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On the Future of Ergonomics: HFES Members Speak Out

By Alan Hedge and Allyson L. Spier

Renowned physicist Niels Bohr is quoted as saying, “Prediction is very difficult, especially if it’s about the future” (BrainyQuote, 2007). Yet we humans are creatures of the future, constantly planning, anticipating, and hoping that future events indeed will come to pass. So what might be the future of the ergonomics field? Should we be pessimistic or optimistic about the prospects for progress in our discipline?

To answer the former question, we polled a sample of HFES members. We selected a quasi-random sample of 519 Society members (roughly 10%), excluding student and academic members, those without e-mail addresses, and non-U.S. residents. We designed a brief Web survey (using Checkbox v4.6.0.2) with five questions to elicit respondents’ opinions about trends in the next 5 years in both the overall ergonomics profession and within their own companies. A final question allowed open-ended comments.

The initial posting generated 52 e-mails that were returned as undeliverable, reducing our sample size to 467 people. We sent one reminder and closed the survey after 3 weeks, having received 122 complete responses (a 26.1% response rate). Following is a summary of our colleagues’ responses.

When asked, “Compared to today, how do you think job opportunities in the ergonomics profession will change in the next 5 years?” 23.1% of the 121 respondents said they think job opportunities will increase substantially, 48.8% said they will increase slightly, 21.5% said they will remain essentially the same, 5.8% think they will decrease slightly, and only 0.8% said they think opportunities will decrease substantially. More than 70% of respondents were generally optimistic about the professional growth of the discipline over the next 5 years.

Respondents were asked to “Check all those areas where you think the job market for ergonomists might increase in the next 5 years.” The results are shown in Table 1. Approximately two thirds of respondents foresee professional growth in health care and human factors/ergonomics consulting. More than half of the sample see a potential for growth in consumer electronics, usability testing, and computer software. Some 40% of the sample noted potential growth in industrial design firms, transportation, and military work. Approximately one third predicted growth in bio-

technology, computer hardware, architectural design firms, and universities and colleges.

Table 1: Response percentages of sectors in which the job market in ergonomics may increase in the next 5 years (n = 120)

Sector	%	Sector	%
Health care	67.5	Computer hardware	35.8
Human factors/ergonomics consulting	65.0	Architectural design firms	32.5
Consumer electronics	54.2	Universities and colleges	31.7
Usability testing	54.2	Government (federal)	26.7
Computer software	52.5	Offices (insurance, etc.)	26.7
Industrial design firms	40.8	Sales (ergonomics items)	26.7
Transportation	40.8	Space (NASA)	25.8
Military	40.0	Light industry	17.5
Biotechnology	36.7	Financial sector	14.2
		Mining, oil, and gas	14.2

A surprisingly low number (roughly one quarter) of respondents foresee growth in government (federal), offices (e.g., insurance), sales (ergonomics items), and space (NASA). The fewest respondents noted possible growth in traditional light-industrial workplaces, the financial sector, and mining, oil, and gas. This result may coincide in part with the decline in manufacturing and mining activities in the United States, as forecast by the latest Bureau of Labor Statistics report (<http://www.bls.gov/emp/>).

Typically, when someone is in a particular sector of the economy, it is difficult for him or her to judge opportunities that exist in other sectors. Consequently, respondents were asked, “Compared to today, how do you think job opportunities in ergonomics will change in your company in the next 5 years?” Of the 121 complete responses, 9.9% said they think job opportunities will increase substantially, 39.7% think they will increase slightly, 42.1% felt they will remain essentially the same, 5.8% said they will decrease slightly, and only 2.4% predicted they will decrease substantially. Almost half the sample was optimistic about the professional growth of the discipline within their companies over the next 5 years.

Far fewer respondents noted sectors in which they foresee any shrinkage in the job market for professional ergonomists in the next 5 years, and these responses are shown in Table 2 (next page).

