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The Sprouting of “Green” Ergonomics

By Alan Hedge

Workplace ergonomics is on the threshold of an exciting transformation. All too often the field is seen as a reactive and idiosyncratic endeavor focusing on ameliorating worker injuries on a case-by-case basis. As such it has been widely opposed by those who view workplace ergonomics as a costly burden to business that is based on inadequate science. However, a recent development may fundamentally change how the ergonomics profession is viewed by positioning the field as a proactive discipline and propelling it to the forefront of the current green design movement.

Ten years ago the U.S. Green Building Council (USGBC, <http://www.usgbc.org/>), a nonprofit trade organization that promotes sustainable building design and operation, launched the Leadership in Energy and Environmental Design (LEED) Green Building Rating System (Gowri, 2004; U.S. Green Building Council). The LEED system was developed to promote integrated, sustainable, whole-building design practices; establish common standards of measurement; and raise consumer awareness of green design benefits. The LEED system focuses on six categories, within which varying credits can be obtained (some are project prerequisites), and within the credits, varying points accrued depending on how well the design solution meets specific green design requirements (Table 1). Based on the total number of points earned, a building project then can be awarded one of four levels of LEED certification (Table 2). An application for LEED certification must document compliance with the requirements of the rating system prior to construction.

The impact of LEED has been phenomenal. In the past dec-

Table 2. Summary of the LEED Certification Levels

Certification Level	Points
Certified	26–32
Silver	33–38
Gold	39–51
Platinum	52–69

ade, the system has transformed the building market. More than 14,000 LEED-certified projects have been completed in every U.S. state and 30 other countries. More than 43,000 design professionals – including those in architecture, interior design, engineering, real estate, and facility management – have been trained and professionally accredited by the Green Building Certification Institute.

The economic impact of LEED-accredited green buildings has been substantial. Occupancy rates are higher and more stable in such buildings, and, when adjusted for occupancy levels, rents are some 6% higher than in nearby comparable office buildings, which equates to around \$5 million in additional market value (Preston, 2008). There is great value to developing designs that amass the greatest number of points in the LEED system, and now ergonomics can be included in this process.

The USGBC Ergonomics Requirements

The USGBC recognizes that creating a healthful, comfortable, and productive workplace is also an integral part of successful green design. The latest iteration of the LEED rating system provides a guidance document that describes the intent of the “Innovation in Design and Innovation in Operations Credit,” which now has been expanded to include the creation and maintenance of a flexible, ergonomic environment that properly accommodates building users and promotes healthy, comfortable, and productive work.

Of the five possible points in this credit, one point can now be obtained for designs that promote good ergonomics. The requirement for this point involves the development and implementation of “a comprehensive ergonomics strategy that will have a positive impact on human health and comfort when performing daily activity for at least 75% of Full Time Equivalent building users.” The

Table 1. Summary of the LEED Rating System

Section	Category	# Prerequisites	# Credits	Max. # Points
1	Sustainable site	1	8	14
2	Water efficiency	–	3	5
3	Energy & atmosphere	3	6	17
4	Materials & resources	1	7	13
5	Indoor environmental quality	2	8	15
6	Innovation & design process	–	2	5
TOTAL		7	34	69

The Sprouting of “Green” Ergonomics

(continued from page 1)

USGBC has also issued recent guidance on what constitutes a good ergonomic design for either existing or planned workspaces and on the four steps that are required for awarding this point, as follows (USGBC, 2008):

Step 1: “Identify activities and building functions for which ergonomic enhancement (i.e., ergonomic strategies which exceed standard industry practice) is both possible and desirable through education and equipment, and wherever possible building users should be consulted on their preferences.”

For this step the USGBC encourages project teams to consult one or more of the existing ergonomics standards and guidelines when identifying ergonomic enhancement opportunities, such as the ANSI/HFES 100-2007 standard for computer workstations (HFES, 2007) and the Canadian Standards Association CSA-Z412-00 (CSA International, 2000).

