

# Institute Insider



Volume 13, Number 1

Winter 2010

The Newsletter of the Institute for Ergonomics at The Ohio State University  
At the forefront of Human Factors since 1950

## Driving and Transportation Symposium Honors Rockwell

On December 1<sup>st</sup>, 2009, dozens of faculty, students, and others interested in the human factors aspects of driving and transportation attended a research symposium to honor the contributions of **Dr. Thomas Rockwell**, to both Ohio State and to the human factors discipline.



At the symposium, *Human Factors Advances in Driving and Transportation*, four of Dr. Rockwell's former students discussed subsequent research they conducted that was, in

part, guided by having Dr. Rockwell as an academic advisor.

The symposium lecturers were:

- **Mike Perel**, who is retired from NHTSA (the National Highway Traffic Safety Administration). He spoke on, *Driver Distraction: Problems, Progress, Priorities*. Mike received his Masters Degree in 1970; his thesis was, "An Investigation of the Subsidiary Task Technique applied to Automobile Driving" ).



- **Vivek Bhise** is a professor of Industrial and Manufacturing Systems Engineering at the University of



(continued on page 8)

### In this Issue...

Institute's Year in Review: 2009-2010 3

In the News - Recent Member Accomplishments 4

Professional Society News 5

Graduate Student News 6

Publish or Perish - New Research Citations 7

Center for Cognitive Science to Host Knowledge Debate 7

## Ferguson Studies Methods to Improve Automobile Assembly

Competition among automotive manufacturers is extremely high. Companies are continually searching for new tools, equipment, and work methods that allow for safer and more efficient assembly of their vehicles.

Because of the continued skyrocketing costs of healthcare, these

types of improvements are based often on ergonomics principles.

As a contribution to this objective, **Dr. Sue Ferguson**, a



(continued on page 8)

## Institute's Year in Review: Research 2009-2010 now available

The Institute has just released its summary of research projects in which members are currently involved.

This *Review* also contains profiles of our Institute members, lists some of the awards they have most recently received, and describes a few of the technical assistance and training projects that have taken place.

There is an incredibly diverse range of human factors/ergonomics research topics covered in this review: Areas of study include:

- Aviation and Space;
- Disability;
- Education;



- Healthcare;
- Information Processing;
- Low Back Disorders;
- Military Planning;
- Musculoskeletal Disorders; and
- Physical Ergonomics, Applied.

We are pleased to report that our Institute members were responsible for active grants and contracts that total more than \$22 million over this time period.

Electronic copies of this *Review* can be downloaded for free from the Institute's website, [www.ergonomics.osu.edu](http://www.ergonomics.osu.edu) or obtained by contacting the Institute (614-292-4565 or [ergonomics@osu.edu](mailto:ergonomics@osu.edu)).

## Institute Offers Ergonomics Training

This year's Spring Ergonomics Short Course, *Putting Ergonomics into Practice*, will be held on the Ohio State campus **May 18<sup>th</sup> - 21<sup>st</sup>, 2010**.

Participants gain many benefits from this course. This includes a more *thorough understanding of ergonomics principles*, presented using lectures, case studies, in-class demonstrations, and hands-on exercises. It also teaches the *use of many ergonomics assessment tools*. This allows attendees to *reduce occupational injuries* and their associated costs as well as *improve*

*their company's productivity and profitability*.

This course is led by nationally recognized Institute members, who have advanced ergonomics degrees, decades of experience studying and applying ergonomics, and professional ergonomics certification.

More detailed information is provided in the course brochure, available at [www.ergonomics.osu.edu](http://www.ergonomics.osu.edu) or by contacting the Institute (614-292-4565 or [ergonomics@osu.edu](mailto:ergonomics@osu.edu)).



# IN THE NEWS



**Philip Smith** was recognized by the Air Traffic Control Association for his “superb contributions to air traffic management, through development of innovative solutions reducing traffic congestion and weather delays.”



In presenting Dr. Smith with the 2009 David Hurley Memorial Award for Aviation Traffic Management, the ATCA noted that, for more than ten years, he has made significant contributions to the collaborative decision-making program in air traffic management.

Congratulations, Phil, on this well-deserved honor!