On the Future of Ergonomics: HFES Members Speak Out

(continued from page 1)

Table 2: Response percentages of sectors in which the job market in ergonomics may decrease in the next 5 years (n = 121)

Sector	%	Sector	%
Financial sector	20.7	Sales (ergonomics items)	9.1
Government (federal)	19.0	Architectural design firms	8.2
Light industry	16.5	Consumer electronics	7.4
Space (NASA)	16.5	Usability testing	7.4
Military	15.7	Health care	6.6
Computer hardware	14.0	Transportation	6.6
Mining, oil, and gas	14.0	Industrial design firms	5.0
Offices (insurance, etc.)	14.0	Universities and colleges	5.0
Biotechnology	9.1	Human factors/ergonomics consulting	4.1
Computer software	9.1		

Forty-four respondents made open-ended comments at the end of the survey when asked, "Where do you see any other future growth possibilities for ergonomists?" These respondents identified some sectors not mentioned in the survey, such as nanoergonomics (nanotechnology and ergonomics), forensics, aerospace, utilities and geriatrics, and some topics not mentioned, such as space tourism, "green" endeavors, and "smart" homes. Two respondents predicted growth within the Department of Defense in human-systems integration but noted that not enough human factors people know the area well. Two respondents commented that the profession is becoming diluted by practitioners from other disciplines and that it would eventually be swallowed by a related discipline.

This was a fairly short survey, and the results should not be regarded as anything more than an indication of the sentiment of Society members. However, the good news is that this sentiment appears to be more positive than negative, and there seems to be a basis for optimism within the discipline. Interestingly, respondents noted growth in opportunities for ergonomics in nontraditional sectors, such as health care and consulting, with much less growth in the traditionally strong industrial sectors. This finding may reflect the broader economic changes afoot in the U.S. economy; the Bureau of Labor Statistics predicts a 20% decrease in manufacturing and mining jobs compared with a roughly 70% increase in health care and professional and business services and a 90% increase in education (U.S. Department of Labor, 2007).

If the results of this survey are indicative of trends in the broader economy, then we will need to ensure that we prepare future ergonomics professionals for careers in health care, consulting, consumer product design, or human-computer interaction and usability testing.

References

- BrainyQuote. (2007). *Niels Bohr quotes*. Accessed November 20, 2007, from http://www.brainyquote.com/quotes/authors/n/niels_bohr.html.
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Alan Hedge is a professor in the Department of Design and Environmental Analysis at Cornell University, where he teaches and conducts research on various human factors and ergonomics issues. Allyson L. Spier is an undergraduate student in the human factors and ergonomics program at Cornell and public relations officer of the local student chapter. ☒

TECHNICAL GROUPS

Entries Sought for User-Centered Product Design Award

By *Dianne McMullin and Stan Caplan, PDTG Awards Cochairs*

Following six outstanding competitions, the Product Design Technical Group (PDTG) is sponsoring its 7th Annual User-Centered Product Design Award. Below are details for submitting a product for the 2008 design award. Full details may be found on the PDTG Web site (<http://cptg.hfes.org/>).

This competition emphasizes both product design and the methods used to specify and achieve the design. Emphasis is placed on innovative and user-centered approaches to human factors and industrial design. Consideration is limited to products, software, or systems that are purchased for use in the home, in the workplace, or while mobile. They include consumer, commercial, and medical products but exclude military equipment and systems. The product or system being nominated must be operational and capable of being marketed with no more than minimal changes. Products already on the market for more than 3 years will not be considered.

Nominations will be accepted from individuals nominating others or themselves. At least one of the award candidates must be a member of HFES but do not have to be a member of the PDTG.

The nominations should be submitted in electronic form and should adhere to the following format:

- Provide a cover sheet (in a separate file) that lists the name of the product, name(s) of person(s) being nominated and their title(s), names of team members who worked on the product and their titles, and the name of a contact person with phone, mailing address, and e-mail address.
- Provide a body sheet that includes the name of the product, its state of development (Is this product currently on the market?)



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If not, what remains to be done?), an abstract (up to 200 words) that contains a concise statement of why you consider this to be an especially user-centered product and design process, a product description (including pictures, storyboards, etc.) that clearly explains the product's form and the operation, targeted users and their characteristics (and how they differ from excluded users), reasons for product development (Why was this product developed?), and external considerations (What external constraints and/or requirements were imposed upon the development of the product or process?).

Entries will be judged using the following criteria. Please write a separate description for each of the six criteria that explains how the product or process meets that criterion.