Step 2: “Define a set of performance goals and expectations for the ergonomics strategy that address productivity, comfort, and health. Develop a plan and design process to meet them. Provide procedures to track and report the results of the ergonomics strategy, ensure that the performance goals have been met, and identify areas of potential improvement.” The USGBC provides a list of recommended actions to be taken to meet the requirements of this step.

Step 3: “Provide machines, equipment, tools, work-aids (METWAs), furnishings, and accessories that reduce the risk of work-related musculoskeletal disorders and are acceptable to a wide range of building users.” Table 3 (next page) summarizes the items that the project team should consider in striving to meet this requirement.

Step 4: “Provide ergonomics education to building users. Provide at least two opportunities for building users to understand and take advantage of ergonomic features in their environment. At least one of these opportunities must be interactive, and at least one must include an explanation of the provided METWAs and furnishings, preferably by the manufacturer. Post-education

evaluations must be conducted.” The USGBC provides a list of suggested education opportunities.

How Do Project Teams Get a Point for Ergonomics?

For a project team to obtain the one point for ergonomics in the Innovation and Design credit, they must submit two pieces of evidence in their plans and actions. First, they must provide a narrative that speaks to the requirements and that includes the following descriptions:

- “The steps taken to identify ergonomics enhancement opportunities.
- Brief verification that it is possible to exceed standard industry practices to achieve an ergonomically superior workplace.
- The performance goals and expectations, and the steps taken to meet them.
- The procedures put into place to track and report the results of the ergonomics strategy. This includes describing how each of the required actions will take place and the collaboration with the management team that will carry out these procedures.
- How purchased METWAs and furnishings will benefit the building users as they conduct routine tasks and activities, the selection criteria used for choosing the products (i.e., how the safety and health of the building user was considered), and how the products will accommodate a wide range of size needs.
- Two ergonomics education opportunities must be made available to building users, including their objectives and content.”

Second, the submittal must provide a list of purchased METWAs and furnishings that have been selected to minimize the risk of work-related musculoskeletal disorders. The submission can include cut sheets and manufacturer information for each METWA. To help project teams in making appropriate choices, it is suggested that they consider METWAs, furnishings, and other ergonomic solutions that will reduce each of the following:

- “awkward, nonneutral work postures (e.g., neck, shoulders, hands-wrist, low back, elbows, lower extremities);
- duration of sustained/static work postures (e.g., leaning forward, elevated arms, continuous grip);
- grip and pinch forces associated with required tasks (e.g., correct tools);
- repetition and duration of tasks, especially those with non-neutral postures and/or higher forces; and
- contact stress—resting soft tissues of the body on hard or sharp surfaces.”

Conclusions

The USGBC has recognized the value of workplace ergonomics as a proactive endeavor that should be involved in the creation of sustainable workplace designs that prevent injuries and that systemically promote comfort and productivity. This informed viewpoint will fundamentally change the acceptance and desirability of our discipline by many organizations. It is now up to us to professionally support the insightful action of the USGBC, to



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Table 3. Summary of the LEED Guidelines on Meeting Step 3 of the Requirements

For users who spend 50% or more of their time at computer workstations

Display – adjustability	<ul style="list-style-type: none">• The display should be centered directly in front of the body.• The top of the display screen should be placed no higher than the eyes.• The display screen should be placed 18 to 36 inches from the eyes.• The user should have control over the tilt angle of the screen and its position on the work surface.• The user must have the capability to position the display low enough to accommodate bifocals or progressive addition lenses (PALs), which may be significantly lower than eye height.
Display – reduced glare	<ul style="list-style-type: none">• The use of technologies such as flat-screen or antiglare devices is encouraged.• The display should be positioned such that light sources will not create glare.
Peripherals	<ul style="list-style-type: none">• Paper documents should be placed on a document holder immediately to the left, right, or below the display.• The keyboard should be positioned so the home row (row with F and J keys) is no higher than the elbow.• The user must have the ability to adjust the keyboard angle and set the slope of the keys flat, if so desired.• There must be enough room for the mouse or pointing device to be used adjacent to the keyboard (left, right, or in front). If a separate adjustable keyboard support is used, it must have space specifically designed for using a mouse or pointing device; preferably the mouse pad should have the capability to be positioned flat if the keyboard is tilted. The arm used to control the pointing device must be supported, either on the work surface or armrest of the chair.• Ergonomically correct keyboards, mouse, phones, and other supporting peripherals should be purchased when possible.
Surface	<ul style="list-style-type: none">• There must be enough work surface to properly support the computer and peripherals. Provide a surface with minimum dimensions of 28 inches wide by 24 inches deep.• Enough clear space should be allowed under the surface to enable the legs and feet to be positioned in multiple postures.• Furnishings in multioccupant workstations should be used that allow the user to control surface and support heights, with surface height initially at proper seated elbow height. If workstations are single-occupant, it is acceptable for facilities management to adjust the heights of surfaces.
Chair	<ul style="list-style-type: none">• Provide a range of chair types or chair features that optimize employee fit and task requirements.• Chairs must have a wide range of adjustability.

