Toward an HF/E-Literate Society

By Waldemar Karwowski, HFES President

As discussed in my November 2006 article, a mission of our Society is “to help our members advance the science, philosophy, and practice of human-centered design” (HFES 2003 Strategic Planning Day). In this context, “we envision a widely shared science, philosophy, and practice that adapt technology to enhance human performance and improve the quality of human life.” Furthermore, our strategic goals include the following:

A. **Science and Practice Goal**: Advance both the science and practice of HF/E to maintain HFES as the premier scientific body in the field.

B. **Education and Training Goal**: Promote the teaching of HF/E science, philosophy, and practice.

C. **Peer Networking Goal**: Promote the evaluation and exchange of information among HF/E researchers and practitioners.

D. **Outreach Goal**: Promote the exchange of information between HF/E professionals and those who need our services.

E. **Organizational Excellence Goal**: Serve and represent the members as the premier scientific, engineering, and practice society.

Perhaps some of you are wondering, as I am today, how well we achieve these goals. Are we able to measure any real impact of what we do? How does society at large benefit from what we provide and aspire to achieve (especially Goals B, C, and D)? And when we look at the society in which we live – with all the unintended consequences of technology that is widely used today – we must also wonder whether our above-stated mission is possible to accomplish at all. Or is it more likely that the complexity of technology is so overwhelming that no one can control the undesirable social effects that people experience every day, such as work-related stress, employee injury and disability, and risks to patients’ well-being and loss of life while in hospitals, industrial accidents, airplane crashes, train derailments, and other transportation catastrophes – not to mention the potential harmful effects of the upcoming age of nanotechnology (see Sequeira et al., 2006)?

If we believe that we can really make a difference, the simple question we need to pose is how can we better communicate with society at large in order to fully demonstrate the value of the HF/E discipline and profession to ensure the level of control over technology that we wish to have. In my view, only when everyone – starting at preschool and continuing throughout the college level – is educated about the basic principles of HF/E theory and applications can we begin our journey in this direction.

A report by the National Academy of Engineering (NAE, 2004) stated that in the near future, the ongoing developments in engineering will “expand toward tighter connections between technology and the human experience, including new products customized to the … dimensions and capabilities of the user, and ergonomic design of engineered products.” Although in the past HF/E has been driven by technology (reactive design approach), in the future, HF/E should drive technology (proactive design approach). But is that even possible? Again, the question is how can we achieve that in practice?

**Educating the World About Human Factors/Ergonomics**

The pillars for any scientific discipline include a definition, a teaching paradigm, and an educational base (Pearson & Young, 2002). A teaching paradigm for HF/E should conform to established scientific standards, emphasize development of competence in the field, and integrate theory, experimentation, design, and practice. In general, an introductory course sequence in HF/E should be based on the curriculum model and the disciplinary description. What is equally important, however, is our ability to promote the requisite HF/E literacy among all citizens of the world.

Our discipline and profession deal with a broad scope of problems relevant to the design and evaluation of work systems, consumer products, and working environments, in which human-machine compatibility affects human performance and product usability. As observed by Pearson and Young (2002), “many consumer products and services promise to make people’s lives easier, more enjoyable, more efficient, or healthier, but very often do not deliver on these promises.” There are many reasons for this situation, but the design of any technological product, tool, or work system requires the involvement of competent HF/E professionals.

At the same time, in the social context, all citizens (consumer product users) must have the ability to understand the utility and limitations of the technological products they intend to use or are using everyday. HF/E literacy should prepare people to perform their roles both inside and outside the workplace effectively and
safely. HF/E-literate citizens should know enough about how technological systems operate that they are able to make informed choices and benefit from what those technological products and systems afford. HF/E literacy is also an important component of the potential future HF/E competency.

In view of the foregoing points, I propose the following set of dimensions for HF/E literacy (see Figure 1 below):

1. **HF/E knowledge and skills.** People should have a basic knowledge of the philosophy of human-centered design and principles for accommodating human limitations.

2. **Ways of thinking and acting.** People should seek information about the benefits and risks of consumer products, services, and systems and use this knowledge in making decisions about purchasing and using those products and systems.

