

AHFE 2010 Tutorials

All Tutorials will be held on July 17, 2010

Full Day Tutorials:	(8:00 am – 5:00 pm)
<u>Tutorial #1</u>	<u>Practical Statistical Methods for Usability Testing</u>
Half Day Tutorials:	(8:00 am – 12:00 pm)
<u>Tutorial #2</u>	<u>Cross-Cultural User-Experience Design</u>
<u>Tutorial #3</u>	<u>Selling Human Factors and Ergonomics in a Successful Way: Creating Enthusiasm for Ergonomics</u>
<u>Tutorial #4</u>	<u>Neuroergonomics Theory and Methods: Neural, Computational, and Genetic</u>
	(1:00 pm – 5:00 pm)
<u>Tutorial #5</u>	<u>Human Factors and Ergonomics in Healthcare</u>
<u>Tutorial #6</u>	<u>Mobile Human-Computer Interface Design</u>
<u>Tutorial #7</u>	<u>Interaction Design of Highly Automated Domain-Specific Systems</u>
<u>Tutorial #8</u>	<u>Application of Systemic-Structural Activity Theory to the Analysis of Cognitive and Physical Tasks</u>
<u>Tutorial #1</u>	FULL DAY (8:00 am – 5:00 pm)
TITLE	Practical Statistical Methods for Usability Testing
PRESENTERS:	James R. Lewis, IBM Software Group, USA and Jeff Sauro, Oracle, USA
DESCRIPTION:	The objective of this tutorial is to cover basic statistical methods (some classical, others new) that are of value to usability practitioners because they provide a principled approach to answering three fundamental questions associated with usability testing: (1) was the goal of testing met? (2) is there a statistically significant difference?, and (3) how many participants are needed? Attendees will benefit by learning these basic statistical methods and practicing their application to real usability data, gaining the skill to apply the methods to their own data. The target audience includes a broad range of usability practitioners, from novice to expert. The content of the course provides a quick refresh of basic statistical principles, covers the major types of quantitative questions that usability practitioners encounter in the performance of their duties, and draws upon recent statistical research conducted by the instructors to guide statistical practice in usability engineering – information that is available in the peer-reviewed published literature, but is not yet available in any textbook. The audience we are trying to reach are those usability practitioners who are working

with or plan to work with quantitative data and have questions about current leading practices.

ABOUT THE PRESENTERS: **James R. Lewis** graduated with an M.A. in Engineering Psychology from New Mexico State University (1982), a Ph.D. in Psycholinguistics from Florida Atlantic University (1996), and has worked at IBM since 1981, where he holds 70 patents. Jim has published research on the measurement of usability satisfaction, use of confidence intervals, and sample size estimation for usability studies. He serves on the editorial boards of the International Journal of Human-Computer Interaction and the Journal of Usability Studies, chaired a formative usability metrics workgroup for NIST, and wrote the chapter on usability testing for the Handbook of Human Factors and Ergonomics (2006).

Jeff Sauro works as a human factors engineer for Oracle, is a Six Sigma Black Belt, and is the webmaster of measuringusability.com. Jeff has published and presented on the topic of quantitative methods and statistical analysis of usability data at conferences such as UPA, CHI, HFES, and HCII. He was recently the guest editor for a special issue of Interactions Magazine dedicated to Quantifying Usability.

Tutorial #2	HALF DAY (8:00 am – 12:00 pm)
TITLE:	Cross-Cultural User-Experience Design
PRESENTER:	Aaron Marcus, Aaron Marcus and Associates, Inc., USA
DESCRIPTION:	Human-computer interfaces (HCIs) for desktop, Web, mobile, and vehicle platforms reach across culturally diverse user communities, sometimes within a single country/language group, and certainly across the globe. If HCIs are to be usable, useful, and appealing to such a wide range of users, HCI/user-interface/user-experience developers must account for cultural preferences in globalizing/localizing products and services. In this tutorial, participants will learn about culture, culture models, practical principles, and effective techniques that are immediately useful in terms of both analysis and design tasks. Human-factors and ergonomics professionals who may have some experience with HCI but may be new to globalization/localization and especially to cross-cultural product/service development is the target audience.