For users who work in an industrial setting

- Height-adjustable work surfaces (e.g., desks, work benches, fume hoods) should be provided.
- Pneumatic vs. electric vs. manual tools, material handling aids, such as lifts, height-adjustable pallet jacks and hand trucks should be provided.
- Provide a range of hand and power tools in sizes and weights that improve employee fit and function while reducing ergonomic risk factors; for example, grip diameter, multifinger activation, and vibration isolation.

assist with the workings of project teams whenever possible, to develop appropriate METWAs and research evidence on their efficacy, to develop educational content for users, and to position workplace ergonomics as an integral component in the green design movement.

References

CSA International (2000). *Guideline on office ergonomics*, CSA-Z412-00 (R2005). Toronto, Canada: Canadian Standards Association.

Gowri, K. (2004). Green building rating systems: An overview. *ASHRAE Journal*, 46 56–59.

Human Factors and Ergonomics Society. (2007). *ANSI/HFES 100-2007 Human factors engineering of computer workstations*. Santa Monica, CA: Author.

Preston, D. K. (2008). *New report shows economic value of green building certification*. Retrieved October 3, 2008, from <http://www.jetsongreen.com/2008/06/new-report-show.html>

Alan Hedge is a professor in the Department of Design and Environmental Analysis at Cornell University in Ithaca, New York. To access three “green ergonomics” worksheets and a sample user survey, go to <http://ergo.human.cornell.edu/cuergoUSGBC.html>.

ANNUAL MEETING

“Works-in-Progress” Session a Success

By Karla Eve Allan

At an alternative-format session conducted at the 2008 HFES Annual Meeting, three human factors professionals presented work still in progress and asked questions of the audience instead of the other way around! The presenters were Shawn Weil, Aptima; Jonathan Winters, Basic Commerce and Industries, Inc.; and Susan Spraragen, IBM T. J. Watson Research Center. Each presenter asked the audience concrete questions regarding assessment approaches.

Alternative Reality Game Training Event

Shawn Weil described an ongoing effort to assess the effectiveness of a novel training approach for new personnel assigned

to a Joint Task Force Operation. His collaborators were Alexandra Geyer and Paul Picciano of Aptima and Alice Leung and Bill Ferguson of BBN Technologies.

After describing the initial training format and assessment, Weil requested audience ideas for additional outcomes to measure during subsequent training trials. Because achievement of the training goals relies heavily on knowing who's who in the network, he received multiple suggestions related to measures of relationships formed by participants during the training scenario. The audience offered other ideas intended to help maintain subject motivation over the multiple sessions needed to complete the game.

Luminance Criteria for Shipboard Pilot-House Displays

The scenario Jonathan Winters described takes place in a ship's pilot house during nighttime operations. His collaborators were Margery Doyle and Scott Higgins of Lockheed Martin Maritime Systems and Sensors.

The proliferation of displays, electronic control panels, and indicator lights hampers the operator's ability to both use the displays and maintain a dark-adapted visual state during night operations. Winters described four assessment approaches for measuring and determining standards for aggregate luminance in a pilot house. He then asked the audience for pros and cons they perceived with each approach and added these to his own list of pros and cons. As a result of this session, Winters and his collaborators were able to take away fresh ideas for fine-tuning his study of luminance criteria.