3. **Practical HF/E capabilities.** People should be able to identify and solve simple task-related design problems at work or home and to apply basic HF/E concepts in making informed judgments about the usability of a product and the related risks and benefits of its use.

In the table at right, I present a list of 10 standards for HF/E literacy, which parallels a model of technological literacy reported by the National Academy of Engineering (Pearson & Young, 2002).

Eight of these standards relate to developing an understanding of the nature, scope, attributes, and role of the HF/E discipline in modern society. The other two refer to the ability to apply the HF/E design process and evaluate the impact of products and systems on human safety and well-being.

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<tr>
<th>Table 1. Proposed Standards for HF/E Literacy (after Karwowski, 2005)</th>
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<td><strong>Citizens have an understanding of:</strong></td>
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<td>Standard 1: Characteristics and scope of HF/E</td>
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<td>Standard 2: Core concepts of HF/E</td>
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<td>Standard 3: Connections between HF/E and other fields of study, and relationships among technology, environment, industry, and society</td>
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<td>Standard 4: Cultural, social, economic, and political effects of HF/E</td>
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<td>Standard 5: Role of society in the development and use of technology</td>
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<td>Standard 6: Effects of technology on the environment</td>
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<td>Standard 7: Attributes of HF/E design</td>
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<td>Standard 8: Role of HF/E research, development, invention, and experimentation</td>
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<th><strong>Citizens are able to:</strong></th>
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<tr>
<td>Standard 9: Apply the basic HF/E design process</td>
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<tr>
<td>Standard 10: Assess the impact of consumer and other products and systems on human health, well-being, system performance, and safety</td>
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This proposal is just a first draft. If we accept this challenge, then the big question is how we can achieve HF/E literacy for all citizens. What should be our strategy to move in this direction, what resources are needed, and where will they come from?

But then, this is just my personal reflection. Ergonomics for kindergartners, anyone?

References


maintain continuous dialogue between HFES and Federation leaders and the leaders of other allied member societies. HFES first joined the Federation in 1985.

Federation board members were treated to presentations by Deborah Olster, deputy director of the National Institute of Health’s Office of Behavioral and Social Science Research; Robert Croyle, director of Cancer Control and Population Sciences at the National Cancer Institute; Michelle Keeney, science adviser in the Human Factors Division, Science & Technology Directorate of the Department of Homeland Security; and Rae Silver of the Office of Integrative Activities (neuroscience) at the National Science Foundation.

Of pertinence to HFES members, Dr. Keeney’s presentation outlined the efforts of the Human Factors Division, newly formed in October 2006 by DHS’s new undersecretary for science and technology, Admiral Jay Cohen. The Human Factors Division is led by Sharla Rausch and has a two-part mission: (a) to apply social and behavioral sciences to improve the detection, analysis, and understanding of threats posed by individuals, groups, and radical movements, and to support the preparedness, response, and recovery of communities affected by catastrophic events; and (b) to advance national security by integrating human factors into homeland security technologies.

As Undersecretary Cohen likes to say to the first of these human factors missions, “We are more interested here in getting into the head and mind of the bomber – than we are in learning how the bomb is made or how it works.” A grant-based university center for such studies is located at the University of Maryland.

The division’s more traditional human factors mission will be to infuse the best tenets of human-systems integration (HSI) into the materiel acquisition processes of numerous DHS organizational elements (e.g., FEMA, Border Patrol, U.S. Customs). This latter portion of the human factors mission is just getting established and formalized at the agency’s Science & Technology Directorate, where initially it will likely adapt those HSI portions of Department of Defense acquisition models already demonstrated to be successful. Therefore, the Human Factors Division will likely infuse its own adaptation of Army MANPRINT and Navy SEAPRINT processes. This will take some time to accomplish; it will require appropriate staffing as well as increased funding before the division can assert its role within the extensive and varied list of DHS organizations, member agencies, and client organizations that make acquisitions of technology. Some DHS organizations (e.g., U.S. Coast Guard) already have legacy materiel acquisition and procurement business practices in place.