**William Marras** has received the 2009 Clara M. & Peter L. Scott Faculty Award for Excellence in Engineering

Education. This distinction is awarded to a senior faculty member who has achieved national and international status as an educator and researcher. Dr. Marras was given this award for his research on sources of back injuries in the workplace, which has improved the productivity of industry and reduced injuries to workers.

**William Marras** delivered the keynote address at the “Risk Management from Manual Patient Handling: Presentation of International Ergonomic Solutions” seminar in Milan, Italy (February 24<sup>th</sup>, 2010). Sponsored by the EPM (Ergonomics of Posture and Movement) Research Unit, Dr. Marras spoke on, “The Influence of Physical Work Factors on Spine Loads in Nurses.”



The Clara M. and Peter L. Scott Faculty Award for Outstanding Academic Achievement was established by the Scotts. It provides each recipient with a plaque and a monetary gift of \$2,000.

The accomplishments of OSU’s Center for Resilience ([www.resilience.osu.edu](http://www.resilience.osu.edu)) was highlighted in the February 26<sup>th</sup>, 2010 issue of Columbus’ *Business First* magazine.

In the article, titled, “Want to Know Your Carbon Footprint? Ohio State Center can Tell You,” Center Director **Joseph Fiksel**

explained its “carbon footprint analyzer,” which has been used



locally at Nationwide Insurance to analyze its utility consumption and find ways to reduce its related energy costs.

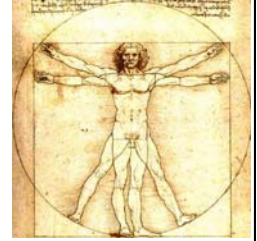
Fiksel noted other business tools that are available at the Center, including:

- Analyzing supply chain vulnerabilities;
- Assessing the sustainability of new products or processes; and
- Exploring methods of reusing leftovers in manufacturing processes into marketable products.

The Center has worked with several other large customers, including Dow Chemical, Hallmark, Harley Davidson, Honda, and Procter & Gamble.

The entire *Business First* article can be read online, at <http://columbus.bizjournals.com/columbus/stories/2010/03/01/tidbits8.html>.

# The latest *Professional Society News*



## Upcoming Events

### 13<sup>th</sup> Annual Applied Ergonomics Conference

JW Marriott – Hill Country Resort & Spa , San Antonio TX, March 22<sup>nd</sup> - March 25<sup>th</sup>, 2010 ([www.iienet.org/Ergo2010](http://www.iienet.org/Ergo2010))



### Ohio Safety Congress & Expo

Columbus Convention Center, Columbus OH, March 30<sup>th</sup> - April 1<sup>st</sup>, 2010

([www.ohiobwc.com/employer/programs/safety/SafetyCongress.asp](http://www.ohiobwc.com/employer/programs/safety/SafetyCongress.asp))



Stop by our booth, #819, in the Exhibit Hall!

### CHI 2010 - ACM Conference on Human Factors in Computing Systems

Hyatt Regency, Atlanta GA, April 10<sup>th</sup>-15<sup>th</sup>, 2010 ([www.chi2010.org](http://www.chi2010.org))



### Engineering to Improve the Operations of Manufacturing Enterprises - A National Symposium

University of Michigan, Ann Arbor MI, May 13<sup>th</sup>, 2010 ([www.engin.umich.edu/eiome/index.html](http://www.engin.umich.edu/eiome/index.html))



### AIHce 2010 – American Industrial Hygiene Association Conference & Expo

Denver CO, May 22<sup>nd</sup> - 27<sup>th</sup>, 2010 ([www.aiha.org/aihce10](http://www.aiha.org/aihce10))



### AHFE International Conference 2010

Intercontinental, Miami FL, July 17<sup>th</sup> - 20<sup>th</sup>, 2010

([www.ahfe2010.org](http://www.ahfe2010.org))



### 2010 Human Factors and Ergonomics Society – Annual Meeting

Hyatt Regency San Francisco, San Francisco CA, September 27<sup>th</sup> - October 2<sup>st</sup>, 2010

([www.hfes.org/web/HFESMeetings/2010annualmeeting.html](http://www.hfes.org/web/HFESMeetings/2010annualmeeting.html))



This year's event in Atlanta will be CHI's 28<sup>th</sup> conference. It is a premier international meeting in the field of human-computer interaction.

This conference is expected to draw 2,000 attendees from 38 countries.