- *Functional obviousness*: Upon first impression, does the design speak to the user in a way that makes the product appealing and apparently easy to use?
- *Ease of operation*: How easy is it to learn and actually do tasks in various applicable usage modes (e.g., setup, normal usage, failure recovery, maintainability, portability, storability) that occur during ownership?
- *Creativity/innovation*: How is this product unique compared with similar products? How do usability and styling take advantage of product technology?
- *Concept development*: How was new user input created or past user data applied to influence the product or system concept?
- *Design*: How were user data generated or used for specifying design parameters or making design decisions?
- *Evaluation*: What was done to assess the usability of the product design and the need for improvement? This could include iterative assessments made during the design process or feedback obtained in the market that could be used for subsequent versions of the product. Be specific concerning testing methodology.

A video (3 MB maximum) may be submitted, but only to illustrate the product or its use. Marketing videos are discouraged and will not be considered in the judging.

Administration

The deadline for submitting nominations for the award is **April 25, 2008**. Nominations should be submitted electronically to Dianne McMullin at dianne.l.mcmullin@boeing.com. The award candidates may receive questions from the judges on May 22. Responses to those questions need to be returned by June 5.

Judges will declare a winner by early July and may also identify submissions for honorable mention. The winner will be recognized at the 2008 HFES Annual Meeting in September and the awardees will be asked to present a talk on the product and methodology.

Call for Judges

The PDTG invites volunteers to assist with judging, which will take place in June. For more information or to volunteer for the award selection committee, please contact Stan Caplan at scaplan@usabilityassociates.com.

Nominations Due for IEA Awards and IEA Fellow

By *Bill Marrass, 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, nomination form, and 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 me at marrass1@osu.edu.



NATIONAL ERGONOMICS MONTH

NEM Featured at the Massachusetts State House

By *Karen Jacobs and Cindy Garcia*

In celebration of National Ergonomics Month in October 2007, the second annual Ergonomics Day was held in the Great Staircase at the Massachusetts State House. We worked together to plan and organize an event in which participants were able to interactively learn how to incorporate ergonomics strategies into their everyday lives.

With the workforce growing older as the retirement age rises, ergonomics in the workplace is becoming more imperative. Ergonomics Day, with the theme "Optimal Aging Through Ergonomics," was intended to increase awareness of and to educate legislatures, staff, and the general public about ergonomics and its impact on optimal aging. Boston Mayor Thomas M. Menino attended, as did numerous legislators, their staff, and members of the general public.

In developing our exhibit, we conducted an extensive literature search to identify evidence of effective ergonomics strategies to promote optimal aging and summarized it in six handouts. Also, interactive stations were created to provide comprehensive,

user-friendly information on the changes that occur with aging (vision, hearing, strength, range of motion, anthropometry, body mass index, and cognition) and on ergonomics strategies to accommodate such changes. Three additional stations included information on backpack use, computing, and blood pressure screening. The participatory stations also provided evaluations, exercises, and activities to reinforce the information.

Special commemorative NEM/HFES 50th Anniversary Frisbees, NEM stickers, and bookmarks were given to attendees. Physical therapy students and occupational therapists volunteered to make this event a success.

Ergonomics Day was sponsored by Massachusetts State Representative Louis Kafka – a longtime advocate of ergonomics legislation – and his colleagues, who are currently sponsoring legislation to establish a commission to study ergonomics in the Massachusetts public schools (MA House Bill 493).

Karen Jacobs is a clinical professor and the program director of the distance education post-professional occupational therapy programs at Boston University. Cindy Garcia is a third-year graduate student working toward her Ph.D. in physical therapy at Boston University. ☉

PEOPLE

HFES Fellow **Randall M. Chambers** died suddenly on December 6, 2007. He was 80 years old. As a former chief life scientist for NASA, Randall developed and implemented early research and training programs for astronauts in the *Mercury*, *Gemini*, and *Apollo* projects. He became known as one of the world's authorities in several areas of space research.

Randall earned a B.A. from Indiana University in 1948, an M.A. from the University of Missouri in 1951, and a Ph.D. in psychology from Case Western University in 1954. A veteran of the U.S. Air Force, Randall had a second career as a distinguished professor of industrial engineering at Wichita State University, where he taught courses in the human factors psychology program. He was the author of several hundred scientific articles and coauthor of the book *Getting Off the Planet*, which chronicles the early U.S. space program. Randall was a Fellow in the American Psychological Association, the American Association for the Advancement of Science, and the Washington Academy of Science.

