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AugCog

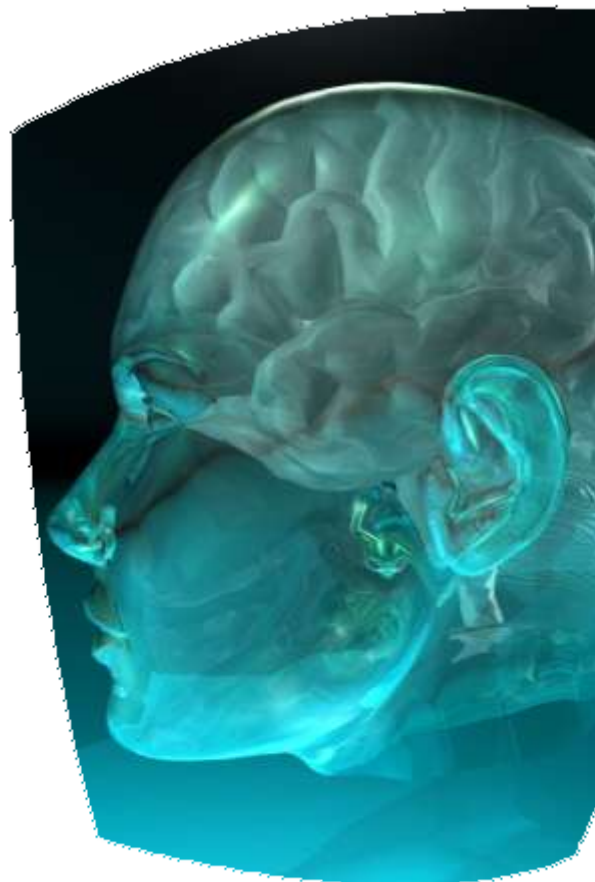
Technical group

THE AC-TG SEEKS TO SERVE AS A FORUM FOR FOSTERING THE CONTINUAL DESIGN AND DEVELOPMENT OF AUGCOG S&T AND FOR THE EXCHANGE AND DISSEMINATION OF INFORMATION

Business Meeting

The Augmented Cognition Technical Group Business Meeting was productive. Drs. Warm and Parasuraman were awarded the Admiral Leland S. Kollmorgen Spirit of Innovation Award. The first Student Grant Award, which includes a \$500 cash prize, was given to John Blich. Dr. Denise Nicholson passed the torch for Technical Group Chair to Dr. Lauren Reinerman-Jones who passed the torch for Program Chair to Lt. Lee Sciarini. A vote was made that each chair would serve a two year term with the Program Chair transitioning to the Technical Group Chair. The idea is to maintain consistency as new faces enter the Technical Group and encourage involvement. The Las Vegas 2011

Conference will mark the fifth year in which the Augmented Cognition Technical Group has been affiliated with HFES. To mark this event, the business meeting will again present the two aforementioned awards and will also include an address from Capt. Dylan Schmorow, one of the most influential individuals in the field of Augmented Cognition. That is only the beginning of the fun. In line with this sense of reflection, Chris Berka, Founder of Advanced Brain Monitoring (ABM), will inform meeting attendees of the history of Electroencephalogram (EEG). The AC-TG Business Meeting is planned for Wednesday September 18, 2011 from 3:30-5:00PM. Please confirm details in your final HFES program.



HUMAN FACTORS AND
ERGONOMICS SOCIETY
55TH ANNUAL MEETING



Next Meeting

The next HFES conference is September 19-23, 2011, in Las Vegas. The AC-TG business meeting is scheduled to be held on September 18, 2011 from 3:30-5:00 PM. In addition to the Augmented Cognition sessions will occur. The first one is on September 20th from 10:30-12:00 and the second one is on September 22nd from 8:30-10:00 AM. Please check the HFES program for any date, time changes, and meeting locations.

2010 Kollmorgen Award Winners

By Kimberly Sprouse

*Applied Cognition and Training in Immersive Virtual Environments (ACTIVE) Lab
Institute for Simulation and Training, University of Central Florida*



Drs. Warm and Parasuraman received the Kollmorgen Award at last year's annual HFES conference in San Francisco, CA.

We want to congratulate Drs. Joel Warm and Raja Parasuraman on winning the 2010 Kollmorgen Award. This award recognizes exceptional scientists and engineers who have made substantial and innovative contributions to the field of Augmented Cognition. The research and development that Drs. Warm and Parasuraman conduct makes a huge impact on the Augmented Cognition community.

Dr. Warm has contributed to the Augmented Cognition community in several ways including his extensive research on vigilance and how it affects a human operator. Vigilance tasks and vigilance decrement has a huge impact on many people including operators that must monitor a repetitive unpredictable task such as air traffic controllers, pilots, or anyone driving a vehicle. This research could help answer questions about the limitations of a human's attention span and decision making process.

