

schedule of events

# 2007 AUGMENTED COGNITION INTERNATIONAL

4<sup>th</sup> International  
Conference on  
Augmented Cognition  
jointly with

Human Factors and  
Ergonomics Society  
51<sup>st</sup> Annual Meeting



October 1 to 3, 2007

Baltimore Waterfront  
Marriott Hotel  
Baltimore, MD, USA

[www.augmentedcognition.org](http://www.augmentedcognition.org)





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## AUGMENTED COGNITION

For those readers new to the field, Augmented Cognition research and development is distinct from other disciplines due to its focus on using modern neuroscientific tools to determine the ‘in real time’ cognitive state of an individual and then adapting the human-system interaction to meet a user’s information processing needs based on this real-time assessment. Augmented Cognition seeks to extend a user’s abilities via computational technologies that are explicitly designed to address and accommodate bottlenecks, limitations, and biases in cognition, such as limitations in attention, memory, learning, comprehension, visualization abilities, and decision making.

Augmented Cognition International (ACI) conferences represent novel, international venues for researchers, scientists, engineers, and practitioners to disseminate and exchange information and understanding and to present late-breaking research and application results concerning the cognitive, perceptual, and neurological aspects of the emerging field of Augmented Cognition (AugCog). Paper, poster and demo sessions highlighted in this brochure represent contributions from more than 200 ACI colleagues of varied disciplines, including human factors and ergonomics, human-systems integration, psychology, neurobiology, neuroscience, mathematics, and computer science— each with a common goal of advancing AugCog science and technology (S&T) while creating revolutionary human-computer interactions that capitalize on recent S&T advances from these various disciplines.



The 1st, 2nd, and 3rd editions of the Foundations of Augmented Cognition represent the diverse and comprehensive collection of works from international scientists, engineers, and practitioners as presented at the 2005 (Vegas), 2006 (San Fran), and 2007 (Beijing) ACI conferences, respectively.

[www.augmentedcognition.org/events.htm](http://www.augmentedcognition.org/events.htm)



# AGENDA AT A GLANCE

Your HFES registration fee includes participation in all ACI events except the Tuesday ACI Banquet.

## MONDAY, OCTOBER 1

LOCATION FOR ALL ACI PAPER SESSIONS: WATERVIEW C/D	
0730 – 0800	Coffee/tea available
0800 – 0830	Welcome by CDR Dylan Schmorrow Introduction by Denise Nicholson and David Kobus
0830 – 0900	“Best of ACI 07” Paper Summary Presentations
0900 – 1000	Foundations Paper Presentations A
1000 – 1030	Break (coffee/tea, assorted pastries)
1030 – 1200	Foundations Paper Presentations B
1200 – 1315	Lunch (not provided)
1315 – 1515	Training and Education Paper Presentations
1515 – 1530	Break (coffee/tea, assorted soft drinks)
1530 – 1730	Future Directions Paper Presentations Closing Remarks from CDR Dylan Schmorrow
1830 – 2130	HFES Conference Welcome Reception in Grand Ballroom

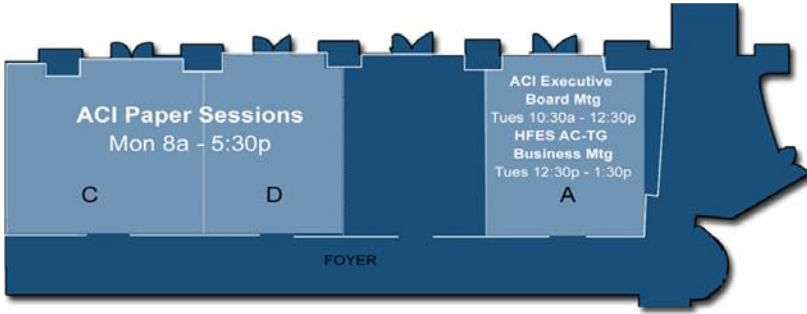
## TUESDAY, OCTOBER 2

0800 – 1015 GRAND BALLROOM V/VI	HFES Opening Plenary Session
1030 – 1230 WATERVIEW A	ACI Executive Board Meeting (*Invitation Only)
1230 – 1330 WATERVIEW A	HFES AC-TG Business Meeting
1330 – 1500 GRAND BALLROOM VI	ACI '07 Poster Session at HFES
1530 – 1700 ESSEX (A/B/C)	“Best of ACI '07” Paper Session at HFES
1830 – 2130 GRAND BALLROOM V	ACI Banquet Dinner and Showcase Event Keynote Address by Leland S. Kollmorgen, Rear Admiral, U.S. Navy (Ret.); Poster Displays from ACI paper authors; and Demo participants including: Advanced Brain Monitoring, Inc., Alion BMH Operation, Electrical Geodesics, Inc., QinetiQ Ltd and TransLumen Technologies LLC, the University of Central Florida's Institute for Simulation and Training, and the University of Iowa's Operator Performance Laboratory