Major sponsors include Google, Microsoft, and the National Science Foundation.

## HFES Awards Deadline: March 31<sup>st</sup>, 2010

Would you like to recognize the accomplishments of a colleague who has done extraordinary human factors/ergonomics work?

At each annual meeting of the Human Factors & Ergonomics Society, outstanding individuals who have made significant contributions to the HF/E discipline are honored.



Nominations for this year's awards are due by March 31<sup>st</sup>. Nominees are not required to be HFES members, but those submitting candidates' names must be Full Members of HFES .

Nominations require:

- The candidate's resumé or curriculum vitae;
- A nominating letter; and
- Two-to-three Letters of Support from individuals able to assess the candidate in terms of the award's criteria.

Send all nomination information to HFES (Lynn Strother, [lynn@hfes.org](mailto:lynn@hfes.org)), as a single PDF file.

More information about this award can be found at [www.hfes.org/web/Awards&Fellows/awards.html](http://www.hfes.org/web/Awards&Fellows/awards.html).

## Graduate Student News

### New Graduate Students

#### Jon Dufour

([dufourjs@gmail.com](mailto:dufourjs@gmail.com))

*Advisor:* William S. Marras

*Hometown:* Morrow, OH



Jon earned his bachelor's degree in Mechanical Engineering here at Ohio State and is currently pursuing his master's, also in ME.

He has previously worked in product development and quality control for a product design firm (New Product Innovations, Powell, Ohio). Now a graduate research assistant in the OSU Biodynamics Laboratory, Jon wishes to apply his product design knowledge and experience to biomechanics. He is interested specifically in the design of prosthetic and surgical devices.

Jon's extracurricular activities include basketball, skiing, soccer, boxing, playing the guitar & harmonica, and singing rock & blues music.

#### Garth McMurray

([mcmurray.33@osu.edu](mailto:mcmurray.33@osu.edu))

*Advisor:* Philip J. Smith

*Hometown:* Logandale, NV



Garth earned a computer engineering degree from Oregon State University and a master's in Systems Engineering at the Air Force Institute of Technology. His extensive work experience includes:

- Computer programming for missile detection satellites (Air Force);
- Solaris system administration for machines that process satellite imagery (National Air Intelligence Center);
- Flight test engineer for the F/A-22; and
- Manager of a distributed simulation and testing center (Air Force Operational Test and Evaluation Center).

Garth's studies while at Ohio State are in preparation for a teaching position at the Air Force Institute of Technology (AFIT), so that he can introduce human factors engineering into its systems engineering program.

Garth and his wife have eight children and a multitude of animals, including dogs, cats, horses, hamsters, crabs, and fish. Garth volunteers with the Boy Scouts of America, in addition to coaching high school wrestling.

#### Aron Price

([aron23@gmail.com](mailto:aron23@gmail.com))

*Advisor:* Philip J. Smith

*Hometown:* Cincinnati, OH



Aron was motivated to pursue a graduate education while he was completing his undergraduate degree in computer information systems (DeVry University, Columbus, Ohio) and working full-time at the American Chemical Society.

Now working on his master's degree, Aron is studying interface design and complex systems. This research has recently evolved into designing interfaces to machine-learning technology for people who are not experts in machine learning. In other words, he is designing interaction models that enable online content producers to leverage machine learning techniques to evaluate and enhance their content.

While he is not doing school work, Aron is busy raising two toddlers with his wife, Jillian. He also designs prototype software interfaces for an editorial department at Chemical Abstracts Service in Columbus, OH and dabbles with the development of Android apps.



The Graduate Studies Coordinator and point of contact for graduate work within the Department of Integrated Systems Engineering is Ms. Judith Flickinger.

Judith can be reached at [flickinger.22@osu.edu](mailto:flickinger.22@osu.edu) or 614-292-6841.



The AFRL at Wright-Patterson Air Force Base is the Air Force's only organization wholly dedicated to leading the discovery, development, and integration of war-fighting technologies for our air, space and cyber-space forces.

## Graduate Student News

### Activities

On January 22<sup>nd</sup>, 2010 **Alex Morison** presented the colloquium, "Perspective Control: Exploring Distant Scenes through Extended Perception," at Wright-Patterson's Air Force Research Lab (Dayton OH). An abstract of this presentation is copied below.