Dr. Parasuraman has also conducted research on vigilance as well as human attention and memory. Research on human attention and memory could answer many questions about a human operator's ability to perform a task. Dr. Parasuraman is well known for combining the field of human factors and cognitive neuroscience in order to develop the field of Neuroergonomics.

Drs. Warm and Parasuraman collaborated on the implementation of physiological measures to improve human performance and they recently worked together to establish the Center of Excellence in Neuroergonomics, Cognition, and Technology (CENTEC). CENTEC is an organization designed to assist the US Air Force in enhancing human effectiveness in air, space, and cyberspace operations. You can find more information on CENTEC at <http://centec.gmu.edu>.

The Augmented Cognition community wants to thank Drs. Warm and Parasuraman for their dedication to the field and looks forward to seeing their work in the future.



Drs. Denise Nicholson and Lauren Reinerman-Jones stand on either side of current and past Kollmorgen Award winners (from left to right) Drs. Glenn Wilson, Joel Warm, Raja Parasuraman, and CPT Dylan Schmorrow.

Leland S. Kollmorgen Spirit of Innovation Award Nomination

The Leland S. Kollmorgen Spirit of Innovation Award was instituted in 2007 by the HFES AC-TG in honor of Leland S. Kollmorgen, Rear Admiral, U.S. Navy (Ret.). The award recognizes exceptional scientists and engineers who have made substantial and innovative contributions to the field of Augmented Cognition. The recipient will be someone whose extensive endeavors have pushed the frontiers of discovery, innovation, and design in Augmented Cognition transcending the boundaries of human-systems computing and is a true inspiration to the HSI field.

The Leland S. Kollmorgen Spirit of Innovation Award recipient is judged not only on accomplishments in the last year, but also on a career history of efforts contributing to the advancement of the Augmented Cognition field. Other criteria for selection include: resourcefulness and dedication in promoting and accomplishing innovative human-systems computing technologies, demonstrated leadership in forming and promoting teamwork among the various disciplines represented within the Augmented Cognition field, demonstrated professionalism and integrity, and the embodiment of the spirit of innovation and collaboration.

If you are interested in nominating an individual or nominating yourself, please complete the form below and return to Lauren Reinerman-Jones (lreinerm@ist.ucf.edu) by August 21, 2011. The recipient will be honored at the 2011 HFES AC-TG Business Meeting in Las Vegas, NV.

Nominator Information:

Your Name

Your Affiliation

Your Email

Years of Affiliation with HFES and Aug Cog

Nominee Information (If Different from Above):


Nominee Name

Nominee Affiliation

Nominee Email

Years of Affiliation with HFES and Aug Cog

Please summarize in 1-2 paragraphs why this person embodies the spirit of this award, including contributions, collaborations, and other honors received pertaining to the field of Augmented Cognition



Student Grant Award

Grant Taylor, Student Ambassador, AC-TG

The HFES Augmented Cognition Technical Group is soliciting proposals for the Student Grant Program. This program is designed to support student research in the application of human factors in Augmented Cognition. Additionally, the Student Grant Program is intended to encourage students to conduct Augmented Cognition research by inviting student affiliate HFES members from various universities across the country and around the world to participate.

The program is open to all ACTG student members and will be open to Augmented Cognition International Student Affiliates for the 2010 award. We offer financial support for research expenses including, but not limited to, purchase of research materials, paying participants, partial payment for equipment, etc. This year, the ACTG will offer one award of \$500. Each submitted proposal will be evaluated on the following criteria:

- Clarity in presentation of ideas
- Clarity of research methods and methodology appropriateness
- Relevance of project to current psychological theory
- Project's potential to advance research in a specified area (theoretical and practical)
- Budget match for scope and requirements of the research



Lt. Lee Sciarini presents Mr. John Blitch with the 2010 Student Grant Award

To be eligible for consideration, proposals must be submitted by midnight on **August 20, 2011**.

Submission Process

To have the grant proposal considered for the ACTG-SGP, the following information needs to be submitted:

Cover Letter

Include the following information:

- Name and Current mailing address
- Telephone number and e-mail address
- Area of research
- University Affiliation
- Full name(s) of other(s) involved in the project

Letter from Faculty Sponsor

This letter should describe

- The amount of faculty involvement in the project
- An assessment of the student's capabilities in completing the project
- The degree of independence exhibited by the student in developing the research idea

Proposal Narrative

Complete a typewritten (single-spaced, no more than 4 pages) project description summarizing the purpose and methodology of the proposed project. This summary should include the research project's title (without author's name) at the top of each page and must include text on the following:

- A synopsis of previous related research
- A short description of the theoretical implications of the research
- A short description of the practical implications of the research
- Specific objectives of the current project
- Clearly stated hypothesis or set of hypotheses (if relevant)
- Proposed methodology
- Budget (budget justification explaining costs and why the proposed expenditures are necessary)

Reviewers Needed

If you are interested in being a reviewer for this award, please contact Grant Taylor (gtaylor@ist.ucf.edu) by August 12, 2011.