Randall was president of the Great Plains Human Factors Society. His vast knowledge and experience made him a tremendous source of information to students and faculty. His calm demeanor, enthusiasm, and fantastic accounts of his encounters as a research scientist at NASA and other HF research labs will be missed.

He is survived by his wife, Mary Jane; two sons; a daughter-in-law; and four grandchildren.

– Barbara Chaparro ☉

Chapter Events Highlight World Usability Day

Virginia Tech

The HFES Virginia Tech Chapter, in cooperation with Virginia Tech's Human Factors Engineering and Ergonomics Center and the Laboratory for User-Centric Innovations in Design (LUCID), celebrated World Usability Day with three events on November 8, 2007. Each centered on the 2007 theme, "How Our Health is Impacted by Design."

Student project teams held a morning introduction to human factors taught by LUCID's director, Woodrow Winchester III. The session highlighted the role of human factors in addressing contemporary challenges in health care.

HFES past president Barry Beith, CEO and CTO of Human-Centric Technologies, Inc., led an afternoon panel discussion on the role of human factors in health care. Joining Beith on the panel were other members of the HumanCentric Technologies team, including Miranda Capra, Jon Howarth, Sriram Sridharan, and Rebecca Pezdek.

Beith also presided over an evening talk, "Innovations in Health Care: Opportunities for Human Factors in Health Care."

Submitted by Kristy Casto

South Jersey Chapter

In October 2007, as part of its community outreach efforts, the South Jersey Chapter launched its World Usability Day essay contest. Kenneth Allendoerfer and Ferne Friedman-Berg, chapter president and president-elect, respectively, visited Egg Harbor Township High School to talk about their careers at the Federal Aviation Administration (FAA) Research, Development, and Human Factors Laboratory (RDHFL) and discussed the kind of education needed to become a human factors engineer. During their visit, they invited entries for the essay contest.

Winners were announced on November 8, 2007. One of the two top essays, written by Richard Rockelman, critiqued the installation process of the Windows Vista operating system. The other, by Phuc Pham, discussed the pros and cons of the Apple iPhone. Other winning essays focused on the novel features and usability of the Logitech Harmony 1000 Advanced Universal Remote (Austin Dix) and the benefits of the simple ball-point pen (Lenny Lara).

The chapter invited both the winners and participating teachers for a tour of the FAA RDHFL, located at the Atlantic City International Airport. The winners have been invited to present their essays at an upcoming chapter meeting.

Submitted by Ferne Friedman-Berg

Tri-State and Southern Ohio Chapters

More than 150 human factors and usability professionals gathered for a World Usability Day event in Springfield, Ohio, on November 8, 2007. The Tri-State and Southern Ohio Chapters co-sponsored the event, which was hosted by publisher Reed Elsevier.

Two topic tracks – health care and product design – ran

throughout the day. Emily Patterson led a roundtable discussion of personal health records, and Peter Jones presided over a discussion of strategies for enhancing the usability of health care practice. The product design track included topics such as UI trends for Web applications (Richard Miller), usability and security (William Kilgallon), and innovative alternatives to the unchanging interface (Darren Kall).

The chapters also held usability demonstrations at The Boonshoft Museum of Discovery, a local children's museum.

The festivities carried into the evening and culminated with a timely, pertinent, and impressive presentation by HFES President Jeff Kelley, on Agile software development and user experience, including his rapid high-fidelity prototyping approach.

Submitted by Laura Militello

Potomac Chapter

The Potomac Chapter marked World Usability Day with a "Usability in Healthcare" symposium that attracted 80 participants. The meeting was cosponsored by the DC chapters of the Usability Professionals Association and the Society for Technical Communication.

Starting off the evening was a trio of poster presentations by Celeste Lyn Paul and Bill Killam; Kelly Zeng, Stuart Nelson, Wei Ma, and Renate Roske-Shelton; and Dana Douglas, Claude Steinberg, and Dick Horst. A speaker's panel followed, featuring health care policymakers and practitioners. Don Detmer, president and CEO of American Medical Informatics Association (AMIA), discussed the importance of a national health information infrastructure.