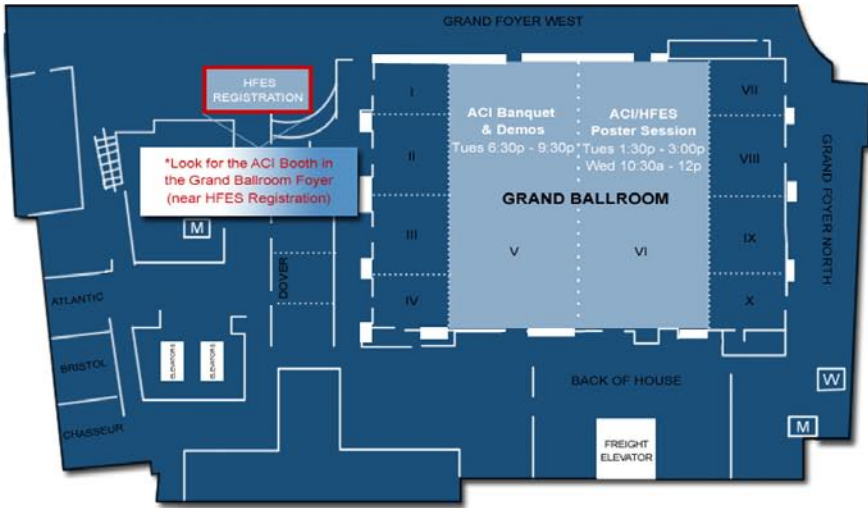
## WEDNESDAY, OCTOBER 3

1030 – 1200 GRAND BALLROOM VI	ACI '07 Poster Session at HFES
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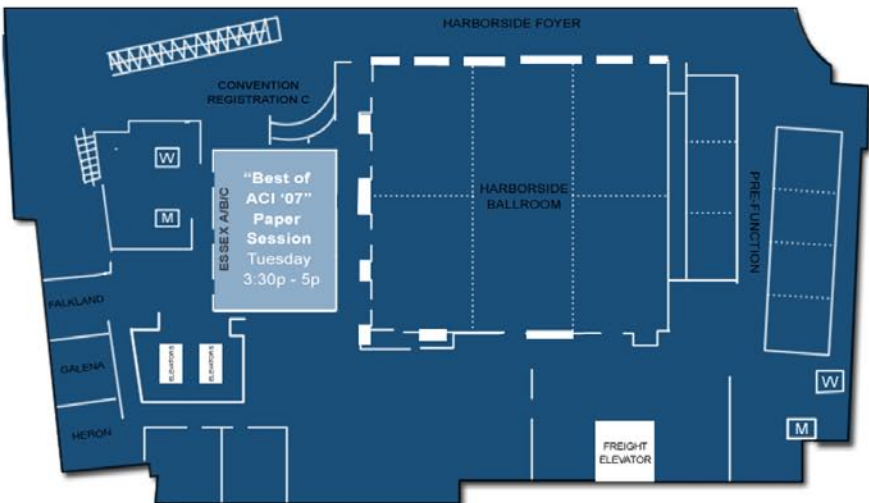
# FLOORPLANS



**WATERVIEW BALLROOM**  
*Lobby Level*



**GRAND BALLROOM**  
*3rd Floor*



**HARBORSIDE BALLROOM**  
*4th Floor*

## WELCOME



Welcome to the 4th International Conference on Augmented Cognition. This year's conference will have attendees from around the globe to hear and present papers regarding the foundations of Augmented Cognition (AugCog) science and technology, training and educational applications, and future directions of this exciting field. The multidisciplinary nature of the AugCog field has provided novel research conducted by collaborative scientists, engineers, specialists, and practitioners to revolutionize the way humans interact with computers. Today's AugCog researchers and developers are putting these tools into practice and developing numerous and diverse applications—from basic academic research to industrial and military fielded operational and training systems to every day computing and entertainment devices.

This year's conference provides an opportunity to review and discuss the latest advances in the field of Augmented Cognition, whether during the Monday paper sessions or the Tuesday banquet dinner and showcase event. The ACI banquet will showcase all of the ACI posters and several signature AugCog demonstrations for all to explore and get a hands-on feel for how AugCog science and technology is revolutionizing the way we interact with computers. This year's HFES conference also includes several AugCog sessions in an effort to improve collaboration and networking opportunities between the newly approved AugCog Technical Group (AC-TG; see p. 11) and the general HFES community: "The Best of ACI 2007" will be presented during the general HFES sessions on Tuesday and select ACI posters will be displayed during the regular HFES poster sessions on Tuesday and Wednesday. So, take advantage of this year's opportunity to get a sneak peak into the future of human-system computing as revealed by this year's ACI events and become part of the future by joining the HFES AC-TG.

Denise Nicholson and David Kobus  
ACI 07 Conference Co-Chairs

## CONFERENCE STAFF

### Conference Management

**Denise Nicholson and David Kobus**  
*Conference Co-Chairs*

**Julie Drexler**  
*Conference Director and Co-Coordinator*

**Cali Fidopiastis and Erica Palmer**  
*Conference Co-Coordinators*

**Leah Reeves**  
*ACI-HFES Liaison*

**Karl VanOrden and Christine Brown**  
*Conference Technical Program Co-Chairs*

**Dylan Schmorrow and Leah Reeves**  
*Awards Committee Co-Chairs*

**Lee Sciarini**  
*Conference Volunteer Committee Chair*

### Session Chairs

**Dylan Schmorrow** (*Office of Naval Research*)

**Roy Stripling** (*U.S. Naval Research Laboratory*)

**Tom Schnell** (*University of Iowa*)

**Gwen Campbell** (*NAVAIR, Training Systems Division*)

**Julie Drexler** (*UCF Institute for Simulation & Training*)

**Leah Reeves** (*Potomac Institute for Policy Studies*)

**Anna Lockerd** (*AnthroTronix, Inc.*)

**Joseph Coyne** (*U.S. Naval Research Laboratory*)

**Christine Brown** (*Pacific Science and Engineering*)

### Special thanks to

Amy Cauffman, Brandyce Romer, Kimberly Sprouse, Patrick Worcester, Laurie Ybarra and HFES Management

### Executive Board

Ray Adams, *United Kingdom*

Joseph Cohn, *USA*

Martha Crosby, *USA*

Blair Dickson, *United Kingdom*

Wai-Tat Fu, *USA*

Chris Forsythe, *USA*

Henry Girolamo, *USA*

Peter Hancock, *USA*

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Robert Taylor, *United Kingdom*

Karl Van Orden, *USA*

John Wagner, *USA*

Kenneth Wang, *USA*

Glenn Wilson, *USA*



## ACI Ambassadors

The following people help to disseminate general information regarding the field of Augmented Cognition and what to expect at ACI conferences. To spot them in a crowd, look for their ACI Ambassador lapel pins as shown here. If you are interested in becoming an ACI Ambassador, please contact Leah Reeves, [leah@augmentedcognition.org](mailto:leah@augmentedcognition.org).