Assessing the Customer Experience with Service Blueprinting

Susan Spraragen is investigating ways to depict the customer service experience visually from the customer's point of view using a technique called *service blueprinting*. She presented three distinct graphical depictions of a customer service episode. Text or icons were used to convey the emotional states of the customer, and a discussion followed about how to best notate these elements on the experience map. She concluded by asking the audience for a show-of-hands vote for their preference among the three blueprints. The audience preferred a more visual, pictorial representation that seemed more effective in conveying the customer's perspective.

Path Forward

It is clear that the Works-in-Progress session was a success. Not only did the presenters and their collaborators leave with greater insights into their cutting-edge work, but the session attendees took away assessment ideas that may apply to their own works in progress across diverse human factors/ergonomics areas. All agreed that this session should be a regular feature of the HFES Annual Meeting. Session chairs Rebecca Grier and Karla Allan plan to submit a proposal for the second Works-in-Progress session at the HFES 53rd Annual Meeting in San Antonio next year. Should the proposal be accepted, we hope to review your submissions and see you in October!

Education and Training Committee Invites 2009 Workshop Proposals

*By Patricia R. DeLucia, Chair,
Education and Training Committee*

The Education and Training Committee cosponsored two workshops at the 2008 HFES Annual Meeting in New York City: "Impacting System Design through Human Performance Modeling," and "Cognitive Crash Dummies: Predictive Human Performance Modeling for Interactive System Design." In cosponsoring workshops at the Annual Meeting, the E&T Committee provides high-quality training opportunities focused on the primary education and training needs identified by HFES members in the committee's 2003 survey. That survey identified needed *content areas* as including HCI, displays and graphical user interface design, cognition, sensation and perception, situation awareness, training, stress/fatigue, expert systems, individual differences, workplace design, warnings, communication technology, instructional technologies, consumer products, and special populations. *Skill areas* that members identified included task analysis, simulation methods, statistical data analyses, test and evaluation, usability analysis, applying HF/E principles, workload measurement, modeling, project/time management, systems analysis, safety/risk assessment, survey construction, experimental methods, human reliability analysis, and prototyping.

Proposals for workshops in these areas are highly desired and urgently solicited. Presenters of workshops cosponsored by the E&T Committee are paid an additional honorarium. Proposals are subject to the normal technical review process. When the Call for Proposals site opens on December 15, we encourage you to submit your proposal. Be sure to indicate that you wish to have the E&T Committee evaluate it for potential cosponsorship.

STUDENT VIEWS

The Annual Meeting: An Undergraduate's Perspective

By Jessi Kane

Strolling into a crowded conference building in the midst of hundreds of esteemed professionals can seem daunting for someone as new to the field as I am. The idea that I would be speaking with Ph.D.s when I have not yet completed my bachelor's degree was enough to raise my heart rate, I can assure you. Little did I know the HFES 52nd Annual Meeting would amount to one of the best career-oriented experiences of my life. Professors and professionals alike were willing to share with me their abundant knowledge, opening my eyes further to the field of human factors/ergonomics.

Each session left me with something more valuable and more

STUDENT VIEWS, cont.

insightful than before. Hearing about current graduate student research gave me a glimpse into what I might be doing in the future. It also showed me ways in which HFES will allow me to further spread my wings in the years to come.

At the Mentor/Mentee Luncheon, I could easily mix and mingle with some of the top professionals in the field. I spoke with a professional from User Centric, who not only explained what she is doing and what she would like to be doing in the future but how she got where she is today.

The conference offered an opportunity for all students to gather and talk about their experiences. As an undergraduate, I was able to accumulate a lot of knowledge about my upcoming grad school experience and my possible future with HFES.

The most enjoyable part of Student Career and Professional Development Day was the question-and-answer session between professionals and students. I benefited from the answers to questions I had always thought about and even answers to questions I had not even thought to ask. Thanks to the candidness of the panel, no one felt out of place asking their questions. It was a very low-key way to acquire useful information.