ABOUT THE PRESENTER: **Aaron Marcus** is a world-renown pioneer of computer graphics and HCI. He designed his first HCI in 1967 for the Picturephone at AT+T Bell Labs. He taught at Princeton, Yale, Hebrew University/Jerusalem, University of California/Berkeley, and Institute of Design/IIT/Chicago. He was a Staff Scientist at Lawrence Berkeley Lab, wrote/co-wrote six books and more than 250 publications, was named an AIGA Fellow, was elected to the CHI Academy, and received the Industry Achievement Award from the NCGA. He founded AM+A in 1982, one of the oldest independent HCI full-service companies. He has lectured and tutored internationally for 30 years.

Tutorial #3	HALF DAY (8:00 am – 12:00 pm)
TITLE:	Selling Human Factors and Ergonomics in a Successful Way: Creating Enthusiasm for Ergonomics
PRESENTER:	Peter Vink, TNO and Delft University of Technology, The Netherlands

DESCRIPTION: Ergonomics is fun for you and your clients. Of course, it's not easy to develop ergonomic solutions that are really implemented and used, but it is possible. In this tutorial the most crucial elements of a successful approach will be trained and also the mistakes in the projects of Peter Vink will be shared with the participants. Ergonomists will learn how to enjoy and celebrate ergonomics. They will experience ways of doing tests and evaluations that can block the implementation and ways that can improve the chance of successful implementation. Test/evaluations concern measuring posture, work paces, usability, experienced workload, comfort with questionnaires etc. Cases from office work and assembly work will be used to experience the differences. A prerequisite is that participants have some experience in participatory ergonomics or at least some experience in improving work. No special material except pencil and paper will be needed.

ABOUT THE PRESENTER: **Peter Vink** is the Head of the Department of Environmental Design at TNO and Professor at Delft University of Technology, Faculty of Industrial Design Engineering. He has written written more than 200 papers on participatory design.

Tutorial #4	HALF DAY (8:00 am – 12:00 pm)
TITLE:	Neuroergonomics Theory and Methods: Neural, Computational, and Genetic
PRESENTERS:	Raja Parasuraman, George Mason University, USA and Glenn Wilson, Physiometrex, Inc., USA

DESCRIPTION: The goal of this tutorial is to outline the major theoretical frameworks of neuroergonomics and to provide attendees with a detailed understanding of neuroergonomics methods and tools. The target audience will range from researchers and practitioners in human factors with no experience in the use of neuroergonomic tools who wish to learn how to use them, to those who have used such methods previously in research and development efforts, but who wish to keep in touch with the latest, state-of-the-art methods and issues. We will focus on three major categories of methods: neural, computational, and genetic. (1) Under neural methods, we will provide a framework that characterizes the merits and disadvantages of neuroimaging methods (fMRI, EEG, ERPs, fNIRS, TCD, etc.) in terms of several criteria such as spatial resolution, temporal resolution, portability, cost, user acceptance, etc. A live demonstration of a portable, dry electrode EEG system and eye and heart data collection with "wet" electrodes will take up part of the tutorial. (2) Under computational methods, we will describe the use of neural network modeling in classification of operator state for possible use in adaptive automation. More broadly, we will describe how neurally-inspired computational models can be used in the assessment of human-machine system performance. (3) Under genetic methods, we will describe candidate-gene and genome-wide association methods for the characterization of individual differences in human performance. Implications for selection, training, and individuation of interfaces will be discussed.

ABOUT THE PRESENTERS: **Raja Parasuraman** is University Professor of Psychology at George Mason University. He is Director of the Graduate Program in Human Factors and Applied Cognition and Chair of the Neuroimaging Core of the Krasnow Institute. He received a B.Sc. (1st Class Honors) in Electrical Engineering from Imperial College, University of London, U.K. and a Ph.D. in Psychology from Aston University, Birmingham, U.K. Raja Parasuraman has long-standing research programs in human factors and cognitive neuroscience. He also has a research thrust in the molecular genetics of cognition. His books include The Psychology of

Vigilance, Varieties of Attention, The Attentive Brain, and Neuroergonomics: The Brain at Work.