- |  |  |
|--|--|
| <b>Ray Adams</b> ( <i>Middlesex University, London</i> )                       | <b>Santosh Mathan</b> ( <i>Honeywell</i> )                                       |
| <b>Laurel Allender</b> ( <i>Army Research Laboratory</i> )                     | <b>Rob Matthews</b> ( <i>QUASAR</i> )  |
| <b>Rick Arnold</b> ( <i>Human Performance Architects, LLC</i> )                | <b>Jennifer McKneely</b> ( <i>Johns Hopkins University Applied Physics Lab</i> ) |
| <b>Rich Cornwall</b> ( <i>Alion Science and Technology, BMH Operations</i> )   | <b>Melissa Walwanis Nelson</b> ( <i>NAVAIR Orlando</i> )                         |
| <b>Larry Davis</b> ( <i>UCF Institute for Simulation &amp; Training</i> )      | <b>Denise Nicholson</b> ( <i>UCF Institute for Simulation &amp; Training</i> )   |
| <b>Hunter Downs</b> ( <i>Archinoetics, LLC</i> )                               | <b>Jennifer Ockerman</b> ( <i>Johns Hopkins University Applied Physics Lab</i> ) |
| <b>Traci Downs</b> ( <i>Archinoetics, LLC</i> )                                | <b>Joe Peak</b> ( <i>U.S. Naval Research Laboratory</i> )                        |
| <b>Julie Drexler</b> ( <i>UCF Institute for Simulation &amp; Training</i> )    | <b>Colby Raley</b> ( <i>Strategic Analysis, Inc.</i> )                           |
| <b>Cali Fidopiastis</b> ( <i>UCF Institute for Simulation &amp; Training</i> ) | <b>COL Mike Russo</b> ( <i>U.S. Army Aeromedical Research Laboratory</i> )       |
| <b>Chris Forsythe</b> ( <i>Sandia National Labs</i> )                          | <b>Doug Siefken</b> ( <i>TransLumen Technologies, LLC</i> )                      |
| <b>Sven Fuchs</b> ( <i>Design Interactive, Inc.</i> )                          | <b>Diglio Simoni</b> ( <i>RTI International</i> )                                |
| <b>Henry Girolamo</b> ( <i>Natick Soldier Center</i> )                         | <b>Mike Snow</b> ( <i>The Boeing Company</i> )                                   |
| <b>Frank Greitzer</b> ( <i>Pacific Northwest National Laboratory</i> )         | <b>Kay Stanney</b> ( <i>UCF and Design Interactive, Inc.</i> )                   |
| <b>LT Marc Grootjen</b> ( <i>Royal Netherlands Navy</i> )                      | <b>Roy Stripling</b> ( <i>U.S. Naval Research Laboratory</i> )                   |
| <b>Kelly Hale</b> ( <i>Design Interactive, Inc.</i> )                          | <b>Len Trejo</b> ( <i>QUASAR</i> )   |
| <b>Monte Hancock</b> ( <i>Essex Scientific Systems Group</i> )                 | <b>Eric Viirre</b> ( <i>UCSD</i> )   |
| <b>Peter Hancock</b> ( <i>UCF</i> )  | <b>Glenn Wilson</b> ( <i>Air Force Research Laboratory</i> )                     |
| <b>Joseph Juhnke</b> ( <i>Tanagram Partners</i> )                              | <b>Peter Young</b> ( <i>Colorado State University</i> )                          |
| <b>Wilhelm Kincses</b> ( <i>DaimlerChrysler Corporation</i> )                  |  |
| <b>David Kobus</b> ( <i>Pacific Science and Engineering</i> )                  |  |
| <b>Todd Macuda</b> ( <i>National Research Council of Canada, Ottawa</i> )      |  |

## ACI Editorial Review Board

The ACI Society thanks the following people for their independent and objective reviews of all ACI 2007 abstract proposals and final papers. Their time and effort helped make the 4th Edition of the Foundations of Augmented Cognition another exceptional contribution to the field.

- |  |  |
|--|--|
| <b>Rick Arnold</b> ( <i>Human Performance Architects</i> )                               | <b>Laura Milham</b> ( <i>Design Interactive, Inc.</i> )                      |
| <b>Dirk Beer</b> ( <i>Pacific Science and Engineering</i> )                              | <b>Denise Nicholson</b> ( <i>UCF Institute for Simulation and Training</i> ) |
| <b>Chris Berka</b> ( <i>Advanced Brain Monitoring, Inc.</i> )                            | <b>Heather Oonk</b> ( <i>Pacific Science and Engineering</i> )               |
| <b>Ami Bolton</b> ( <i>Strategic Analysis, Inc.</i> )                                    | <b>Erica Palmer</b> ( <i>Pacific Science and Engineering</i> )               |
| <b>Christine Brown</b> ( <i>Pacific Science and Engineering</i> )                        | <b>Sasanka Prabhala</b> ( <i>Intel Corporation</i> )                         |
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| <b>Blair Dickson</b> ( <i>QinetiQ</i> )  | <b>Dylan Schmorrow</b> ( <i>Office of Naval Research</i> )                   |
| <b>Julie Drexler</b> ( <i>UCF Institute for Simulation and Training</i> )                | <b>Tom Schnell</b> ( <i>University of Iowa</i> )                             |
| <b>Cali Fidopiastis</b> ( <i>UCF Institute for Simulation and Training</i> )             | <b>Randy Shumaker</b> ( <i>UCF Institute for Simulation and Training</i> )   |
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| <b>Eva Hudlicka</b> ( <i>Psychometrix Associates</i> )                                   | <b>Roy Stripling</b> ( <i>US Naval Research Laboratory</i> )                 |
| <b>David Kobus</b> ( <i>Pacific Science and Engineering</i> )                            | <b>Betty Tuller</b> ( <i>Florida Atlantic University</i> )                   |
| <b>Anna Lockerd</b> ( <i>AnthroTronix, Inc.</i> )  | <b>Karl VanOrden</b> ( <i>Naval Health Research Center</i> )                 |
| <b>Todd Macuda</b> ( <i>National Research Council of Canada</i> )                        | <b>Jack Vice</b> ( <i>AnthroTronix, Inc.</i> )                               |
|  | <b>Diane Williams</b> ( <i>Naval Health Research Center</i> )                |



The following people have been recognized by ACI Society for their direct contributions to the establishment of a new frontier in human-computer interaction—Augmented Cognition.