Between sessions, I had the opportunity to simply walk around and chat with people. This enabled me to see the infinite array of paths that are open to me.

I would like to thank everyone who shared their knowledge with me, and I look forward to expanding my horizons in HFES in the years to come.

Jessi Kane is a senior at the College of New Jersey in Ewing. She is double majoring in biopsychology and Spanish and works as an ad sales research intern with MTV networks. Her future interests in the field of HF/E include human-computer interaction and usability.

WORLD USABILITY DAY

Carolina Chapter Celebrates WUD 2008

By Andrew Wirtanen

HFES Carolina Chapter members observed World Usability Day at the Triangle Usability Professionals Association's celebration, hosted by GlaxoSmithKline in Research Triangle Park. The evening was kicked off with a fajita dinner and a usability method trading-card game, which allowed attendees to meet each other as they tried to collect 10 different cards. The hour that followed featured three presentations by experts in the field of transportation.

Transportation planner Graham James took the audience on several adventures, which led to discussions about some of the current problems in the design of bus stops. Graham shared one example: He decided to take public transportation instead of the hotel shuttle in Little Rock, Arkansas. He stood beneath the bus shelter, but the bus flew right by him. What did he do wrong? After the bus had passed, Graham looked down the road a little

ways and saw the back of a sign. Curious, he walked down to the sign, which told him he should have been standing near the sign, not at the bus shelter.

The next speaker was human factors specialist and HFES member Beth McCough from Johnson Controls, Inc. (JCI). JCI is a Wisconsin-based automotive supplier best known for its HomeLink® system, which provides a universal remote control in overhead consoles in automobiles for the operation of garage doors and gates. McCough, who works in the Human Machine Interaction (HMI) group, discussed her research on the safety of operating portable music players while driving. HMI conducted usability tests with several music players and used metrics such as task time and lane deviance. Not surprisingly, they concluded that all music players were unsafe to use while driving.

The last speaker was Alex Hussain, a design engineer from HumanCentric Technologies, a product development company based in Cary, North Carolina, with a team composed of human factors/ergonomics professionals, and industrial and graphic designers. Alex discussed HumanCentric's bike rack design for the CityRacks design competition held by the New York City Department of Transportation. The bike rack, dubbed "CycleSpot," makes it easier to secure a bike to the rack through such user-friendly features as integrated signage that instructs the bicyclist where the lock points are.

Following these talks were two presentations by teams that had participated in a three-week design challenge. The first team, from the Cary-based software company SAS, created an interactive prototype in Adobe Flex of a social mobile solution that encourages ride sharing and calculates routes. The other team, which included various members from HumanCentric, BB&T, and BlueStripe Software, looked into peripheral bus stop design. They created three designs that improved the visibility of the bus stops and encouraged access to information.

The event brought together many experts in the Raleigh-Durham area, and the evening was filled with stimulating discussions around the World Usability Day theme of usability in transportation.

Andrew Wirtanen is a human factors specialist at HumanCentric, an integrated product design firm headquartered in Cary, NC.

CHAPTERS

Puget Sound Chapter Wins 2008 Award

By Susan Murphey, President, Puget Sound Chapter

As president of the HFES Puget Sound Chapter (PSHFES), I was honored to attend the HFES 52nd Annual Meeting and accept the Outstanding Chapter Award on behalf of our chapter. This award speaks to the level of commitment of our Executive Council and our members in support of the various community and educational events we sponsor. I believe the strength of our chapter comes from the environment of learning, information sharing, and networking that exists throughout the membership.

We are engaged in several ongoing projects and activities, including facility tours, dinner events, public awareness media offerings, and an annual symposium and workshop. We also conduct internal activities that support the growth and development of the chapter. Currently, we are working on a centralized database for improved member information tracking and communication. We are also continuing our efforts to reinforce our organizational foundations through fiduciary- and management-focused improvements.

