

# Institute Insider

The Newsletter of the Institute for Ergonomics at The Ohio State University

At the forefront of Human Factors since 1950 Volume 11, No. 2, Spring/Summer, 2008



## Patterson Receives Lumley Award

Emily Patterson received a 2008 Lumley Research Award from OSU's College of Engineering.

The Lumley Research Awards recognize the contributions of College faculty and staff who have shown success in pursuing new knowledge of a fundamental or applied nature.

Dr. Patterson has two primary research themes. One is identifying unintended effects from implementation of technologies to reduce human error. The second involves innovating strategies and metrics to support teamwork in complex, sociotechnical settings.

The Lumley Research Award also includes a \$1,500 cash prize. Congratulations, Emily!



Patterson

## COHAM Helps Solve Real-World Auto Manufacturing Problems

As reported in the Spring 2008 issue of Ohio State's *News in Engineering* magazine, researchers continue to make strides at OSU's Center for Occupational Health in Automotive Manufacturing (COHAM).

Two recent efforts were highlighted. First, a study is currently being conducted on the impact to workers of repetitive torque tool use. Associate professors Carolyn

continued on page 4



(from left): Dr. Carolyn Sommerich, and Honda of America Mfg. Inc.'s Tim Myers (Sr. Manager, Purchasing), Tim Downing (Chief Engineer, New Model Division Manager), and Larry Jutte (VP and General Manager, Operations Office).

## Students Host "Backpack Day"

In April 2008, members of OSU's Student Chapter of the Human Factors and Ergonomics Society sponsored "Backpack Day."

In preparation for this event, students searched the literature for risks associated with carrying heavy backpacks and methods to reduce pain, discomfort, and injury potential.

On April 9<sup>th</sup>, these members set up an information table outside the Baker Systems Engineering building. They weighed backpacks of students, compared this with the student's weight, and told them whether or not their backpack exceeded a "safe" weight, according to recent research studies. The HFES student members also provided guidance on ways to reduce the stresses associated with carrying backpacks, and gave those who had their packs weighed a free T-shirt.



Student chapter members of the Human Factors & Ergonomics Society, Dawn Chandler (l.), Dan Zelik (rear), and Kim Vandlen (r.) weigh a student's backpack. (photo courtesy of Cedric Sze)

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**Contact Information**

Phone: 614-292-4565  
Fax: 614-292-7852  
E-mail: [ergonomics@osu.edu](mailto:ergonomics@osu.edu)  
Web: [www.ergonomics.osu.edu](http://www.ergonomics.osu.edu)

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**Applied Human Factors and Ergonomics 2008**

2<sup>nd</sup> International Conference

July 14<sup>th</sup>-17<sup>th</sup>, 2008, Las Vegas, NV

Please consider attending the AHFE International conference in July.



Its objective is to provide an international forum for the dissemination and exchange

of scientific information on theoretical, generic, and applied areas of ergonomics, including, physical ergonomics, cognitive ergonomics, social and organizational ergonomics, ergonomics modeling and usability evaluation, healthcare and special populations, safety, and ergonomics in manufacturing.

Conference information will be presented through keynote addresses, parallel sessions, demonstration and poster sessions, tutorials, exhibitions, and meetings of special interest groups.

The four-day conference will start with tutorials. These will be held on July 14<sup>th</sup>, 2008. Tutorials will be offered (both half-day and full-day) at introductory, intermediate, and advanced levels covering the entire spectrum of the conference.

More information about this conference, which is being held jointly with the 12<sup>th</sup> International Conference on Human Aspects of Advanced Manufacturing (HAAMAHA), can be found at [www.aei2008.org](http://www.aei2008.org).

**Human Factors and Ergonomics Society 52<sup>nd</sup> Annual Meeting**



Sept. 22<sup>nd</sup>-26<sup>th</sup>, 2008,  
New York City

The upcoming HFES Annual Meeting will take place at the New York Marriott Marquis Times Square.

On-line registration is now open. Visit the HFES web site, [www.hfes.org/web/HFESMeetings/08annualmeeting.html](http://www.hfes.org/web/HFESMeetings/08annualmeeting.html) to register and get much more information. Although rooms at the conference hotel are sold out, the web site directs you to other hotel sources.

# IN THE NEWS



In March 2008, **Carolyn Sommerich** presented a talk titled, “Teaching and Learning with Mobile Technology: A Human Factors Perspective” at the University of Louisville. The lecture was sponsored by that university’s student chapter of the Human Factors and Ergonomics Society and its Center for Ergonomics.