Glenn Wilson is currently Chief Scientist with Physiometrex. He received his B.A. from Idaho State University and his M.A. and Ph.D. in Psychology from the University of Arizona. He held a post doctoral position at the University of California, Los Angeles. Working with colleagues, he developed methods for determining operator cognitive workload. This work was extended to drive adaptive aiding in complex tasks. He has participated in and led NATO working groups and lecture series. Glenn is a Fellow of the Human Factors and Ergonomics Society, Aerospace Medical Association and the Aerospace Human Factors Association. He was awarded the Henry Taylor Founder's Award by the Aerospace Human Factors Association and the Harry G. Armstrong Scientific Excellence Award by the Air Force Research Laboratory.

Tutorial #5	HALF DAY (1:00 pm – 5:00 pm)
TITLE:	Human Factors and Ergonomics in Healthcare
PRESENTER:	Vince Duffy, Purdue University, USA

DESCRIPTION: Recent human factors and ergonomics research in the healthcare area will be the focus of this tutorial. Fundamental principles in human factors and ergonomics will be highlighted considering the physical, cognitive and organizational aspects. With emphasis on patient safety, healthcare information technology implementation, medication impairment and human performance, this tutorial will be accessible to intermediate and advanced participants with interest in developing new research activities in healthcare. The tutorial will be presented through classroom type instruction and powerpoint projection. Selected readings will be made available in advance for those who have pre-registered

ABOUT THE PRESENTER: **Vincent Duffy** is a faculty member at Purdue University and has held a three year appointment with the Regenstrief Center for Healthcare Engineering. He has a dual appointment in the School of Industrial Engineering and the Department of Agricultural & Biological Engineering with a focus on safety and work design. Professor Duffy is the author of over 100 scientific publications, four edited books and is a Certified Professional Ergonomist.

Tutorial #6	HALF DAY (1:00 pm – 5:00 pm)
TITLE:	Mobile Human-Computer Interface Design
PRESENTER:	Aaron Marcus, Aaron Marcus and Associates, Inc., USA

DESCRIPTION: Human-computer interfaces (HCIs) combining computation with communication functions, e.g., phone, video, the Web, music, and video are enabling mobile products/services to penetrate environments for work, play, and on the way. For some users, the mobile device is their primary phone, texting, email, media playing, and information-browsing environment. Consequently, developers must learn techniques to make mobile products/services easier to learn and use, more usable, useful, and appealing to an every wider, more diverse set of users. Users must be able to find, sort, play, and pay. This tutorial surveys current issues and products/services and provides key principles/techniques to make product/services easier to produce, sell, learn, use, and maintain. Human-factors and ergonomics professionals who may have some experience with HCI but may be new to mobile product/service development is the target audience.

ABOUT THE PRESENTER: **Aaron Marcus** is a world-renown pioneer of computer graphics and HCI. He designed his first HCI in 1967 for the Picturephone at AT+T Bell Labs. He taught at Princeton, Yale, Hebrew University/Jerusalem, University of California/Berkeley, and Institute of Design/IIT/Chicago. He was a Staff Scientist at Lawrence Berkeley Lab, wrote/co-wrote six books and more than 250 publications, was named an AIGA Fellow, was elected to the CHI Academy, and received the Industry Achievement Award from the NCGA. He founded AM+A in 1982, one of the oldest independent HCI full-service companies. He has lectured and tutored internationally for 30 years.

Tutorial #7	HALF DAY (1:00 pm – 5:00 pm)
TITLE:	Interaction Design of Highly Automated Domain-Specific Systems
PRESENTERS:	Guy A. Boy , Florida Institute of Technology and Institute for Human and Machine Cognition, USA Jeffrey M. Bradshaw , Institute for Human and Machine Cognition, USA

