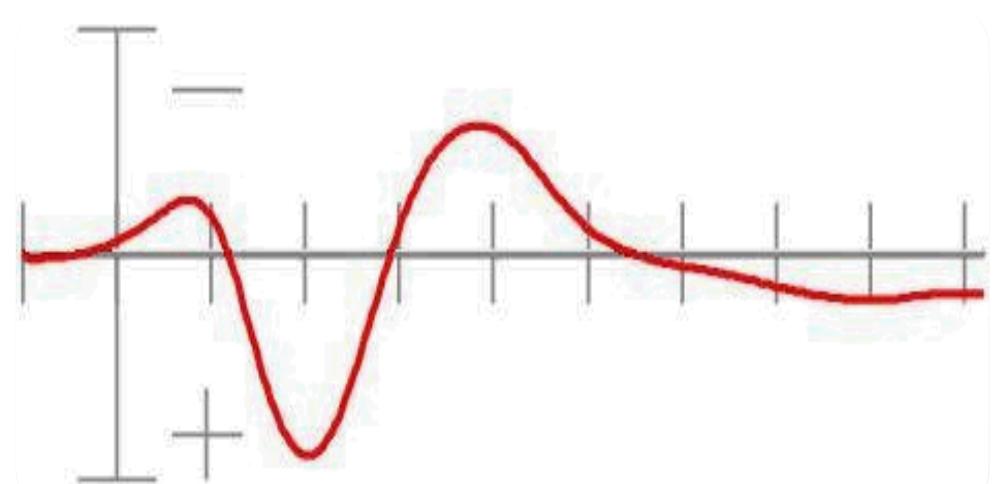
Approach and technology:

Collect data from human subjects to understand and enhance cognitive processes

Inform development of new technology, software, training, and best practices

Physiological measures: EEG, eye tracking, tDCS

Behavioral measures: questionnaires, cognitive tasks, human-machine transaction monitoring (e.g., Hyperion)



Research findings from SNL's cyber team (using Tracer FIRE):

- Training in **adversary-based** (as opposed to **tool-based**) techniques led to greater situational awareness
- Characteristics positively correlated with better performance: **conscientious, emotionally stable, inquisitive, intuitive, rational, high comprehension span**
- Increase use of **general-purpose** tools & reduced **switching between tools** predicted better performance
- Novices **inspect extraneous visual elements** while experts **focus on important regions of interest faster (3x)**