## ACI 2007 FAC Award Recipients

**Gwen Campbell**  
*NAVAIR Orlando*

**Martha Crosby**  
*University of Hawaii*

**Marc Grootjen**  
*Technical University of Delft and  
Directorate Materiel Royal Netherlands Navy*

**COL Mike Russo**  
*USAARL*

**Ron Stevens**  
*UCLA School of Medicine, IMMEX Project*

**Stephen Whitlow**  
*Honeywell Laboratories*

## Previous FAC Award Recipients

**Rich Barker**  
*The Boeing Company (Ret.)*

**Chris Berka**  
*Advanced Brain Monitoring, Inc.*

**Ken Boff**  
*Air Force Research Laboratory*

**Britton Chance**  
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**J. Hunter Downs, III**  
*Archinoetics, LLC*

**Traci Downs**  
*Archinoetics, LLC*

**Don DuRousseau**  
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**Rich Edwards**  
*The Boeing Company*

**Monica Fabiani**  
*University of Illinois*

**Sven Fuchs**  
*Design Interactive, Inc.*

**Gabriele Gratton**  
*University of Illinois*

**LT Jeff Grubb**  
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**Banu Onaral**  
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**Pieter Poolman**  
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**Alan Pope**  
*NASA Langley Research Center*

**Denny Proffitt**  
*University of Virginia*

**Leah Reeves**  
*UCF & Potomac Institute for Policy Studies*

**Chris Russell**  
*Air Force Research Laboratory*

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**Michael Snow**  
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*Electrical Geodesics, Inc.*

**Trish Ververs**  
*Honeywell Laboratories*

**Glenn Wilson**  
*Air Force Research Laboratory*

**Peter Young**  
*Colorado State University*



## Events

### Neuroscience 2007

November 3-7, 2007

San Diego Convention Center

San Diego, CA, USA

<http://www.sfn.org/am2007>

### 15th Annual Meeting of the Cognitive Neuroscience Society

April 12-15, 2008

Hyatt Regency Hotel

San Francisco, CA, USA

<http://www.cogneuroscience.org>

### 2nd International Conference on Applied Ergonomics

July 14-17, 2008

Caesars Palace, Las Vegas, Nevada, USA

<http://www.AEI2008.org>

CDR Dylan Schmorow will be giving the AE 2008 Keynote Address and chairing 2 Augmented Cognition-related Panel sessions during the conference

## Select Publications

### Available Now

#### Operational Applications of Cognitive Performance Enhancing Technologies

A special supplement for the journal *Aviation, Space, and Environmental Medicine: May 2007, 78, 5, Section II, Supplement*

Guest co-editors: Mike Russo, Dylan Schmorow, and Maria Thomas

### Optical Brain Imaging

A special issue in IEEE's *Engineering in Medicine and Biology Magazine*: Volume: 26, Issue: 4, July-Aug 2007

Guest co-editors: Monica Fabiani, Dylan Schmorow, and Gabriele Gratton

### Available Fall 2007

#### Augmented Cognition: Past, Present, and Future

A special issue of the *Journal of Cognitive Engineering and Decision Making*

Guest co-editors: Dylan Schmorow, Kay Stanney, and Leland Kollmorgen

### Available Winter 2007

#### Augmented Cognition in HCI: 21st Century Adaptive System Science and Technology

Chapter in the *Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies, and Emerging Applications (2nd Edition)*, edited by A. Sears & J. Jacko

Chapter authors: Dylan Schmorow, Amy Kruse, Leah Reeves, and Ami Bolton

### Available Early 2008

#### Augmented Cognition: A Practitioner's Guide

Text to be published by the Human Factors and Ergonomics Society

## CALL FOR PAPERS



2009 HCI/ACI

July 19-24

San Diego, CA

See [www.hcii2009.org/submissions.html](http://www.hcii2009.org/submissions.html) for the Call

for Participation and submission site for our International AugCog colleagues. Select the "Augmented Cognition" thematic area when submitting. Paper abstracts are due 20 October 2008; poster abstracts are due 23 February 2009.

### 2008 International Computational Neuroscience Meeting

July 20-24, 2008

Portland, OR, USA

<http://www.cnsorg.org/>

### HFES 52nd Annual Meeting

September 22-26, 2008

New York Marriott Marquis Times Square

New York, NY, USA

<http://www.hfes.org/web/HFESMeetings/meetings.html>

*Edited by: Dylan Schmorow, Kay Stanney, and Leah Reeves*

### Available Spring 2008

#### The PSI Handbook of Virtual Environments for Training and Education: Developments for the Military and Beyond

*Edited by: Dylan Schmorow, Joseph Cohn, and Denise Nicholson*

### Available Fall 2009

#### Augmented Cognition

Chapter in Volume 5 of *Reviews of Human Factors and Ergonomics*, edited by F. Durso

Chapter authors: Kay Stanney, Dylan Schmorow, Leah Reeves, Kelly Hale, and Sven Fuchs



## Monday, October 1

### Location for all ACI Paper Sessions:

Waterview C/D

**Time: 0800-0830**

### Welcome & Introduction

*CDR Dylan Schmorrow, Office of Naval Research  
Denise Nicholson, Conference Co-Chair  
David Kobus, Conference Co-Chair*

**Time: 0830-0900**

### Session

Best Topic Area Papers

#### Session Chair

*CDR Dylan Schmorrow, Office of Naval Research*

#### Session Description

CDR Dylan Schmorrow will kick off the morning ACI paper sessions by introducing the “ACI 2007 Best Topic Area Paper” winners. Each winner will present a brief overview of their papers—they will later give full presentations during the Tuesday “Best of ACI ‘07” HFES general session being held from 1530 – 1700 in Essex (A/B/C) (see p. 12).