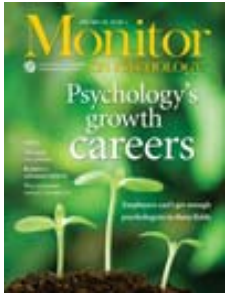
**Emily Patterson** has been named Associate Editor of the *IEEE Transactions on Systems, Man, and Cybernetics, Part A*. This section of the journal is devoted to human systems & organizational interactions, which includes cognitive ergonomics, system test and evaluation, and human information processing concerns.



**David Woods** was quoted in the April 30<sup>th</sup> issue of *New Scientist* magazine, in the article "Emergency 2.0 is Coming to a Website Near You." In it, Dr. Woods discussed the danger of being distracted by visual inputs in a virtual environment and not being aware of information being presented through more-traditional means. The article can be accessed at <http://technology.newscientist.com/channel/tech/mg19826545.900.html>.



**David Woods** was quoted in the April 2008 issue of the American Psychological Association’s *Monitor on Psychology*, in an article on “Psychology’s Growth Careers.” He pointed out the exciting post-graduation opportunities available to human factors students who take multi-disciplinary courses, such as those in digital production, new media, and innovation.



A paper by **John McGuirl**, Nadine Sarter, and **David Woods**, titled, “See is Believing? The Effects of Real-Time Image-Based Feedback on Emergency Management Decision-Making” won the best paper award at the 5<sup>th</sup> International Conference on Information Systems for Crisis Response and Management (ISCRAM). This conference was held in Washington DC May 4<sup>th</sup>-7<sup>th</sup>, 2008.



**McGuirl**



**George Smith** received the Fred C. Crane Distinguished Service Award at the Annual Conference of the Institute of Industrial Engineers. Presented on May 18<sup>th</sup> in Vancouver BC, Dr. Smith was recognized for his outstanding service to the IIE.



**Emily Patterson** (PI) and **David Woods** (co-PI) were awarded a \$450,000 grant from the Office of Naval Research. This project, “Investigating Relationships among Macrocognitive Processes,” began in April 2008 and will run through March 2011.

This project will increase our basic understanding of how teamwork is accomplished through a series of nested and interrelated macrocognitive subprocesses, through two phases. Phase I will examine interactions among team processes using a card sorting technique. Phase II will explore how macrocognition in a small, ad hoc team is accomplished in an experiment where one-of-a-kind, collaborative problem solving is needed to accomplish a planning task under competing demands for attention.

Increasing the understanding of macrocognition will provide the necessary foundation for valid, reliable, coordinated cognitive research in team collaboration, which will, in turn, enable a common level of granularity when defining, measuring and discussing the cognitive processes in team collaboration.

Congratulations, Emily and David!