**Abstract:** An explosion of sensing capabilities have resulted in both old and new challenges to human-automation interaction. Challenges such as, data overload and supervisory control are familiar but take on new forms in domains, such as wide-area surveillance and unmanned vehicle control. Where in video surveillance, large numbers of video feeds overwhelm surveillance personnel, and unmanned vehicle operators are asked to supervise growing numbers of unmanned vehicles. Other challenges such as perceiving an environment through sensors, while tele-operating a robot for example, are new and are less well understood.

The interfaces and sensor platforms that exist today across all of these domains are point solutions to these challenges. We

present a new approach for analysis and design of both sensor platforms and human-automation interfaces that are outside of this current paradigm.

The approach is based on a model of perspective-taking that defines a set of principles and frames of reference (i.e., coordinated spherical coordinate systems) for supporting human apprehension of a virtual, or physically distant, environment. The goal of this work is to demonstrate, through this model, that when perspective relationships are properly analyzed and supported that it is possible to design interfaces and sensor platforms that extend human perceptual processes into a distant scene.

The solution presented is a working demonstration of a perspective-taking system that embodies the perspective-taking model, operating within a surveillance context. The system consists of a perspective controller, virtual three-dimensional environment, and two pan-tilt-zoom cameras. The integration of these three components results in an interface outside of the current paradigm for apprehending and interacting with a distant sensor platform.

# C/S/E/L

Innovations at the Intersection of People, Technology & Work

### Award

At the Human Factors and Ergonomics Society's 53<sup>rd</sup> Annual Meeting in San Antonio TX (October 2009), Ohio State ISE graduate student **Wei-Ting Yen** received the Aging Technical Group's first research scholarship award.

Through his research, Wei-Ting is studying the effects of interface design on grasp and torque production capabilities of older people with



Wei-Ting Yen (r.) receives his award from Dr. Diana Schwerha

hand pain and impairment. He is also addressing the challenge of how to make findings from this type of human factors research more accessible and usable to designers.

Wei-Ting is pursuing a PhD under the advisement of Dr. Carolyn Sommerich.

Congratulations!

## PUBLISH or PERISH

### Instrumentation for Measuring Dynamic Spinal Load Moment Exposures in the Workplace

**William S Marras, Steven A  
Lavender, Sue A Ferguson, Riley E  
Splittstoesser, Gang Yang, and Pete  
Schabo**, 2010, *Journal of Electro-  
myography and Kinesiology*, 20(1):1-9.



These are the latest publications authored  
by Institute members (indicated in **boldface**  
font)

## Center for Cognitive Science to Host Knowledge Debate



### THE ORIGINS OF KNOWLEDGE Susan Carey vs Jay McClelland April 16, 2010



Ohio State's **Center for Cognitive Science** will host a debate on questions that have interested both scientists and philosophers for more than 2,000 years, such as:

- How do people gain knowledge about the world around them?
- Are we born with some fundamental knowledge about concepts like object, number or space, or do we have to learn everything?

This debate will feature two scientists who represent two different answers to the question of Origins of Knowledge.

Professor Susan Carey (Harvard University) advocates the position of innate knowledge through her research on infant understanding of object and number. Professor James McClelland (Stanford University) advocates the learning position through his work on learning in networks of interacting neuron-like elements.

The question of origins of knowledge is of prime importance for cognitive scientists, as philosophers, psychologists, biologists, computer scientists, linguists, and neuroscientists. Answers to this

question will determine how we study cognition and language as well as learning and development in the years to come. Answers will also affect the ways we design artificial intelligence and learning systems.

Each speaker will have 45 minutes to outline their case, to be followed by an 1-½ hour Q&A session. A reception will follow at 5:00 PM.

#### Event details:

Date: April 16<sup>th</sup>, 2010

Time: 1:00 PM

Location: Great Hall Meeting Room,  
Ohio Union, Ohio State  
University's main campus  
(Columbus), 1739 N High St.

This event is free and open to the public, but **registration is required**. To RSVP, call 614-292-8200 or send an email to [liming.1@osu.edu](mailto:liming.1@osu.edu)

Can't attend in-person? The debate will be streamed live at:

<http://streaming.osu.edu/mediawww2/presentations/CogScience/041610/>.