Jeanie Scott, Patient Safety Program office director of the Veterans Health Administration Office of Information, described her department's work with regard to designing a medication-ordering interface that could correctly balance the competing goals of user requests and task needs. Finally, Jan Horsky, usability lead for the Longitudinal Medical Record System at Partners HealthCare, took the audience through a case study of medical dosing error.

Submitted by Michael Eidelkind

GRADUATE DIRECTORY

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 HF/E graduate programs in North America. This year, in response to a number of inquiries, we will include information about distance-learning courses. Please submit your changes by *March 31, 2008*.

To obtain a listing application, please contact Assistant Managing Editor Jason Dean at 310/394-1811 or jason@hfes.org.

Nomination Ballots to Be Mailed

Nominations ballots for the 2008 election of HFES officers and at-large Executive Council members will be mailed to Full and Emeritus Members and Fellows on *March 28*. Completed nomination ballots are due on *April 25*.

NEWS

Defining an Agenda for Human-Centered Computing

By Andrew Sears, Jonathan Lazar, Ant Ozok, and Gabriele Meiselwitz

Two workshops sponsored by the National Science Foundation (NSF) were held in September 2006 at NSF headquarters in Arlington, Virginia, with the goal of identifying important and emerging research areas and trends in Human-Centered Computing (HCC). In this article we report on these workshops, each of which was attended by about 30 prominent researchers in the area.

About the NSF HCC Cluster

According to the National Science Foundation Act of 1950 (Public Law 81-507), NSF's mission is to initiate and support basic scientific research and research fundamental to the engineering process, programs to strengthen scientific and engineering research potential, science and engineering education programs at all levels and in all the various fields of science and engineering, programs that provide a source of information for policy formulation, and other activities to promote these ends. As part of this mission, NSF recently established a new cluster, referred to as Human-Centered Computing, within the Division of Information and Intelligent Systems. The core of this new cluster was formed by combining what had been three separate programs: Human-Computer Interaction, Universal Access, and Digital Society and Technologies. As a result, this cluster addresses a diverse set of research themes "which are united by the common thread that human beings, whether as individuals, teams, organizations or societies, assume participatory and integral roles throughout all stages of IT development and use" (National Science Foundation, 2007).

The workshops were designed to accomplish the following:

- educate active researchers in the areas of human-computer interaction, universal access, and digital society and technology about the new HCC cluster and the related solicitation (NSF 06-572);
- provide guidance to young researchers regarding areas for future research and issues to consider when developing research proposals for submission to NSF; and
- provide feedback to NSF from the affected research communities regarding topics that are considered particularly important.

The majority of the workshop attendees were principal investigators on grants funded by one of the three merged programs.

To ensure a broad perspective, other individuals were invited. The following sections summarize the structure of the workshops and some of the significant outcomes.

Workshop Structure

Both workshops were two-day events. Two breakout sessions in each one allowed smaller groups to explore specific issues in depth. Combined, the two workshops included six breakout groups that discussed continuing and emerging research opportunities, three groups that focused on interdisciplinary research opportunities, and two groups that explored issues related to HCC education. At the conclusion of each session, all groups came together to share their insights.

Outcomes: Continuing and Emerging Research Opportunities

Below are some of the many areas discussed by workshop participants.

Privacy, security, e-government, and HCC. These questions were seen as fundamental for the HCC community to address in the areas of privacy, security, and e-government: How can we provide usable tools and interfaces to enable individuals to remain in control of their personal information? What tools and policies can help organizations and institutions more effectively manage and secure their data?

Participants discussed the role of regulations and directives, the integration of usability-related concerns into security and privacy issues, and the need to address these issues in e-government-related projects. Electronic voting was noted as an area for additional research.

Intelligent user interfaces. Workshop groups highlighted the need for additional research on multimodal interactions, adaptive user interfaces, artificial intelligence-supported interactions, and other related methods of interacting with information technologies, including interactions that leverage speech, eye-tracking, and electrophysiological data.