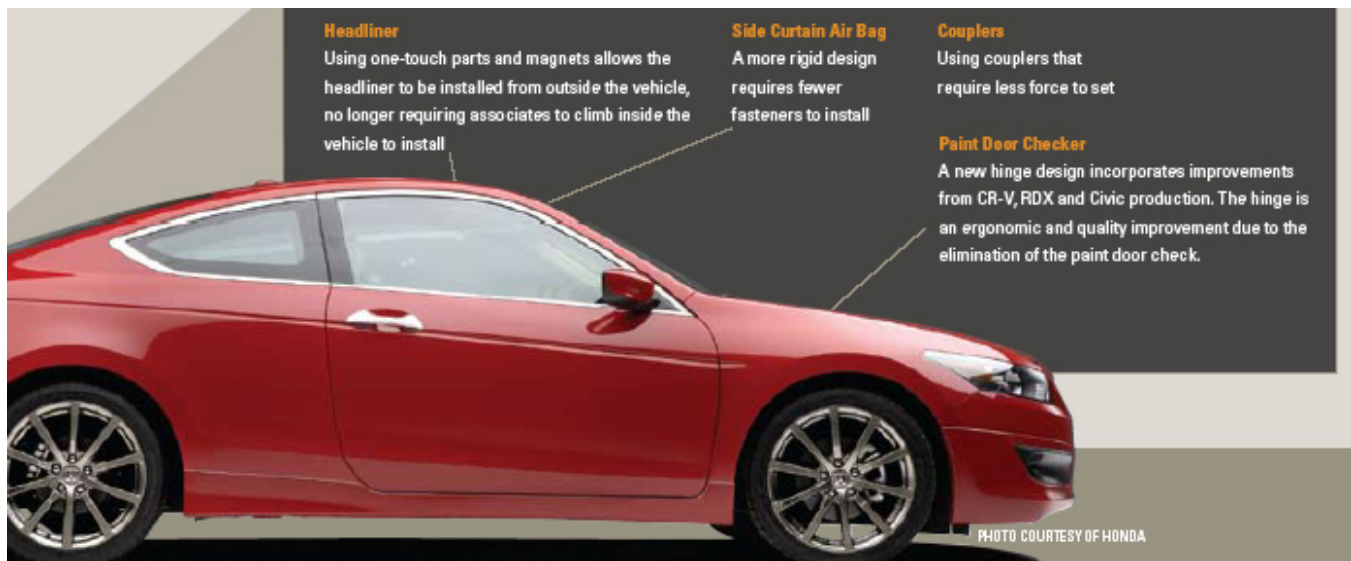


Sommerich (Industrial, Welding, & Systems Engineering) and Tony Luscher (Mechanical Engineering) are studying how these types of tools are used in auto assembly plants, as well as the ways they can be programmed to supply the desired amount of torque to a joint. This will lead to a better understanding of how assembly processes should be designed for optimum efficiency and the lowest amount of injury risk to users.

Second, the issue identified several features integrated into Honda's redesigned 2008 Accord, which were based on a series of OSU-led biomechanics research projects.

These included: (1) a headliner that could be installed more easily, from outside the vehicle; (2) a side-curtain air bag held with fewer fasteners, to reduce the repetitive nature of its assembly; (3) couplers that are easier to set, due to a reduced insertion force; and (4) the elimination of a difficult quality check, resulting from a redesigned door hinge.

COHAM is an interdisciplinary partnership between several OSU departments, automobile manufacturers, and automobile suppliers, to study and improve manufacturing technology and its impact on the health and safety of employees. More information can be found at its web site, [coham.osu.edu](http://coham.osu.edu).



## Marras Reports of the NAS/NRC's Committee on Human Factors

Many people are unaware of the Committee on Human Factors, housed within the National Academy of Sciences/National Research Council. To remedy this, William S. Marras, Chair of this committee, highlighted its activities in the April 2008 issue of the Human Factors and Ergonomics Society's *Bulletin*.

In this front page article, Dr. Marras noted that, although various branches of the armed forces requested that the NAS convene such a committee, it currently conducts both military and non-military studies.

The Committee on Human Factors has several general goals, including:

- Providing new, objective perspectives on issues involving individuals' and organizations' relationships to technology and environments;
- Identifying human-centered technology issues, particularly regarding design, test, evaluation, and use; and
- Advising sponsors about research needed to improve technology's ability to support users.

This committee conducts a variety of activities, aimed at highlighting emerging areas that can benefit from human factors/ergonomics. These are:

- Prove unbiased environments for sponsors to discuss issues with others and with subject matter experts;
- Survey the scientific HF/E research base;
- Make HF/E knowledge available to the public policy community;
- Help sponsors design their research agendas;
- Conduct forums enabling experts to highlight research and policy issues critical to the HF/E community; and
- Choose topics that would benefit from more-thorough study.

Dr. Marras welcomes feedback that would assist the Committee on Human Factors to continue fulfilling its mission. He can be reached at [marras.1@osu.edu](mailto:marras.1@osu.edu).

The full text of this article can be downloaded at: [www.hfes.org/Web/BulletinPdf/0408bulletin.pdf](http://www.hfes.org/Web/BulletinPdf/0408bulletin.pdf).

## Graduate Student News

**Amod Damle** successfully defended his doctoral work on May 23<sup>rd</sup>, 2008. His dissertation involved, "The Influence of Design Tools on Design Problem-Solving." Dr. Philip J. Smith advised this research.

This research is summarized on page 7.



On June 9<sup>th</sup>, 2008, **Miruna Tecuci** successfully defended her Masters thesis. Under her advisor, Dr. Philip Smith, Miruna studied, "Improving Understanding of Operations Orders through Message Conversion into Text or Multimedia." The abstract of this research can be found on page 7.



Upon graduation, Miruna will be returning home to Fairfax, Virginia, where she plans to become a math or computer science teacher. Miruna can be reached at [miruna.tecuci@gmail.com](mailto:miruna.tecuci@gmail.com).