Send the above materials to Grant Taylor at gtaylor@ist.ucf.edu. All materials must be received by midnight on August 20, 2011, in order to be considered for this year's Student Grant Program. The winner of the award will be announced at the HFES meeting in September. Any questions regarding the program or awards can be directed to Grant Taylor (gtaylor@ist.ucf.edu).

Pondering How Augmented Cognition Can Enhance Museum Learning Experiences

*Eileen Smith, Director, E2i Creative Studio,
Institute for Simulation and Training, University of Central Florida*

Free-choice learning experiences happen every day in a multitude of environments. For this article I will specifically be talking about free-choice learning in a science museum environment. Learning is a journey from motivation through performance through true understanding and application. Science museums are a rich social experience meant to spur discussion on the topic being explored between friends, family groups, even strangers who happen to be at the same exhibit at the same time. The experience any one person has in a museum is colored by their life experience to date, their prior knowledge of the topic being explored, and their expectations for the learning experience before them.

Debate is ongoing in the science museum field about the appropriate technology to incorporate that will enhance the experience yet not displace the richness of human discourse found in museums. As that debate intensifies, it is important to realize that museum learning is not an isolated experience, but a node on the learning journey. Each of those nodes has a unique role in learning. The museum environment is one where motivation to want to investigate a topic of interest is increased by exploring engaging interactive experiences. The classroom environment is one where learners, once motivated to learn, can be taught content and tested to show their performance. The everyday life environment is where true understanding, generalization and transfer to other applications are demonstrated by learners.

Technology is allowing learners to bring experiences forward with them as they move through the various learning nodes of free-choice (museums in this discussion), compulsory (classroom) and everyday application in life. Levels of

technology being explored in museums include camera tracking, emerging simulation technology, mobile phone apps and augmented reality to name a few.

Technology is also enabling learners to customize their learning journey to intersect with their unique point of view and interest. Simulations extend the depth and breadth of traditional exhibit and program experiences. Simulations allow us to do what we couldn't, shouldn't or wouldn't do in real life. "What if?" simulations allow learners to explore dimensions of experiences not possible before.

Augmented cognition research allows for the discovery of when in the learning process any individual learner is either over-stimulated by a certain delivery method, or under-stimulated by the content or process underway. Of great use in systematic design of new interfaces and exploratory processes, there is potential to explore AugCog use in the learning experiences themselves, possibly augmenting reality to add elements that could dynamically measure stress levels and suggest ways that the learner might mitigate/expand the museum experience once they leave the facility. In its potential effect on the other learning nodes of the classroom and the real world environments, AugCog and its computational methods and neuro-technological tools can impact memory, comprehension and visualization abilities to name just a few linkages. This is a compelling research potential for free-choice learning in science museums...let's start the research!



“Sea Creatures” pilot test at Orlando Science Center showing an augmentation of a fossil hall that allowed learners to see virtual prehistoric sea creatures such as Elasmosaur and Tylosaur swimming around the museum space. (Photo courtesy of E2i Creative Studio.)

Human Agents for Training and Simulation (HATS)

By Kimberly Sprouse

*Applied Cognition and Training in Immersive Virtual Environments (ACTIVE) Lab
Institute for Simulation and Training, University of Central Florida*

In last year's newsletter, the ACTIVE Lab and the U.S. Army's Research, Development and Engineering Command (RDECOM) discussed studies one and two from an ongoing project and this year they are discussing study three. The current project researches the impact of adaptive automation, situation awareness, automation invocation methods, and the effects of workload and stress on performance. In each study, workload and stress were monitored using physiological measures such as an Eye tracker, an Electrocardiogram (ECG), and an Electroencephalogram (EEG).

Participants performed a threat detection task and a change detection task in addition to either operating or supervising an Unmanned Ground Vehicle (UGV). The threat detection task required the participant to monitor the screen throughout scenarios looking for enemy targets. Once an enemy target was located, the participant clicked on the 'threat detect' button and then on the enemy target. The change detection task involved icons on the bottom of the screen that appeared, disappeared, or moved. The participant clicked on a corresponding button to acknowledge which change occurred. The operation of the UGV was determined by the condition assigned. There were two scenarios where the UGV drove itself autonomously and two scenarios that were adaptive based on the change detection task, meaning the task load. In the adaptive scenarios, if the change detection task was in high workload, then the UGV drove itself autonomously, but if the change detection task was in low workload then the participant drove the UGV with a joystick.