Our annual symposium and workshop was held in September, with record attendance of more than 100 professionals from the local area. Our keynote speaker, Alan Hedge of Cornell University, offered a thought-provoking look at the historical aspect of ergonomics and introduced exciting potentials for the future of the profession. Hedge's presentation was followed by a variety of topics offered by other speakers throughout the day. Workshop attendees were able to follow the steps of the design process from start to finish, including the basics of sketching for effective communication of ideas.

The 5th Annual PSHFES Professional of the Year Award was presented to Rick Goggins, ergonomist for the Washington State Department of Labor and Industries, at our symposium. This award was launched in 2004 as a means to recognize a person or group who has worked to advance the science of human factors/ergonomics, educate others, and/or promote awareness of the field.

Our ergonomics for schools initiative, which started in 2007, is taking flight with the development of a pilot project called "Technically Cool Computing." This is a learning activity module for student computer workstation ergonomics. The module will teach students how to evaluate their computer workstations and work habits in order to reduce their risk for musculoskeletal injuries. Technically Cool Computing is being promoted by the Washington Health Foundation as part of its Governor's Bowl Coordinated School Health Activities; information about the project has been sent to more than 400 schools in Washington State. Monies from our Outstanding Chapter have been earmarked for continuing this important project.

HFES represents a varied professional community. For a local chapter, providing value to all members is an ongoing challenge. We continue to seek opportunities for meaningful involvement for our members to advance their professional knowledge and to provide an avenue for giving back to the community and professional society. Acknowledgment of our efforts by HFES is greatly appreciated. Thank you for selecting the Puget Sound Chapter as the Outstanding Chapter of the Year.



Mark your calendar!

Human Factors and Ergonomics Society
53rd Annual Meeting

October 19–23, 2009
San Antonio, Texas USA

Irv Streimer, a former HFES member, passed away on October 1, 2008 at the age of 81. Irv worked at Boeing until 1963, and then went to California State University, Northridge, where he taught in the Psychology Department and started its human factors graduate program in 1965. Many incoming psychology students wanted to specialize in fields such as clinical psychology, but Irv convinced some to take a different road. He told them, "If you really want to help people, think about how to design things so people can use them easily and safely. Then, instead of helping just one person at a time, you can help many." This was totally new to some of his students, who had never considered such a career.

Besides teaching in the fledgling field of human factors, Irv also worked with North American Rockwell in the new space program. He developed and built a 6-degree-of-freedom simulator, a large device that floated over a glass floor on cushions of air. A person at the top of the device could attempt tasks without the benefit of gravity anchoring him to the ground, just as astronauts would have to do on future spaceflights. Some of Irv's students participated in these experiments. He performed studies for the U.S. Navy in which people working underwater attempted to perform tasks similar to those performed in space. He was very productive in publishing his research.

As a result of Irv's guidance, his students went on to work in diverse fields such as aircraft manufacturing, underground mining, computer systems, and medical devices and health care systems. They have spread out across the landscape to teach, to write, and to produce things that have improved the quality of our lives.

Irv was a good man, a kind man, a man of stature and integrity – a true mentor to many, and is greatly missed.

—Daniel Johnson

IN THE NEWS

Daniel V. McGehee, director of the Human Factors and Vehicle Safety Research Division at the University of Iowa, was quoted in a November 2 *Washington Post* article on in-car camera monitoring systems for cars driven by teenagers. McGehee's own research on in-car cameras for teen drivers was featured in a November 15 article in the *Iowa City Press-Citizen*.

HFES Fellow **Robert B. Sleight** was recently quoted in the November 10 Road Runner column of the *Arizona Daily Star* regarding visibility for motorcyclists, bicyclists, and pedestrians.

HFES Fellow **Alan Hedge** was quoted in an article on selecting the right office chair in the November 10 issue of the *Hartford Courant*.

Volume 4 is Now Available!

The HFES annual series, *Reviews of Human Factors and Ergonomics*, condenses HF/E knowledge in specific subject areas into a form that provides readers with a comprehensive understanding of each topic — its current state, important new research findings and technology, and current issues and research needs. Chapters note ways in which research results inform theory or methodology for future research and also emphasize the practical implications of the research that is reviewed. Chapter authors are among the most prominent HF/E professionals in their respective subject areas.