## Autumn Quarter 2008 Course Announcement

### Decision Processes

**Course Number:** Psych 815 (4 credit hours)

**Time:** Tuesdays & Thursdays, 10:30 - 12:18

**Instructor:** Richard Jagacinski

This course will discuss topics in human judgment and decision making. Lectures will cover empirical research on subjective beliefs, values, probability judgments, choices, and intuitive predictions. Results will be discussed in light of descriptive theories (how people make decisions) and normative theories (how people should make decisions to satisfy certain criteria) including Bayesian approaches, regression models, and utility theory.

Additional topics will include adaptive adjustment of decision procedures, the sampling of information from processes that change over time, the relation of decision making to control tasks in dynamic environments, and decision aids for improving performance.

For further information, contact Dr. Jagacinski at 614-292-1870 or [jagacinski.1@osu.edu](mailto:jagacinski.1@osu.edu).



## 2007-2008 Members of the HFES Student Chapter



**Back row:** Dan Zelik (web master), Dr. Gary Allread (co-advisor), Peter Guindon, Dr. Carolyn Sommerich (co-advisor).

**Middle row:** Kim Vandlen (president), Peter Le, Dawn Chandler (treasurer); Olivia Hernandez.

**Front row:** Rajiv Gumpina, Monica Johnson, Di Liu. (photo courtesy of Cedric Sze)

## Center for Cognitive Science Holds COGFEST

The Center for Cognitive Science held its annual COGFEST on May 9<sup>th</sup>, 2008. Three OSU faculty members gave lectures:

- Aleix Martinez (Department of Electrical Engineering), presented, "What's in the Face?"

- Cynthia Clopper (Department of Linguistics), spoke on, "Interactions between Social and Linguistic Sources of Variability in Speech Processing"

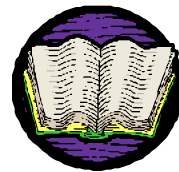
- Hal Arkes, (Department of Psychology) discussed, "Why Don't Physicians Like to Use Decision Aids"



In addition, guest speaker Richard Lewis, professor of Psychology and Linguistics at the University of Michigan, presented, "The Surprising Nature of Working Memory in Language Processing."

Quicktime video clips and electronic copies of these presentations can be downloaded from: [www.cog.ohio-state.edu/html/cogfest.php](http://www.cog.ohio-state.edu/html/cogfest.php).

# PUBLISH or perish



Recent publications written by Institute members (indicated in **boldface** font) include:

## Effective Creation of Multimedia Operations Orders to Support the Communication of Battle Plans

**Philip J Smith**, **Amy L Spencer**, and **Miruna Tecuci**, 2008, *Proceedings of the 8<sup>th</sup> Annual Conference on Human Interaction with Complex Systems*, Norfolk VA, April 3<sup>rd</sup>-4<sup>th</sup>, 2008.



## An Evaluation of the Veterans Health Administration's Clinical Reminders System: A National Survey of Generalists

CH Fung, JS Tsai, A Lulejian, P Glassman, **Emily S Patterson**, BN Doebbeling, and SM Asch, 2008, *Journal of General Internal Medicine*, 23(4): 392-398.



## Impact of Clinical Reminder Redesign on Learnability, Efficiency, Usability, and Workload for Ambulatory Clinic Nurses

JJ Saleem, **Emily S Patterson**, L Militello, **Shilo Anders**, M Falciglia, JA Wissman, EM Roth, and SM Asch, 2007, *Journal of the American Medical Informatics Association*, 14(5): 632-640.

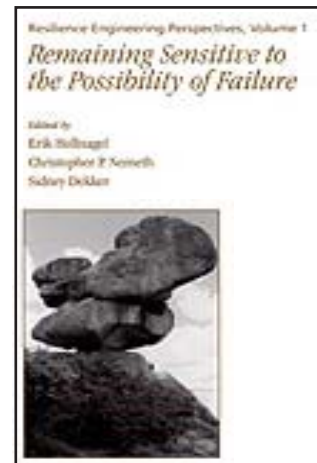


## Traffic Management Tools for Dealing with Weather and Traffic Constraints in the National Airspace System

**Philip J Smith**, **Amy L Spencer**, and **Charles Billings**, 2008, *Proceedings of the 8<sup>th</sup> Annual Conference on Human Interaction with Complex Systems*, Norfolk VA, April 3<sup>rd</sup>-4<sup>th</sup>, 2008.