### Topic Winners

#### Foundations

Application of the Cognitive Avionics Tool Set (CATS) in Airborne Operator State Classification  
*Tom Schnell, Mike Keller, and Todd Macuda*

Experimental Design and Testing of a Multimodal Cognitive Overload Classifier  
*Leonard J. Trejo, Neil J. McDonald, Robert Matthews, and Brendan Z. Allison*

### Topic Winners

#### Training and Education

A Preliminary Comparison of Statistical and Neurophysiological Techniques to Assess the Reliability of Performance Data  
*Gwendolyn E. Campbell and Phan Luu*

Allocation of Time, EEG-Engagement and EEG-Workload Resources as Scientific Problem Solving Skills are Acquired in the Classroom

*Ronald Stevens, Trysha Galloway, and Chris Berka*

### Topic Winner

#### Future Directions

WorkSense: Exploring the Feasibility of Human Factors Assessment Using Electrophysiological Sensors  
*Santosh Mathan, Thea Feyereisen, and Stephen Whitlow*

**Time: 0900-1000**

### Session

#### Foundations

#### Session Co-Chairs

*Roy Stripling, U.S. Naval Research Laboratory, and Tom Schnell, University of Iowa*

#### Session Description

This session addresses foundations of Augmented Cognition science and technology, including: neurophysiological-based techniques (e.g., EEG- and fNIR-based sensors and gauges) for detecting cognitive functional state in real time and in various application domains; closed-loop systems, and; adaptive design strategies and frameworks, multimodal information display, and integration architectures.

Iterative Experimental Design to Mature Cognitive State Classification Techniques from the Laboratory to Field Settings  
*Michael C. Dorneich, Stephen D. Whitlow, Santosh Mathan, and Patricia May Ververs*

Determining Gaze Parameters to Guide EEG/ERP Evaluation of Imagery Analysis  
*Kelly S. Hale, Sven Fuchs, Par Axelsson, Angela Baskin, and David Jones*

Initial Validation of Tool for Interface Design Evaluation with Sensors (TIDES)  
*Patrice D. Tremoulet, Patrick Craven, Saki Wilcox, Susan Harkness Regli, Joyce Barton, Kathleen Stibler, Adam Gifford, William Fitzpatrick, Dervon Chang, Laura Milham, Chris Berka, Daniel J. Levendowski, and Marianne Poythress*

**Time: 1030-1200**

Neurophysiological Estimation of Interruptibility: Demonstrating Feasibility in a Field Context

*Santosh Mathan, Stephen Whitlow, Michael Dorneich, Patricia Ververs, and Gene Davis*



Physiological Arousal in Response to Low and High Workload Conditions in a Military Forward Observer PC Simulator Task  
*Stephanie R. Fishel, Lyndsey Banks, Lauren N. Brewer, Jarryd Player, Adam W. Hoover, and Eric R. Muth*

Exploiting Perceptual Effects in RSVP  
*Stefan Joe-Yen and Monte F. Hancock, Jr.*

Utilizing an Eye-Tracker Device for Operator Support  
*Tjerk de Greef and Harmen Lafeber*

**Time: 1315-1515** \_\_\_\_\_

## Session

### Training and Education

#### Session Co-Chairs

*Gwen Campbell, NAVAIR, Training Systems Division, and Julie Drexler, UCF Institute for Simulation & Training*

#### Session Description

This session is focused on training and education applications of Augmented Cognition science and technology (S&T), including: behavioral and neurophysiological-based tools and techniques for establishing accelerated learning strategies and adaptive training systems; design, development, and implementation of individually-tailored and closed-loop training systems for both individuals and teams. Lessons learned and implications most relevant to future directions in Augmented Cognition-enabled training system design, development, and application are also addressed.

The Use of Electrophysiological Markers of Expertise to Configure Adaptive Training Systems

*Blair Dickson and Andy Belyavin*

A Multi-Domain Meta-Thematic Approach to Deriving Design Recommendations and Identifying Applications for Adaptive Systems

*Melissa M. Walwanis Nelson, Beth F. Wheeler Atkinson, Eric R. Stewart, and Susan M. Eitelman*

Determining the Color of Your Mood Rock: Synchronizing Dynamic Eye Tracking Data with Arousal Measures in a Virtual Environment

*Larry Davis, Cali Fidopiastis, Aniket Vartak, Pankaj Mahajan, and Denise Nicholson*

Webcam Eye-Tracking Using a Radial Basis Neural Network

*Curtis S. Ikehara and Martha E. Crosby*

Putting the Cart Together with the Horse: Augmenting Cognition Across the Training Cycle

*Stephen M. Fiore and Denise Nicholson*

**Time: 1530-1730** \_\_\_\_\_

## Session

### Future Directions

#### Session Co-Chairs

*Leah Reeves, Potomac Institute for Policy Studies, and Anna Lockerd, AnthroTronix, Inc.*

#### Session Description

This session highlights future directions in Augmented Cognition science, technology, and application including innovative human-centered computing design strategies, assessment techniques, and application areas (e.g., gaming, cognitive rehabilitation) and also addresses lessons learned and implications most relevant to the future of the Augmented Cognition field in general.