Many Capitol Hill advocacy efforts by the Federation and its members were described in the business portions of the board meeting. HFES was formally recognized for our cosponsorship of our third annual Science Forum, which was held in November and addressed contributions of human factors/ergonomics to education in science and technology as it relates to the American Competitiveness Initiative (see my report in the January 2007 HFES Bulletin, http://www.hfes.org/web/BulletinArchive.html). HFES Science Forums are part of our strategic effort to educate, communicate, and advocate on important topics facing the United States.

During the meeting, the Foundation for the Advancement of Behavioral and Brain Sciences (FABBS), which is an outgrowth of the Federation, announced that it had named HFES Fellow Richard W. Pew (BBN Technologies) as the Featured Honoree. Dr. Pew, a prominent HFES fellow and past president, now ranks among FABBS’s list of distinguished scientists who have made important and lasting contributions to the behavioral and brain sciences. Past HFES President Wendy Rogers nominated Pew for this prestigious honor. If you wish to add your name to the list of those honoring Dick Pew, or to view the list of other recipient honorees, see http://www.fabbs.org/Pew_Honor.html.

HFES is approximately the fifth-largest member of the Federation, which now counts 22 major societies among its members. It also represents a sizable number of university and APA Division affiliate member organizations. A list is available at http://www.thefederationonline.org.

Gerald (Jerry) Krueger, principal scientist/ergonomist at the Wexford Group International in Vienna, Virginia, has served as the HFES representative to the Federation since 2002.

IEA

Nominations Due for IEA Awards and IEA Fellow

By Michelle M. Robertson, HFES IEA Representatives Committee Chair

Nominations for the following IEA awards are due at the HFES Central Office on March 1:

- IEA Distinguished Service Award
- IEA Outstanding Educators Award
- IEA Award for Promotion of Ergonomics in Industrially Developing Countries
- IEA Ergonomics Development Award
- IEA/Liberty Mutual Prize and Medal in Ergonomics and Occupational Safety
- IEA Fellow Award

In particular, HFES members are encouraged to nominate HFES Fellows and Honorary Fellows for the IEA Fellow Award. HFES endorsement for this award requires that the nominee be an HFES Fellow or Honorary Fellow. Additional information about the award, the nomination form, and a list of past recipients can be found at the IEA Web site, http://www.iea.cc/.

Send an electronic copy of a completed nomination form, a copy of the nominee’s current CV, and any supporting material to Michelle Robertson, HFES IEA Delegate Committee Chair, michelle.robertson@libertymutual.com. Questions may be directed to Executive Director Lynn Strother (lynn@hfes.org).
Nomination Ballots to Be Mailed

Nominations ballots for the 2007 election of HFES officers and at-large Executive Council members will be mailed to Full Members, Fellows, Emeritus Members, and Emeritus Fellows on March 28. Completed nomination ballots are due on April 25.

ODAM 2008

The Human Factors in Organizational Design and Management (ODAM) Symposium is seeking submissions for its ninth meeting, to be held March 19–21, 2008, in São Paulo, Brazil. Topics can address any area related to organizational design and management, including work environment, participatory ergonomics, assembly and service systems, macroergonomics in health care, training systems, occupational health and stress, anthropotechnology, sociotechnical change, and quality improvement.

Submissions can describe completed work or work-in-progress research, student papers, discussion panels, forums, tutorials, or workshops. The deadline for abstracts is April 6, 2007. Electronic submissions are required. For more information, send e-mail to patricia.monteiro@vanzolini.org.br.

HFEP Team Races in the Nike Marathon

By Haydee M. Cuevas, HFEP Team Captain

As part of the Society’s year-long celebration of its 50th anniversary, a group of HFES members formed the Human Factors/Ergonomics Professionals (HFEP) team to spearhead a fund-raising effort for the Nike Women’s Marathon: A Race to Benefit the Leukemia & Lymphoma Society. The event took place in San Francisco on October 22, 2006, the weekend following the HFES 50th Annual Meeting.