Reviews volumes are broader in scope than handbooks and deeper in detail than encyclopedias. They are designed to inform both researchers and practitioners. All chapters include extensive references.

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Chapter 2. Digital Human Modeling for Workspace Design – *Don B. Chaffin*

Chapter 3. Forensic Human Factors: People, Places, Products – *Ilene Zackowitz & Alison Vredenburg*

Chapter 4. Handheld Digital Devices – *James R. Lewis, Patrick M. Commarford, Peter J. Kennedy, & Wallace J. Sadowski*

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CHAIR

INDUSTRIAL AND OPERATIONS ENGINEERING UNIVERSITY OF MICHIGAN, ANN ARBOR

**CHAIR, Department of Industrial and Operations Engineering,
University of Michigan.**

The University of Michigan invites applications for the position of Chair in the Department of Industrial and Operations Engineering (IOE) <http://ioe.engin.umich.edu/index.php>. Candidates should have a distinguished record of scholarship, demonstrated leadership ability, a commitment to excellence in both teaching and research, and the vision to advance the academic leadership of the IOE department in the coming years. In addition, they must have an earned doctorate in Industrial Engineering, Operations Research, Ergonomics, or a related field. The IOE Department currently has 23 full-time faculty, 5 jointly appointed faculty, 21 adjunct faculty, outstanding undergraduate, master's, and doctoral programs, and a broad portfolio of externally-funded research.

Inquiries and applications (including a complete resume and the names, addresses, and phone numbers of three references) should be directed to:

Professor Farnam Jahanian
Division of Computer Science and Engineering
University of Michigan, 2260 Hayward Street
Ann Arbor, MI 48109-2102
Fax (734) 647-7009; Email: farnam@umich.edu

The target date for filling the position is Summer 2009. Applicant screening will begin October 1, 2008 and will continue until the position is filled. The University of Michigan is an Equal Opportunity Affirmative Action Employer and is especially interested in candidates who can contribute, through their research, teaching, and/or service, to the diversity and excellence of the academic community.



Michigan**Engineering**

WEST VIRGINIA UNIVERSITY

COLLEGE OF ENGINEERING AND MINERAL RESOURCES DEPARTMENT OF INDUSTRIAL AND MANAGEMENT SYSTEMS ENGINEERING

The Department of Industrial and Management Systems Engineering (IMSE) at West Virginia University invites applications and nominations for two tenure-track faculty positions at the level of Assistant Professor for Fall 2009. One position is in Ergonomics/Human Factors Engineering and the other position is in Production Planning and Control/Operations Research. We seek outstanding candidates who possess a Ph.D. in industrial engineering and are able to teach undergraduate and graduate courses, to develop an externally funded research program, and to perform professional service activities.

West Virginia University is a comprehensive land grant institution with medical, law, and business schools, over 29,000 students, and Carnegie Doctoral Research Extensive standing. The IMSE Department has 14 faculty members, 180 undergraduate, and 115 graduate students. The Department offers degrees at the B.S., M.S., and Ph.D. levels. The College has seven departments, over 3,000 students, 112 faculty, and approximately \$28 million in research expenditures per annum.

Candidates should submit current curriculum vitae, names and addresses of three references, a one page summary statement describing qualifications for the position, and plans for teaching and research. Review of applications will start on February 16, 2009. These positions will remain open and applications will continue to be reviewed until appointments are made.

Send inquires and applications to:

Chair, Faculty Search Committee
Industrial and Management Systems Engineering Department
West Virginia University
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FLASH!

2009 Membership Renewal

If you haven't already, don't forget to renew your membership for 2009 this month. The deadline to renew without incurring a \$15 postage surcharge is January 31, 2009.

Call for Proposals

Proposals for the 53rd Annual Meeting are due February 23, 2009. HFES welcomes proposals on any HF/E topic for any format (lecture, poster, panel, etc.). The submission/review site will open on December 15, 2008.

2009 Applications for Fellows

The due date for nominations for Fellows is February 2, 2009. The Honorary Fellow designation has been discontinued.



Human Factors and Ergonomics Society

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