Using Neural and Physiological Correlates to Detect Loss of Situation Awareness

*Leigh A. Baumgart, Jennifer A. B. McKneely, and Carlos A. Comperatore*

Approaches for Bias Mitigation During Imagery Analysis

*Sven Fuchs, David L. Jones, and Kelly S. Hale*

Efficient Selection of Information Presentation Modality in a Hybrid-Task Environment

*Priyamvada Tripathi, Troy McDaniel, and Sethuraman Panchanathan*

Use of Communication Delays to Identify Physiological Indices for Augmented Team Cognition

*Robert A. Henning, Thomas J. Smith, and Adam G. Armstead*

Near-term, Mid-term, and Long-term Research Objectives for Augmented Cognition: (a) Robust Controller Technology and (b) Mitigation Strategies  
*Leah Reeves, Kay Stanney, Par Axelsson, Peter Young, and Dylan Schmorrow*

# ACI DINNER BANQUET AND SHOWCASE EVENT

**Demo Session Chair:** Joseph Coyne (*U.S. Naval Research Laboratory*)

**Poster Session Chair:** Christine Brown (*Pacific Science and Engineering*)

**When:** Tuesday, October 2nd, 6:30-9:30pm

**Where:** Grand Ballroom V

**Why:** Take advantage of this thrilling opportunity to see existing AugCog science and technology in action, and take a sneak peak into the future of human-system computing.

**What:** Food, Fun, and Great Entertainment!

Dinner, invited speakers, 2007 ACI awards presentation, inspiring conversations, ACI posters, and a few interactive AugCog demos for all attendees to explore and get a hands-on feel for what AugCog science and technology truly represents. The AugCog demos include:

- Advanced Brain Monitoring, Inc. will showcase a real-time demonstration of EEG recording, decontamination, and signal processing while participants use the IMMEX learning testbed as well as a live three electrode set-up and recording of EEG on volunteers from the audience
- Alion BMH Operation will showcase Cognitive Cockpit (CogPit) spin off efforts, to include the DARPA Advanced Tactical Aircraft (ATAS) effort, and the Quality of Training Effectiveness Assessment (QTEA) tool project
- Electrical Geodesics, Inc. will showcase an integrated 256-channel EEG and head/eye movement videometry within a tank identification task
- QinetiQ Ltd and TransLumen Technologies LLC will showcase an augmented symbology application in an operational interface workstation environment
- The University of Central Florida's Institute for Simulation and Training will showcase a synchronization and visualization of eye tracking and arousal data within a dynamic environment
- The University of Iowa's Operator Performance Laboratory will showcase a Cognitive Avionics Tool Set (CATS) for multi-sensory physiological based operator state characterization real-time

## POSTER DISPLAYS

During the ACI Dinner Banquet and Showcase Event, the following posters will be on display throughout the Grand Ballroom and respective authors will be on hand to discuss their work.

### Foundations

**Mitigating the Vigilance Decrement: Perceptual versus Cognitive Interventions**

*Mark St. John and Matthew R. Risser*

**Augmented Symbology: A New Approach to Data Visualization**

*Dale Richards and Douglas R. Siefken*

**Design and User Evaluation of an Interface Prototype that Adapts to the Operator's Cognitive Task Load**

*M. Grootjen, M.A. Neerincx, K.D. Stolk, J.C.M. van Weert, and E.P.B. Bierman*

**Multiple Baseline Approach to Understanding Psychometric Data in Augmented Cognition Paradigms**

*Denise M. Nicholson, Cali M. Fidopiastis, Clint A. Bowers, Pankaj Mahajan, Aniket Vartak, Tatiana Ballion, and Carl Anglesea*

**Ethical Considerations in the Use of Cogniceuticals as Augmented Cognition Mitigation Strategies: Alertness Sustaining Fatigue Countermeasures**

*Michael B. Russo, John A. Caldwell, Jr., and Maria L. Thomas*

### Training and Education

**Task Performance and Workload Using an Augmented Reality Attention Orienting System**

*Christian Jerome and Amanda Howey*

**Using Scale Simulation and Virtual Environments to Study Human-Robot Teams**

*Scott Osofsky, A. W. Evans III, Joseph R. Keebler, and Florian Jentsch*

**Eye Tracking as a Viable Means to Study Augmented Team Cognition**

*Heather Lum, Moshe Feldman, Valerie Sims, and Eduardo Salas*

**Evaluation of Psychophysiological Sensor Data's Contribution to Enhancing Training Effectiveness: What Do We Know?**

*Jefferson Grubb, Melissa Walwanis Nelson, Philip Fatolitis, Meagan Shetty, and Jordan Knicely*

**Promising Directions for Improved Training, Learning, and Memory**

*Daniel Afergan and Joel L. Davis*



## Future Directions

### Augmented Team Cognition for Complex Problem Solving Tasks: A Framework and Research Agenda

*Michael A. Rosen, Moshe Feldman, Stephen M. Fiore, and Eduardo Salas*

### Augmented Napping: Development of an Intelligent Sleep Aid

*Matthew A. Yanagi, Chris Berka, Gene Davis, Daniel Levendowski, Robin R. Johnson, and Wayne Ensign*

### Eye-Com® Biosensor, Communicator and Controller System for Assessing Cognitive State Via Oculomotor Signals

*William Torch, Michael B. Russo, Carlos Cardillo, and Maria L. Thomas*

### Augmented Cognition and Chronometric Data: Physical vs. Psychological Time

*Philip G. Fatolitis and Peter A. Hancock*

### Interaction Strategies for Smart AugCog

*Taro Kanno and Kazuo Furuta*

### Designing Products That Sell: Transition Strategies for Augmented Cognition

*Timothy Mills and Joseph Juhnke*

### Playing Games With the Mind: Augmented Cognition in the Entertainment Industry

*Julie Drexler, Lee Sciarini, Peter Smith, and Denise Nicholson*



## New Augmented Cognition Technical Group (AC-TG) in HFES

In June 2007 the HFES Executive Council officially approved the new Augmented Cognition Technical Group (AC-TG), which was co-founded by Dr. Kay Stanney and Dr. Leah Reeves. We thank all current HFES members who enthusiastically expressed interest in joining the AC-TG and helped garner additional support from their colleagues. We look forward to welcoming additional HFES members—your continued interest and support will be the key to our group’s success in the coming years.