HFEP team members Haydee Cuevas (SA Technologies), Brian Peacock (Embry-Riddle Aeronautical University), and Julie McMath (California State University, Long Beach) ran 26.2 miles along a scenic but challenging course to emphasize the importance of community outreach in our profession. The Nike Marathon raised more than $16 million to benefit research to find a cure for leukemia, lymphoma, Hodgkin’s lymphoma, myeloma, and other blood cancers and to provide support for patients and their families.

This race, however, had special significance for HFES members, particularly those involved in the Technical Program Committee (TPC). The initiative to include the Nike Marathon in the Society’s 50th anniversary activities started when we learned of fellow TPC member Cheryl Bolstad’s breast cancer diagnosis in April 2006. Her courage and determination to face and overcome this challenge have been inspirational, and we look forward to having her join us at the HFES 51st Annual Meeting in Baltimore.

Cognitive Modeling Conference

The 2007 International Conference on Cognitive Modeling invites submissions for half- and full-day tutorials to be presented on July 26 in Ann Arbor, Michigan. Tutorials should provide conference participants with the opportunity to gain new insights, knowledge, and skills from a broad range of topics in the cognitive-modeling field.

Tutorial proposals are due on March 5, 2007. For tutorial format, submission, or general conference information, visit http://www.iccm2007.org.

CONTEXT ’07

Submissions are invited for CONTEXT 2007: The Sixth International and Interdisciplinary Conference on Modeling and Using Context, to be held at Roskilde University near Copenhagen, Denmark, on August 20–24. Topics include cognitive modeling, human-computer interaction, semantic Web systems, knowledge, engineering, neuroscience, and perception.

Papers, posters, and demonstrations are due March 15, 2007. All work must be submitted electronically as a PDF file. For more information, visit http://context-07.ruc.dk.

SAFE Symposium 2007

The 45th Annual SAFE Symposium is seeking abstract submissions for the meeting to be held October 29–31, in Reno, Nevada. This is an opportunity to present lectures or showcase equipment and systems that have shaped safety in aviation, space, land, and military disciplines.

Submissions may include papers, discussion panels, exhibits, product demonstrations, workshops, and technical debates. The deadline for abstracts is June 29, 2007. All abstracts must be submitted electronically to safe@peak.org. For more information, visit http://www.safeassociation.com.

Graduate Directory Update

The HFES Directory of Human Factors/Ergonomics Graduate Programs will be updated in the coming months. The Communications Department will contact each person named as the graduate program contact and request updates to existing listings. HFES invites members and nonmembers to submit new listings describing human factors/ergonomics graduate programs in North America. This year, in response to a number of inquiries, we will include information about distance learning courses.

To obtain a listing application, please contact Assistant Editor Shoshana Muhammad at 310/394-1811 or shoshana@hfes.org.
Online Community Explores Design

DESIGN 21: Social Design Network, a recently launched online community, explores the connection between design and society. The network serves people in the design community, nonprofit organizations, businesses, and local governments. It allows them to connect, share concerns and resources, and inspire solutions. Anyone can become a member of the community, and membership is free.

In partnership with UNESCO and Felissimo Design House in New York, DESIGN 21 aims to examine ways that design can respond to social and global concerns, including the improvement of objects, structures, environments, and communities. The network also features resources, discussion forums, and design competitions that address social or environmental challenges.

For more information, visit http://www.design21sdsn.com or contact Director Haruko Smith at 212/956-4438 ext. 140 or hsmith@felissimo.com.

In the News

Michael J. Paley, vice president for government programs at Aptima, was quoted in the October 16, 2006, issue of Washington Technology. In an article on computer-based training for emergency first responders, Paley talked about the need for deliberate practice in training crisis management skills.

Jack T. Dennerlein, associate professor of ergonomics at the Harvard School of Public Health in Boston, was quoted in an August 7, 2006, Los Angeles Times article about the benefits of exercise in dealing with repetitive stress injuries. Dennerlein stated that ergonomics must be used alongside a regular exercise program because the two are “synergistic.”