Several members of the Institute made contributions to the recently published book, *Resilience Engineering Perspectives, Volume 1: Remaining Sensitive to the Possibility of Failure*, which was edited by Erik Hollnagel, CP Nemeth, and Sidney Dekker. This book contains the chapters:



## Stress-Strain Plot as a Basis for Assessing System Resilience

by **David D Woods** and J Wreathall

## Resilience in the Emergency Department

by RL Wears, SJ Perry, **Shilo Anders**, and **David D Woods**

## Detecting an Erroneous Plan: Does a System Allow for Effective Cross-Checking?

by **Matthieu Branlat**, **Shilo Anders**, **David D Woods**, and **Emily S Patterson**

Published in June 2008 by Ashgate, this 346-page book (ISBN: 978-0-7546-7127-5) is available in hardback (£55.00) or on-line (£49.50).



## Best Practices Guide for Food Distribution Centers Now Available for Free

The Institute now offers free downloads of the book, *A Best Practices Guide for the Reduction of Musculoskeletal Disorders in Food Distribution Centers*.

Co-authored by **William Marras**, **Gary Allread**, **Mike Jorgensen**, and **Carol Stuart-Buttle**, this *Guide* provides useful information for individuals and companies who work in or with the food distribution industry on issues and solutions to reduce health and safety concerns.

To view or download this book, visit our web site: <http://ergonomics.osu.edu/>.

### A Best Practices Guide for the Reduction of Musculoskeletal Disorders in Food Distribution Centers

William S. Marras, PhD, CPE  
W. Gary Allread, PhD, AEP  
Michael J. Jorgensen, PhD, AEP  
Institute for Ergonomics, The Ohio State University  
and  
Carol Stuart-Buttle, MS, CPE  
Stuart-Buttle Ergonomics



Institute for Ergonomics, The Ohio State University





## **Research Corner**

**This issue of the Bulletin summarizes recently conducted research**

### **Improving Understanding of Operations Orders through Message Conversion into Text or Multimedia**

**Miruna Tecuci, Masters Thesis**

#### Abstract

In the United States military, Operations Orders (OPORDs) are well-structured text documents used to describe mission objectives and details on the plan to accomplish the mission.

A recent study by Bower and Smith (2005), described how the Collaborative SLide ANnotation Tool (CSLANT), can be used to create richer messages that can more effectively communicate the commander's intent and increase understanding and recall of the message.

To further study the impacts of using multimedia messages for asynchronous communication, this project used the new version of CSLANT, called C-MRE, to study the impact of transforming a message from one medium to another (e.g. text to multimedia), as opposed to using the same medium (e.g. text to text).

It is hypothesized that the multimedia group will perform better on a recall and understanding questionnaire due to the deeper level of processing required for translating a message from one medium into another.

### **The Influence of Design Tools on Design Problem-Solving**

**Amod Damle, Doctoral Thesis**

#### Abstract

The literature on design thinking indicates that, in order to avoid early fixation on a less than effective overall form, product designers are trained to sketch the overall form for a design before focusing attention on the details of individual components. Using a between-subjects design, an empirical study involving 30 experienced designers was conducted to investigate how design tools can influence this process, specifically investigating the potential for color to induce early fixation on the details of a design rather than first exploring concepts for an effective overall form of that design.

In this study, the participants were randomly assigned to two groups. Both groups performed a design task that involved creating a concept sketch for a lamp by selecting and combining two features from each of the two lamps seen in a reference picture. The participants were asked to assemble several line segments of various sizes and orientations on a computer screen to create the sketch. Group one was provided with the line segments in a single color while Group two had access to the line segments in multiple colors.

It was hypothesized that the availability or use of multiple colors for sketching could influence the participants to focus on the details of the individual components before sketching the overall form.

Based on the data from the verbal protocols it was found that the participants in the multi-color group were 33% more likely to verbalize the goal of sketching the overall form than those in the single-color group. Consistent with these verbal protocols, it was observed that the multi-color group made significantly more revisions ( $p=0.02$ ) on the first component before leaving it for the first time than after revisiting it (as contrasted with the single color group). This suggests that the multi-color group was more likely to focus on the details of the first component before completing a sketch of the overall form.

One way of explaining these results is to say that the availability of multiple colors influenced the participants to mentally group design elements into discrete objects and create a perceptual or cognitive discontinuity, focusing attention on the details of the first component before sketching the outlines of the rest of the components. As a result, they were less likely to apply their training and to sketch the overall form before working on the details of specific components.

Thus, these findings indicate that, like the problem-solving processes involved in diagnosis and planning, the problem-solving processes involved in a creative activity like design can be influenced in fundamental ways by the features of the tool provided.