The AC-TG is concerned with fostering the development and application of: real-time physiological and neurophysiological sensing technologies that can ascertain a human’s cognitive state while interacting with computing-based systems; data classification and integration architectures that enable closed-loop system applications; mitigation (adaptive) strategies that enable efficient and effective system adaptation based on a user’s dynamically changing cognitive state; individually- tailored training systems; and roadmaps for future directions concerning AugCog science and technology (S&T) and guidelines of use for the technology and user information that may be garnered from it.

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, which will provide another exciting opportunity for the Human Factors and AugCog fields to promote and leverage S&T breakthroughs, applications, and lessons-learned emerging from both fields. The AC-TG and its officers take a particular interest in continuing to provide novel and interactive venues for researchers, scientists, engineers, and practitioners to disseminate and exchange information and understanding and to present late-breaking research and application results concerning the perceptual, cognitive, and neurological aspects of the burgeoning field of AugCog. Through such recurrent exchange of ideas and information, it is envisioned that today’s AugCog researchers and developers will continue to address basic human factors R&D challenges and put AugCog tools and methodologies into practice to develop numerous and diverse applications—from basic academic research to industrial and military fielded operational and training systems to everyday computing and entertainment applications.

If you would like more information on the AC-TG, please contact Leah Reeves ([leah@augmentedcognition.org](mailto:leah@augmentedcognition.org)) or visit [www.augmentedcognition.org](http://www.augmentedcognition.org). To join the AC-TG, please visit: <http://www.hfes.org/web/TechnicalGroups/technical.html>.

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**Please join us Tuesday Oct 2nd 1230 - 1330 in Waterview A for our first official HFES AC-TG Business Meeting!**

## Tuesday, October 2

### “Best of ACI '07” Paper Session at HFES

Time: 1530-1700,

Location: Essex (A/B/C)

#### Session Co-Chairs

*Kay Stanney, UCF and Design Interactive,  
Leah Reeves, Potomac Institute for Policy Studies,  
and Dylan Schmorrow, Office of Naval Research*

To foster further mutual outreach opportunities between the AC-TG and HFES communities, this special session is being held during the general HFES sessions. It will feature presentations from the authors of the “best of the best” ACI 2007 paper submissions, as selected by the ACI 2007 Editorial Review Board. To kick off this session, CDR Dylan Schmorrow will present these authors with their ACI '07 Best Paper Awards.

Application of the Cognitive Avionics Tool Set (CATS) in Airborne Operator State Classification

*Tom Schnell, Mike Keller, and Todd Macuda*

A Preliminary Comparison of Statistical and Neurophysiological Techniques to Assess the Reliability of Performance Data

*Gwendolyn E. Campbell and Phan Luu*

Allocation of Time, EEG-Engagement and EEG-Workload Resources as Scientific Problem Solving Skills are Acquired in the Classroom

*Ronald Stevens, Trysha Galloway,  
and Chris Berka*

Experimental Design and Testing of a Multimodal Cognitive Overload Classifier

*Leonard J. Trejo, Neil J. McDonald, Robert Matthews, and Brendan Z. Allison*

WorkSense: Exploring the Feasibility of Human Factors Assessment Using Electrophysiological Sensors

*Santosh Mathan, Thea Feyereisen, and Stephen Whitlow*

### ACI Poster Session at HFES

Time: 1330-1500

Location: Grand Ballroom VI

#### Session Chair

*Christine Brown, Pacific Science and Engineering*

Ethical Considerations in the Use of Cogniceuticals as Augmented Cognition Mitigation Strategies: Alertness Sustaining Fatigue Countermeasures

*Michael B. Russo, John A. Caldwell, Jr.,  
and Maria L. Thomas*

Design and User Evaluation of an Interface Prototype that Adapts to the Operator's Cognitive Task Load

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Augmented Team Cognition for Complex Problem Solving Tasks: A Framework and Research Agenda

*Michael A. Rosen, Moshe Feldman, Stephen M. Fiore, and Eduardo Salas*

## Wednesday, October 3

### ACI Poster Session at HFES

Time: 1030-1200,

Location: Grand Ballroom V

#### Session Chair

*Christine Brown, Pacific Science and Engineering*

Mitigating the Vigilance Decrement: Perceptual versus Cognitive Interventions

*Mark St. John and Matthew R. Risser*

Augmented Napping:

Development of an Intelligent Sleep Aid

*Matthew A. Yanagi, Chris Berka, Gene Davis,  
Daniel Levendowski, Robin R. Johnson, and Wayne Ensign*

Playing Games With the Mind: Augmented Cognition in the Entertainment Industry

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Eye-Com® Biosensor, Communicator & Controller System for Assessing Cognitive State Via Oculomotor Signals

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Evaluation of Psychophysiological Sensor Data's Contribution to Enhancing Training Effectiveness: What Do We Know?

*Jefferson Grubb, Melissa Walwanis Nelson,  
Philip Fatolitis, Meagan Shutty, and Jordan Knicely*



Baltimore Marriott Waterfront Hotel is set on the edge of the Baltimore Inner Harbor in the heart of Harbor East, the newest Baltimore neighborhood. You are steps from Inner Harbor restaurants and shopping, the National Aquarium, Maryland Science Center and USS Constellation. The hotel is also within easy walking distance of downtown Baltimore, the Convention Center, Camden Yards and M&T Bank Stadium sporting events.

## Transportation

<b>Local Bus, Metro, Light Rail and MARC Train</b>	410-539-5000	<b>Seaport Taxi of Baltimore</b>	410-675-2900
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## Directions to Hotel

### Baltimore/Washington International Thurgood Marshall Airport - BWI

From Baltimore-Washington International Airport: Take Baltimore/Washington Parkway North, 8 miles to Pratt Street, turn right. Proceed to President Street and turn right. Get into the right-hand lane and proceed straight. At stop sign, go straight, hotel will be on your right. Distance: 12 mi; Estimated taxi fare: \$23.