DESCRIPTION: The main learning objectives of this tutorial are to introduce practitioners and researchers to emerging changes in the way people interact with machines, and in particular to the shift from direct manipulation to agent management in life-critical domains such as aviation, space exploration, military, nuclear industry, automobile industry, telecommunications, and medicine. By the end of the tutorial, participants will be able to better understand and more effectively use current concepts in interaction design of highly automated domain-specific systems. The major features of this tutorial are: an introduction to similarities and differences between human-centered and technology-centered approaches to interaction design of highly automated domain-specific systems; a development of the concept of cognitive function as a common entity that is useful for the representation of both human and software agents (i.e., automation); a presentation of the necessary cognitive science knowledge within the scope of the currently emerging industrial agent technology; a presentation of the tradeoffs between direct manipulation and agent management; live and video demonstrations of how agents can be used to facilitate the communication, cooperation and coordination between various activities that include training and operations; and hands-on exercises of cognitive function allocation that help understand how automation can be human-centered developed. Participants don't need to have any deep knowledge in HCI or agent technology. However, they are expected to come from a domain of expertise that requires the development of advanced interaction media to insure, for example, safety, efficiency, usability, comfort, esthetics, ethics or ease of learning.

ABOUT THE PRESENTERS: **Guy A. Boy** is University Professor at the Florida Institute of Technology, and Senior Research Scientist at the Florida Institute for Human and Machine Cognition. He was from 1992-2008 the President and Director of the European Institute of Cognitive Sciences and Engineering (EURISCO International). He received his Ph.D. in Automation and System Design from the Ecole Nationale Supérieure de l'Aéronautique et de l'Espace (ENSAE) in 1980. His research is in human-centered design of safety-critical dynamic systems. He is an expert consultant at the European Commission for the Information Society Technologies Programme (IST). He is a Member of The French National Academy of Air and Space.

Jeffrey M. Bradshaw is a research scientist at the Institute for Human and Machine Cognition. Previously, he led the intelligent agent technology group at The Boeing Company. Among other publications, he edited the books Knowledge Acquisition as a Modeling Activity (with Ken Ford, Wiley, 1993), Software Agents

(AAAI Press/The MIT Press, 1997), Software Agents for the Warfighter(in press), and the forthcoming Handbook of Agent Technology (AAAI Press/The MIT Press).

Tutorial #8	HALF DAY (1:00 pm – 5:00 pm)
TITLE:	Application of Systemic-Structural Activity Theory to the Analysis of Cognitive and Physical Tasks
PRESENTERS:	Gregory Bedny and Inna Bedny, Ergologic, USA

DESCRIPTION: This tutorial introduces participants to the Systemic-Structural Activity Theory (SSAT) that provides a unified framework and a new approach to the study human work. In this workshop SSAT will be discussed as a conceptual approach of task analysis in study manufacturing and HCI tasks. The tutorial will consist of presentations, discussion and small group exercises. Participants will learn basic concepts and principles of SSAT and acquire knowledge and practical skills for applying these concepts to the task analysis in manufacturing and HCI studies. Researchers, usability engineers, ergonomists and psychologists would find the material useful. The tutorial introduces basic principles and concepts of SSAT. Multiple examples of the algorithmic, functional and quantitative task analysis will be presented. Such concepts as human algorithm, deterministic and probabilistic algorithm will be introduced. Basic principles of algorithmic analysis will be considered based on practical examples. New method of eye movement analysis will be shown. Quantitative method of task complexity evaluation will be discussed. Hands on experience in applying the demonstrated approach to the analysis of computer based tasks and manual-based manufacturing operations will be given. Participants will practice discussed above methods performing a number of exercises. By applying these methods to a series of examples, participants will get hands on experience of using SSAT in manufacturing and HCI fields.

ABOUT THE PRESENTERS: **Gregory Bedny** received his PhD degree in Industrial/Organizational Psychology from Moscow State Pedagogical University and he received his ScD in Experimental Psychology from Russian National Academy of Science. Gregory is a Senior Researcher and Consultant with Ergologic, Inc. He has approximately 100 publications, including journal papers, scholarly monographs and textbooks in the area of applied and organizational psychology, human factors, activity theory, human performance and human-computer interaction. He presently resides in Wayne, New Jersey.

Dr. Inna Bedny received her B.A. in computer science and her PhD in psychology from the University of South Ukrainian State University. She has over 20 years of experience in the analysis and design of complex computer systems. Her research interests include reliability and efficiency of human computer interaction.