Universal access. Children and older adults were identified as being appropriate targets for additional research in universal access. Foci include cognitive impairments in general, autism and illiteracy, and visual, physical, and hearing impairments. Brain-computer interfaces, which can provide interaction opportunities for individuals with severe impairments, may offer interesting possibilities for a broader range of users than has been studied in the past, including individuals without disabilities.

Research with child participants. Several efforts are ongoing to integrate technology into children's lives in a positive way, including educational technology and other aspects of design. Related HCC research can also involve design ideas specific to younger users.

Needs of an aging population. Older adults are becoming more familiar with information and communication technologies that enable them to stay connected with family and friends, pursue education, and shop online. Ongoing HCC research for this population involves the provision of an engaging and safe environment for the elderly through technology, especially for adults in assisted-living facilities.

Ubiquitous computing. This category includes mobile, embedded, and location-aware technologies. There is an increased emphasis on smaller multifunctional devices, such as those that combine the functionality of mobile phones, cameras, digital music players, and personal digital assistants. The workshops focused on embedding these devices in the environment (e.g., integration with home-monitoring systems). This convergence in computing was noted as a research area of great interest.

Mobile computing. Information and communication technologies are becoming smaller, more mobile, and more connected. There was significant interest in research that would address a broader range of computing environments.

Nomadic computing (computing on the move) is an area of interest because it leads to more dynamic environments and additional challenges for information technology users. Location-aware technologies are on the rise and enable mobile computing tools to support social connections, e-commerce, and a number of other socially engaging activities.

Social computing. Of great interest were online communities that support daily tasks and work-related activities (e.g., *jobster.com* and *monster.com*), as were the factors that influence the success of such communities. One specific question concerned the usefulness of online communities in engaging children and women in science and math.

Health care applications. Telemedicine has a potentially far-reaching impact to improve delivery of health care to remote areas. User-centered design of sensor technologies to support home health care could allow for greater independence and better treatment. Information technology can greatly improve disease management and patient safety.

Healthy computing and long-term effects of technology. Prolonged computer use is associated with such repetitive strain injuries as eye strain and carpal tunnel syndrome. Two areas highlighted for additional research were the relationship between repetitive-stress injuries and mobile devices and other, less traditional information technology interfaces. Also of interest are potential social and psychological problems stemming from excessive computer use.

Theory and evaluation methodologies. The groups suggested that greater emphasis must be placed on developing underlying, foundational theories as the HCC area moves forward.

Outcomes: Interdisciplinary Research Opportunities

Research can address issues related to electronic medical records, emergency care, security, privacy, and mobile interactions. Other possible domains include space industry, neuroscience, the humanities, philosophy, and urban computing. With these opportunities come numerous challenges, which include:

Understanding the disciplines. Effective interdisciplinary research requires an understanding of and appreciation for the various disciplines involved in HCC research. Interdisciplinary experts may not be fully accepted by the various discipline-specific experts.

Promotion and tenure. The issue of acceptance is particularly important for new faculty members who are seeking tenure and interdisciplinary Ph.D. students who will be pursuing faculty positions. A "tenure home" must be defined for the interdisciplinary faculty

if they are involved in a discipline-specific promotion and tenure process. Additionally, finding funding sources may be more difficult for individuals with an interdisciplinary research focus.

Administrative overhead and where to publish. There were concerns with regard to the most appropriate venues in which to publish interdisciplinary research results as well as the additional administrative overhead that is often involved in such activities.

Different approaches to science. It can be difficult to identify methodologies that are considered acceptable by all individuals involved in a specific project. Learning and applying new methodologies can also be a challenge for a new faculty member who has limited time.

Interdisciplinary Ph.D. students. Relatively few doctoral students plan to pursue a faculty career and conduct interdisciplinary research. Some challenges include a lack of mentors engaged in interdisciplinary research, concerns regarding future employment opportunities, and additional work involved to obtain appropriate breadth and depth of knowledge in more than one discipline.

Outcomes: HCC Education

In each workshop, one breakout group discussed HCC education. Their discussions produced a list of curriculum recommendations and a number of ways to enhance the education of future HCC practitioners and researchers. Workshop participants suggested that HCC education would be improved by additional coverage of issues related to the tools used, iterative development techniques, methodologies, theoretical frameworks, and various application domains.