### Ronald Reagan Washington National - DCA

From Reagan National Airport, Washington DC: Take George-Washington Parkway North to I 495 and proceed North to I 95 North. Follow I 95 North to I 395 to Pratt Street, turn right. Proceed on Pratt Street to President's Street. Turn right onto President's Street. Turn right onto Aliceanna, hotel is on the right. Distance: 45 mi; Estimated taxi fare: \$100.

### Washington, DC/Dulles - IAD

From Washington Dulles International Airport: Take the Dulles Toll Road East to I 495 North. Proceed on I 495 North to I 95 North. Follow I 95 North to I 395 Downtown Baltimore to Pratt Street, turn right. Proceed on Pratt Street to President's Street, turn right onto President's Street. Turn right onto Aliceanna, hotel is on the right. Distance: 52 mi; Estimated taxi fare: \$125.

## Easy-Access Restaurants at the Baltimore Marriott Waterfront Hotel

### Grille 700

American fare. Open for breakfast, lunch and dinner. Restaurant on the waterfront features a seasonal menu.

### Kozmo's Lounge

American fare. Open for lunch and dinner. Upscale martini bar features wines, beers, and spirits with a light fare menu.

### Rigano's Bakery and Deli

Bakery & delicatessen. Open for breakfast, lunch and dinner. Take-out, snacks, deli items and baked goods, and Starbucks coffee.

## Additional Hotels near the Baltimore Marriott Waterfront Hotel

<b>Days Inn Inner Harbor</b>	410-576-1000 100 Hopkins Place	<b>Sheraton Baltimore City Center Hotel</b>	410-752-1100 101 West Fayette Street
<b>Holiday Inn Express at Stadium</b>	410-727-1818 1701 Russell Street		



## Museums, Sights, and Entertainment

### Baltimore, MD

#### Inner Harbor – Harborplace

A festive marketplace with shops, eateries, and activities

#### Power Plant Live

Intersection of Market Place & Water Street

Premier dining and entertainment district featuring a variety of restaurants and night-clubs surrounding a common plaza with outdoor seating which often features live performances

#### Maryland Science Center

410-685-5225

601 Light Street

Dinosaurs, Planet Earth, The Human body, Outer space, The Kids Room, and so much to see and do

#### National Aquarium in Baltimore

410-576-3800

501 E. Pratt Street

World-class aquatic museum dedicated to education, conservation and environmental improvement

#### Port Discovery

410-727-8120

35 Market Place

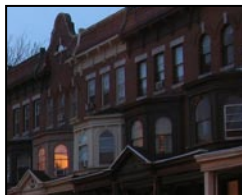
Kid-powered museum offering 3 floors of interactive, educational exhibits for kids ages 2-10!

#### Ride the Ducks Tour

410-727-3825

25 Light Street

80 minutes of entertainment and information as you tour Charm City on a land and sea vehicle



### Walters Art Gallery

410-547-9000

600 N. Charles St.

World famous art collection of Egyptian artifacts, medieval armor and Faberge eggs

### Baltimore Museum of Art

443-573-1700

10 Art Museum Drive

Has the world's second-largest private collection of Andy Warhol works in the country

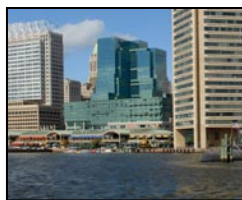
### Washington, DC

#### Washington Monument Tour

202-426-6841

15th St. & Constitution Ave. NW

The National Park Service re-opened the Washington Monument for visitation. Free same day timed tickets are available beginning at 8:30 am at the 15th street kiosk. The Monument is open daily 9am to 5pm



**White House Tour**

202-456-2200  
1600 Pennsylvania Ave. NW

Tours of the White House has been expanded to include parties of ten or more people, regardless of age or type of group.

**George Washington's Distillery**

5514 Mount Vernon Memorial Hwy  
Mount Vernon, VA 22121

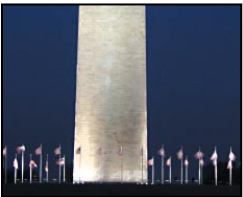
Demonstrations by costumed distillers take visitors through the historic process of whiskey-making in this reconstruction of the largest 18th-century distillery in America

**The Dome in Rosslyn**

1101 Wilson Boulevard  
Arlington, VA 22209

Celebrate the wonder of the human form at BODIES... The Exhibition - with educational relevance for all ages, this exhibition of real human specimens immerses visitors in the complexities of the human body, telling us the amazing story

of ourselves with reverence and understanding



**Golf Courses**

**18-Hole Courses:**

**Diamond Ridge Golf Course** – Par 70  
410-887-1349

**Greystone Golf Course** – Par 72  
410-887-1946

**Mountain Branch** – Par 72  
410-836-9600

**Bulle Rock** – Par 72  
410-939-8887

**9-Hole Course:**

**Rocky Point Golf Course** - Par 30  
410-887-0215

**Shopping**

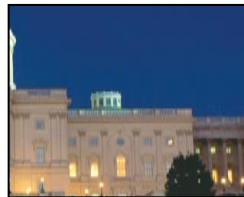
**Harborplace and the Gallery**  
410-332-4191  
200 E. Pratt Street

**Harborplace Light Street Pavillion**  
410-539-5260  
301 Light Street

**Arundel Mills Mall**  
410-540-5100  
7000 Arundel Mills Circle

**Antique Warehouse at 1300**  
410-659-0663  
1300 Jackson Street (Corner of Key Hwy)

**White Marsh Mall**  
410-931-7100  
8200 Perry Hall Blvd



**4<sup>th</sup> International Conference on Augmented Cognition  
October 1 to 3, 2007**

**2007  
AUGMENTED  
COGNITION  
INTERNATIONAL**  
[www.augmentedcognition.org](http://www.augmentedcognition.org)

**Strategic Analysis, Inc.**

One Virginia Square  
3601 Wilson Blvd., Suite 500  
Arlington, VA 22201

**Held in conjunction with the  
HFES 51<sup>st</sup> Annual Meeting, October 1-5, 2007  
Baltimore, MD USA**