Najmedin Meshkati, associate professor of engineering at the University of Southern California, was quoted in a July 29, 2006, Los Angeles Times article about a near-collision at the Los Angeles International Airport. Meshkati pointed out the problems with the Airport Movement Area Safety System.

Rani Lueder, president of the Encino, CA, consulting firm Humanities ErgoSystems Inc., was quoted in a July 25, 2006, Washington Times article on ergonomics and body posture. She emphasized the importance of taking rest breaks and doing stretching exercises to avoid injury when working at a computer.

People

After 16 years in academia and 26 years in military settings, Richard Christ is joining the ranks of those in retirement. Although his primary life activities will shift from professional to pure leisure, he will continue his interest in and association with research in human factors. He may be reached at 4815 St. Francis Ave., Columbus, GA 31904, 706/660-8059, rchrist@knology.net.

Scott H. Isensee was promoted to corporate user interface architect at BMC Software in Austin, Texas. Isensee is responsible for the common user interface style that is employed throughout the company. He may be reached at BMC Software, 10431 Mordado Circle, Austin, TX 78759, 512/340-6695, scott_isensee@bmc.com.

Richard W. Pew, principal scientist at BBN Technologies in Massachusetts, was recently honored by the Foundation for the Advancement of Behavioral and Brain Sciences (FABBS) for his career-long contributions to the field of engineering psychology and situation awareness. He may be reached at BBN Technologies, 10 Moulton St., Cambridge, MA 02138, 617/873-3557, pew@bbn.com.

Nicholas Shields, Jr., received Boeing’s 2006 Technical Fellow designation for his contributions to ground-based defense systems, combat systems, international space studies, and advanced space flight. He may be reached at 256/461-3744 or nicholas.l.shields@boeing.com.

Human Factors Program at CSULB

By Kim Vu, Assistant Professor of Human Factors

California State University, Long Beach, is pleased to announce the master of science in human factors psychology degree. Established in 2005, this program prepares students for human factors careers with a curriculum that emphasizes both interdisciplinary course work and hands-on research and design experiences. Its emphasis on research and design prepares students for advanced graduate work.

The program has two Centers of Excellence in Human Factors: The Center for the Study of Advanced Aeronautics Technologies (CSAAT), a venue for research and training in air traffic management simulation; and the Center for Usability in Design and Assessment (CUDA), where research and training are conducted in usability testing and interface design. In-house internships are available in both centers, and scholarships have been made available from the Boeing University Relations Program. Students have also obtained internships in local aerospace, medical, and computer organizations.

The MS-HF program already has an active HFES student chapter, which was recently recognized with the HFES Best Student Chapter Award at the 50th Annual Meeting. This year, the students will be organizing the Second Annual Regional CSU Human Factors Conference in Long Beach on February 24.

For more information about the program, contact Tom Strybel (tstrybel@csulb.edu) or Kim Vu (kvu8@csulb.edu). Applications may be obtained from Graduate Advisor Diane Roe (droe@csulb.edu).
2 Postdoctoral Positions
Dynamic Decision Making Laboratory (www.cmu.edu/ddmlab)
Carnegie Mellon University

Ideal candidates will have a PhD in Psychology, Cognitive Science, Decision Science or Human Factors and strong research interests in all facets of dynamic decision making: conducting cognitive task analysis, helping in real world computer simulation design, conducting experiments, analyzing data and writing research reports. Salaries and benefits are competitive, based on background and experience. Positions are available to start immediately. Applicants send CV, research statement, journal articles, and names of 3 references to Dr. Cleotilde Gonzalez (coty@cmu.edu).

CMU is an EEO/AA employer (www.cmu.edu/policies/documents/SoA.html).

Calendar

Announcement deadlines: First day of the month prior to the desired issue; for events or deadlines within the first three weeks of a month, send information at least two months in advance. Items are published according to space availability. A more detailed Event Calendar is available at http://hfes.org.


★ Human Performance, Situation Awareness, and Automation (HPSAA III) Technology Conference, April 3–6, 2007, Cocoa Beach, FL. Mustapha Moulooua, Conference Chair, Dept. of Psychology, P.O. Box 1390, Orlando, FL 32816, 407/823-2910, fax 407/823-5862, moulooua@pegasus.cc.ucf.edu, http://faculty.erau.edu/bpsaa/.