The results of the study concluded that performance on the threat detection task during periods of low task demand were better with adaptive automation, but performance during periods of high demand were better with static automation. The change detection performance was better under low workload and declined when workload increased. Similarly, change detection performance was also better during adaptive automation. As expected, the task switching analysis found performance on the change detection task to be better in periods of low task demand than high demand. However, the comparison between static and adaptive automation conditions found no significant effect. Therefore, performance was consistent across periods of equivalent task demand and level of automation regardless of the type of automation provided, showing that the task switching which results from adaptive automation has no impact on performance of the change detection task.

Two areas of interest that need further consideration and research include the type of task automated and the impact on situation awareness (SA). Perhaps it would be more beneficial to automate a task such as threat detection or change detection instead of the operation of the UGV. SA is critical to the success of completing many tasks and missions. Future research should address the effects of performance on other tasks if more emphasis is put on SA.

Please join us at the upcoming HFES conference for a more in depth presentation and discussion on the results of study three.



EEG Response to Vigilance: A Collaboration with the Kazakh National University

Gerald Matthews

University of Cincinnati

The vigilance decrement is accompanied by numerous changes in neural functioning, some of greater functional significance than others. Studies at the University of Cincinnati (e.g., Matthews et al., 2010; Warm, Matthews, & Parasuraman, 2009) have identified declining cerebral bloodflow velocity (CBFV) as a key index of resource loss that is sensitive to task workload. I am working with Almira Kustubayeva of the al-Farabi Kazakh National University to evaluate changes in EEG using one of the paradigms used in the Cincinnati CBFV studies. The participant views a display resembling an air traffic control screen in order to detect target stimuli representing planes on a collision path. Workload is manipulated using a cue that signals the likely appearance of a target. Cueing reduces vigilance decrement, and enhances right-hemisphere CBFV and subjective state.

Dr. Kustubayeva is a neuropsychologist with expertise in EEG. Following a tradition going back to Pavlov, there was a substantial research effort in psychophysiology in the Soviet Union, an approach that continues in the former Soviet republics, including Kazakhstan. At the same time, the research milieu is a little different to the US. Kazakh undergraduates have much less familiarity with research participation than American psychology students do. Data obtained using the Dundee Stress State Questionnaire show that in the experimental setting Kazakh students tend to be highly engaged and motivated, but also somewhat worried, although they also

show the characteristic profile of state change induced by vigilance. We had to make the target discrimination a little harder in order to obtain temporal performance decrements in pilot subjects.

The study focuses on EEG workload indices that may be used to monitor the functional state of the operator in support of augmented cognition. Indices include the Task Load Index developed Gevins and Smith and the Engagement Index used by Pope, Scerbo, Freeman and others. Initial data analyses confirm a performance decrement in vigilance, and show that, as in the Cincinnati data, cueing enhances detections and lowers workload assessed by the NASA-TLX. We also find differences in between EEG workload indices in their sensitivity to cueing and temporal change. We aim to report findings from the study at the 2012 HFES Meeting.

References:

Matthews, G., Warm, J.S., Reinerman, L.E., Langheim, L, Washburn, D.A., & Tripp, L. (2010). Task engagement, cerebral blood flow velocity, and diagnostic monitoring for sustained attention. *Journal of Experimental Psychology: Applied*, 16, 187–203.

Warm, J.S., Matthews, G., & Parasuraman, R. (2009). Cerebral hemodynamics and vigilance performance. *Military Psychology*, 21, S75-S100.



2010–2011 AC-TG Officers

- **AC-TG Chair:** Lauren Reinerman-Jones, Ph.D.
- **AC-TG Program Chair:** Lee Sciarini, Ph.D.
- **AC-TG Resource Manager/Newsletter Editor:** Joy Martinez
- **AC-TG Assistant Newsletter Editor:** Kimberly Sprouse
- **AC-TG Student Ambassador:** Grant Taylor

Contact Information:

AC-TG Newsletter Submissions:

- E-mail actg@ist.ucf.edu if you have content you would like to submit to the AC-TG newsletter.

AC-TG ListServe:

- E-mail the AugCog listserv at hfes-actg@hfes.org with anything you would like to share with the community such as job announcements, funding opportunities, scholarships, questions, etc.

AC-TG Website:

- Also, be sure to check out our updated website at www.augmentedcognition.org/actg.htm

AC-TG Group on LinkedIn:

- Join The Augmented Cognition LinkedIn Group!
www.linkedin.com/groups?home=&gid=2579497&trk=anet_ug_hm

