# June 18, 2019: Pre-Conference Workshops

## Morning Workshops (8:30am – 12:00pm):

Title: Designing Complex Scenarios for Evaluation of the Effectiveness of Technology for Supporting Distributed Cognitive Work
Presenter(s): Emilie M. Roth, Laura G. Militello, & Emily S. Patterson
Description: In human-in-the-loop simulation-based evaluations, there is a tendency to use evaluation scenarios which are not sufficiently complex. When a scenario objective is too easily achieved, it is difficult to objectively measure improvements in individual or team human performance. Often, scenarios have already been developed for purposes of demonstrating a new technology or sales. In this workshop, we describe how to increase the complexity of these scenarios in order to use them for evaluations. We discuss strategies for identifying the types of complexity that will increase the relevance of evaluation findings for predicting the impact of technology on real-world performance. We describe techniques that have been successfully used for evaluations with nuclear power generation, military environments, and healthcare information technology. These include complexity factors and embedded probes. Hands-on practice is provided for using these with garden path scenarios, where participants in an evaluation are set up to have an initial false prime explanation that encourages 'fixation bias' in taking longer than is optimal to move to the correct set of best explanations. These techniques are described in the context of objectives for formative and summative evaluations and selection of macrocognition measures which are appropriate for measuring changes in cognition, such as sensemaking and replanning.

Title: Assessing Mental Models using Sero!
Presenter(s): Brian Moon
Description: Mental models lie at the heart of NDM research. Given that a critical element in the various definitions and descriptions of mental models are the interrelations and interconnections between concepts, concept maps are a natural fit for the expression of mental models. The comparison of concept maps – as representations of mental models – offers a powerful alternative to other methods of mental model assessment. This proposed workshop will introduce concept mapping and its potential for eliciting and representing mental models, introduce Sero! as a viable platform for conducting mental model assessment, and instruct in the use of Sero! for doing so.

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## Afternoon Workshops (1:30 – 5:00pm):

Title: Cognitive Task Analysis (CTA)
Presenter(s): Gary Klein & Laura G. Militello
Description: CTA methods are a staple in many Naturalistic Decision Making projects. The tutorial will describe the concepts behind CTA, some of the CTA success stories, and methods for performing Cognitive Task Analyses. It will primarily cover the Critical Decision Method (CDM) technique, describing the four sweeps for conducting a CDM interview. Participants will have a chance to conduct their own CDM interviews. The tutorial leaders have been conducting CTA workshops for many years, at conferences such as Human Factors and Ergonomics, and also for private and governmental organizations. Attendance is limited to 20 participants.
The workshop leaders are Gary A. Klein and Laura Militello. Dr. Klein, a Senior Scientist at MacroCognition LLC, is one of the developers of the CDM. Dr. Militello, Senior Scientist at Applied Decision Science, has been using the CDM for over 20 years in healthcare and other domains.

Title: Applying Human-Machine Teaming Methods to Operational Systems
Presenter(s): Patty McDermott & Cindy Dominguez
Description: In this workshop, participants will learn about facets of human-machine teaming (HMT) and practice a set of methods for eliciting HMT needs and designing team-based interaction with emerging autonomy, AI, and automation-based systems. The instructors will provide an overview of a research-based HMT Framework that addresses the need for appropriate observability, cognitive assistance, and coordination.

The workshop will enable participants to learn and practice a set of methods for developing HMT design guidance that is specific to their system or application. Participants will practice techniques for gathering HMT information from experts, analysing interview data, applying findings to design, and conducting HMT evaluations. The workshop will be highly interactive with lively discussions and exercises to practice HMT methods in context. Upon completing the workshop, participants will be able to:

- Identify when an opportunity exists to leverage the HMT systems engineering methods
- Apply HMT systems engineering methods to their problem domain

This workshop is applicable to researchers, engineers, designers, and project leaders looking to better understand human machine teaming design guidelines, and methods.