★ Indicates new listing

Short Courses


★
Faculty Position in Aerospace Engineering and Cognitive Engineering

The Georgia Tech Daniel Guggenheim School of Aerospace Engineering has an opening at the assistant professor level for faculty specializing in aerospace engineering and cognitive engineering. The School is ranked second nationally at the undergraduate level and fourth in Aerospace graduate programs, and has a broad and diverse faculty and vital research program. The School has an established research thrust in aerospace cognitive engineering and is the founding unit of Georgia Tech’s Cognitive Engineering Center. This position will be within the School of Aerospace Engineering and required qualifications include a degree in Aerospace Engineering or related fields, and demonstrated ability and interest in contributing to the teaching and research activities of at least one of its technical interest groups as well as in cognitive engineering.

This tenure-track faculty position is intended to complement the Cognitive Engineering Center’s current research in aerospace engineering. The applicant should be prepared to establish a research program in any of a number of areas such as: human-robot interaction in space; human decision aiding in real-time safety-critical aerospace domains such as flight deck design, UAV operations, air traffic control and mission control; human-automation interaction in the design of autoflight systems or autonomous vehicles; the relationship between vehicle design and the cognitive capabilities of their human operators; and methods of flight deck display or avionics design arising from engineering principles such as analysis of vehicle flight dynamics.

It is anticipated that person filling this position will participate in Georgia Tech’s new interdisciplinary Cognitive Engineering Center. This center provides an additional community for collaboration in developing cognitive engineering methods and models and their application to aerospace. Likewise, this person is also expected to join in teaching interdisciplinary graduate courses in cognitive engineering, and is invited to develop a new graduate course in his/her area of specialization.

Applications should include a curriculum vitae, a list of potential references for the search committee to contact, and brief summary of interests relative the School’s research and educational programs; a representative technical publication reporting on the candidate’s research is also welcome. Please send to:

Dr. Amy Pritchett
David S. Lewis Associate Professor of Cognitive Engineering and Director, Cognitive Engineering Center
Daniel Guggenheim School of Aerospace Engineering Georgia Institute of Technology
Atlanta, GA 30332-0150 U.S.A.
Georgia Tech is an equal opportunity, affirmative action employer.
University of Michigan-Dearborn
Department of Industrial and Manufacturing Systems Engineering
Faculty Position in Human Factors Engineering/Ergonomics

The Department of Industrial and Manufacturing Systems Engineering at the University of Michigan-Dearborn invites applicants for a tenure track assistant professor position starting Fall 2007. The candidate must have a Ph.D. in industrial engineering or a closely related field by the time of appointment. The candidate is expected to teach undergraduate and graduate courses and secure and conduct sponsored research in Human Factors Engineering/Ergonomics.

Information about the department can be obtained from www.engin.umd.umich.edu/IMSE.

Please send a resume, a brief statement of purpose, a dissertation abstract, a representative research paper, and names of at least three references to:

IMSE Faculty Search Committee
c/o Lisa Beach
IMSE Department, 2340 EC
University of Michigan-Dearborn
4901 Evergreen
Dearborn, MI 48128-1491

Review of applications will begin February 28, 2007, and continue until the position is filled. The University of Michigan-Dearborn is dedicated to the goal of building a culturally diverse and pluralistic faculty committed to teaching and working in a multi-cultural environment, and strongly encourages applications from qualified minorities and women. The university is an EOE/AA employer.

The University of Michigan-Dearborn campus is uniquely located near the product engineering and manufacturing facilities of a number automotive and related supplier companies. A new 44,000-square-foot Institute for Advanced Vehicle Systems Building was completed in Fall 2006 that includes a large open experimental bay and a new 1050-square-foot enclosed laboratory for ergonomics research and teaching activities related to design and evaluation of products, vehicle interfaces, workstations, hand tools and work processes. In addition, the new faculty member would have opportunities to procure research equipment needed for his/her specialized interests.