With the establishment of the new Human-Centered Computing Cluster, new opportunities will emerge with regard to the nature of the research that is funded and the types of educational activities that are supported. In these workshops, a diverse set of established researchers, as well as individuals who are still developing their research programs, outlined a variety of important topics for human-centered computing. Researchers and educators interested in the future of this field are encouraged to explore these issues and to watch for future developments within the HCC Cluster at NSF.

Reference

National Science Foundation. (2007). *Human-centered computer cluster, synopsis*. Retrieved January 29, 2008, from http://www.nsf.gov/funding/pgm_summ.jsp?piims_id=500051&org=IIS&from=home.

Andrew Sears is a professor of information systems and chair of the Information Systems Department at UMBC. Jonathan Lazar is an associate professor in the Department of Computer and Information Sciences at Towson University. Ant Ozok is an assistant professor in the Information Systems Department at UMBC. Gabriele Meiselwitz is an assistant professor in the Department of Computer and Information Sciences at Towson University. This material is based on work supported by the National Science Foundation under Grant Nos. IIS-0642332 and IIS-0642302. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the NSF. A more comprehensive review of the topics discussed in these workshops may be found in Sears, A., Lazar, J., Ozok, A., & Meiselwitz, G. (2008). Human-centered computing: Defining a research agenda. International Journal of Human-Computer Interaction 24(1), 2-16. ☒

University of Wisconsin-Madison Department of Industrial and Systems Engineering

The **Department of Industrial and Systems Engineering at the University of Wisconsin-Madison** invites applicants for two tenure-track or tenured faculty positions beginning August 2008 to complement our existing interdisciplinary strengths with scholars whose research spans across two or more of these program areas. Applicants should have an outstanding academic record, exceptional potential for creative research, and a commitment to both undergraduate and graduate education in industrial and systems engineering. Applicants are expected to create and maintain a strong program of research, provide classroom and individual training for undergraduate and graduate degree-seeking students, and contribute to the intellectual and academic life of the department.

Key themes of research in each area are: **1). Human Factors and Ergonomics:** cognitive ergonomics or human-technology interaction, or who focus on health, the elderly/aging workforce, and/or healthcare devices and technology. **2). Manufacturing and Production Systems:** emerging paradigms in the areas of production processes, manufacturing and service enterprises, and quality systems. **3). Decision Sciences/Operations Research:** applied probability or probabilistic modeling (including stochastic processes and simulation). **4). Health Systems:** decision making (including cost benefit analysis and decision support) logistics of patient care delivery systems, performance measurement and quality.

Appointment to a tenure-track or tenured position requires the Ph.D. degree or credentials equivalent to it in the judgment of the ISyE Executive Committee. For a tenured position, candidates should have the following: at least six years in a university faculty position, or government or industrial research position; demonstrated track record of national leadership in industrial engineering or a related field, with academic accomplishments as a scholar and teacher that meet the standards for a tenured appointment in Industrial and Systems Engineering. Send letter of application, curriculum vitae, and teaching and research statements to:

**Faculty Recruitment Group,
Department of Industrial and Systems Engineering,
1513 University Avenue, Madison, WI 53706.**

Concurrently, please ensure that three confidential letters of reference from well respected authorities in the field be sent directly to **Professor Patricia Flatley Brennan** at the same address. To ensure consideration, applications should be received by February 20, 2008, however the search will continue until the positions are filled. Please find the official application materials at http://www.ohr.wisc.edu/pvl/pv_058061.html. Unless confidentiality is requested in writing, information regarding applicants must be released upon request. Finalists cannot be guaranteed confidentiality.

UW Madison is an equal opportunity/affirmative action employer. We promote excellence through diversity and encourage all qualified individuals to apply.

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FLASH!

Upcoming Deadlines

IEA Awards and Fellow – Nominations for IEA Awards and IEA Fellows are due at the HFES Central Office on March 1. See page 3 for more information.

2008 HFES Officer Elections – Nomination ballots for the 2008 election of HFES officers and Executive Council members will be mailed on March 28.

Mark Your Calendar – Graduate Directory changes are due to the HFES Central Office by March 31.

Opinions expressed in BULLETIN articles are those of the authors and should not be considered as expressions of official policy by the Human Factors and Ergonomics Society.



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