The Center for Cognitive Science is one of the premiere cognitive science programs in the U.S. Approximately 65 faculty are affiliated with the Center, who represent 24 OSU departments and eight colleges. More information can be found at <http://www.cog.ohio-state.edu/Index.php>.

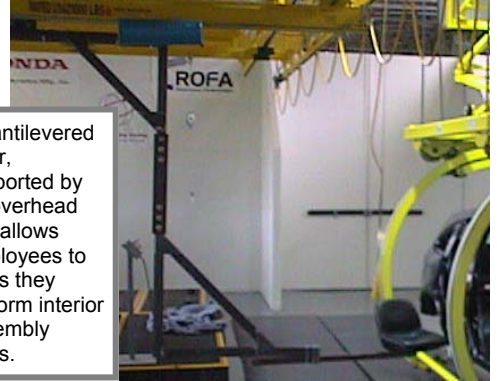
(continued from page 1)

Senior Research Associate Engineer in the Biodynamics Lab at Ohio State, is studying the efficacy of using a cantilevered chair for automobile assembly tasks.

The aim of this project, which is funded by Honda of America Mfg, Inc, is to determine if a relatively simple seated chair, to be used by employees as they perform specific assembly processes, can reduce physical loading on their bodies, compared to their traditional assembly postures. The question to be answered is whether or not this type of chair is a safer and more cost-effective technique than that traditionally used.



A cantilevered chair, supported by an overhead rail, allows employees to sit as they perform interior assembly tasks.



Example of an assembly task that requires bending and reaching to do work located in the center of the vehicle.



Use of the cantilevered chair brings the employee closer to the assembly area and eliminates the need to climb in and out of vehicle.



This study is examining use of the chair at eight separate vehicle regions where assembly tasks commonly occur.

Research publication information can be found in an upcoming issue of the *Insider*.



General Motors estimated that, in 2007, healthcare costs added about \$1,525 to the price of every vehicle it produced.

Source:  
[www.healthreform.gov](http://www.healthreform.gov)

(continued from page 1)

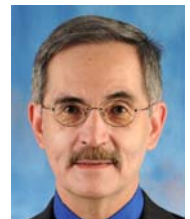
Michigan-Dearborn. He reviewed, "From OSU to Automotive Human Factors Research." Dr. Bhise's PhD was awarded in 1971. For his dissertation, he studied, "The Relationship of Eye Movements and Perceptual Capabilities to Visual Information Acquisition in Automobile Driving."

- David Hoffmeister, an Engineering Specialist at **Baxter Healthcare**, presented, *Human Factors in the Healthcare Industry*. Mr. Hoffmeister previously earned a Masters degree



in 1973, for his work, "Two Models for Rural Intersection Negotiation."

- Louis Tijerina, from Ford, discussed, *The Science and Politics of Cell Phones & Driver Distraction*. His 1985 PhD involved a study of, "Video Display Luminance and Human Performance: The Effects of Polarity, Contrast, and Absolute Luminance on Visual Search."



These presentations can be downloaded from the Institute's web site, <http://ergonomics.osu.edu/publications.html#news>.



In 1957, Thomas H. Rockwell received his PhD from Ohio State and became an Assistant Professor in the Industrial & Systems Engineering Department.



**Institute for Ergonomics  
The Ohio State University**

1971 Neil Avenue  
210 Baker Systems  
Columbus, OH 43210

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)

**At the forefront of Human  
Factors since 1950**



**Administration**

Dr. William S. Marras

Executive Director

Dr. Philip J. Smith

Executive Director

Dr. W. Gary Allread

Program Director

Candi McCain

Fiscal Officer & Research Administrator

**Board of Directors**

Dr. Wayne Carlson

OSU - Industrial, Interior, &  
Visual Communication  
Design

Dr. Thomas Santner

OSU - Statistics

Dr. James Todd

OSU - Psychology

Dr. David Woods

OSU - Integrated Systems  
Engineering

Dr. Stuart Zweben

OSU - Computer Science &  
Engineering

**Advisory Board**

Dr. Lawrence Fine

National Institutes of Health  
(NIH)

Dr. Thomas Rockwell

OSU - Integrated Systems  
Engineering

Dr. Michael Shafto

NASA - Ames Research  
Center

Dr. Roger Stephens

Occupational Safety &  
Health Administration  
(retired)

Dr. Jay Wilkins

OSU - College of Public  
Health