



## CONTENTS

INSIDE HFES .....	2
IEA 2000/HFES 2000.....	2
STUDENT NEWS.....	2
REGULATORY NEWS .....	3

NEWS .....	3
SHORT COURSES .....	3
CALENDAR .....	5

## Opinion

### Patient Safety and Human Factors Opportunities

by David D. Woods

It is the best of times, it is the worst of times...for health care and for human factors in health care. The current round of interest in patient injuries as a result of care, the current political debate over medical "error," and the current round of press reporting on these matters place human factors at the center of prospects for improving patient safety. On the one hand, opportunity seems to beckon as leaders in health care speak of adopting a systems approach, seem to take inspiration in an analogy to aviation safety, call for new levels of computer information technology, and prepare to invest new resources.

On the other hand, the patient safety movement is in crisis. The political visibility comes with a cost as organizations and political leaders posture rather than build on the existing knowledge base on the human contribution to success and failure and how complex systems fail – the 20-year-plus "new look" at human error (Woods, Johannesen, Cook, & Sarter, 1994; Reason, 1997). The debate is mired by profound and commonplace misconceptions. Tired red herrings are re-treaded as if they were forward-looking solutions or quick and easy successes waiting to be plucked like low-hanging fruit.

#### The Patient Safety Movement

The patient safety movement began around 1995 as the public and press, concerned over the consequences of economic and organizational change, reacted dramatically to a series of celebrated medical failures (see Cook, Woods & Miller, 1998). One example was the death of a *Boston Globe* reporter at a leading cancer center as a result of multiple chemotherapy misadministrations over several days involving multiple practitioners. The case came to be seen as a breakdown in all of the systems that should protect patients.

Another example was the Libby Zion case in New York. Zion died as the result of a drug interaction. The case also came to represent the issues of excessive work hours and lack of supervision of residents, capturing symbolically people's fear of medical care at the hands of overworked, tired, or novice practitioners without adequate supervision.

In the third case, Willie King of Florida had the wrong leg amputated, sensitizing the public's collective dread of wrong site surgery.

These and other cases acted as a fundamental surprise (a pattern in reactions to failure, described in Woods et al., 1994) to some in health care as the events challenged commonly held beliefs about how failure could occur and led individuals and organizations to question common assumptions, search for new explanations, and begin to learn new ideas about how safety is made and broken. In this process, earlier efforts on patient safety such as reducing medication misadministrations (Institute for Safe Medication Practice), progress in anesthesia safety (Anesthesia Patient Safety Foundation), and initial work on human factors in health care (Bogner, 1994) provided a jumping-off platform.

The good news is that people from various human-factors-related areas have been party to the debates across health care from the beginning and helped to stimulate new directions: moving beyond blame, adopting a systems approach, and building new partnerships among all stakeholders. Evidence of this can be seen in the National Patient Safety Foundation (NPSF) and in the Annenberg series of meetings. The NPSF's mission is to bring all stakeholders together to replace the culture of blame with learning. It brought human factors experts and related specialists together with health care leaders in 1997 to develop a landscape of patient safety based on research results (see the monograph "A Tale of Two Stories: Contrasting Views on Patient Safety"). NPSF has developed a longer-term research agenda and developed a research grant program to stimulate new partnerships and fund seed projects (see the NPSF Web site, <http://www.npsf.org>).

The Annenberg series of conferences on patient safety, particularly the Annenberg II conference, are wonderful examples of partnerships between human-factors-related work and different health care areas. The first meeting, in October 1996, brought together parties from a wide range of areas, who were convinced that progress on patient safety was both critically needed and technically possible. The second meeting contained some excellent examples of partnerships that combine human factors expertise with health care expertise (Hendee, Scheffler, & Zipperer, 1999).

A third sign of progress is the Veterans Administration (VA) patient safety initiatives. The VA has built serious partnerships

*continued on page 4*

Election ballots will be mailed in May. If you are a full member in good standing and have not received your ballot by the end of the month, please contact the central office at 310/394-1811 or [membership@hfes.org](mailto:membership@hfes.org).

This year's nomination ballots have been tallied, and the following candidates have agreed to run for office.

#### President-Elect

- Jefferson M. Koonce, director, Center for Applied HF in Aviation and professor of psychology, University of Central Florida
- David L. Post, industrial engineer, Wright-Patterson Air Force Base
- John B. Shafer, human factors consultant, Owego, New York

#### Secretary-Treasurer-Elect

- Dennis B. Beringer, lead research engineering scientist, Federal Aviation Administration
- Michelle M. Robertson, senior research associate, Liberty Mutual Research Center
- Carol Stuart-Buttle, consultant, Stuart-Buttle Ergonomics

#### Executive Council At-Large Members

- Cletis R. Booher, aerospace technologist, Manned Systems, NASA Johnson Space Center
- Hal W. Hendrick, consultant, Hendrick and Associates
- Deborah A. Mitta, senior research engineer, Georgia Tech Research Institute
- John Brian Peacock, manager of manufacturing ergonomics laboratory, General Motors Corporation
- Valerie J. Rice, director of operation aegis – injury control, U.S. Army Medical Center and School

## Colloquium Participants Needed

Participants are invited for a colloquium to be held at the IEA 2000/HFES 2000 Congress in San Diego, CA. Colloquia provide an opportunity for a group of participants with different perspectives on some topic to exchange ideas that will result in developing new knowledge. Colloquia can serve as advanced collaborative learning sessions or may be working sessions structured to achieve a better understanding and consensus on a topic within the discipline. In colloquia the focus is on group discussion rather than presentations of individuals' positions and follow-up questions.

Organizers of the Universal Design for Human Factors Colloquium are looking for participants to discuss issues such as regulation and requirements issued by government, regulatory, and professional groups and how to "make machines match the man" in light of litigation, mandates, and laws. The colloquium provides an excellent venue for exposition, examination of successful applications in living and playing spaces, and delineating where collaboration is desperately needed. Invited speakers include Jake Pauls, Shatoshi Kose, George Peters, and Gregg Vanderheiden. The colloquium will take place in San Diego, CA on July 30, 2000. For more information contact Lorna Middendorf, colloquia chair, at 810/485-1815; [fontanus@aol.com](mailto:fontanus@aol.com).

## Items Wanted for Daily Newsletter

The IEA 2000/HFES 2000 newsletter/on-site information editors are now accepting items for publication in the annual meeting newsletters. Issues may include advertisements, descriptions of demonstrations, previews of panels, TG special session information, invited speakers and topics, summaries of the Keynote and Presidential Addresses, special events, "Birds of a Feather" gatherings, "Web Site of the Day" URL, news on upcoming events, last-minute program changes, and other announcements.

The registration issue is being assembled and e-mail submissions are encouraged. If you would like to submit an article or help with the newsletter, contact Sherry Proctor or Dan Manes, 6310 Greenwich Dr., Ste. 200, San Diego, CA 92122; 858/535-1661, fax 858/535-1665; [sproctor@pacific-science.com](mailto:sproctor@pacific-science.com) or [dmanes@pacific-science.com](mailto:dmanes@pacific-science.com). If you are interested in advertising in the newsletter, please contact the HFES Communications Department at 310/394-1811; <http://hfes@compuserve.com>.

## STUDENT NEWS

## Call for Student Award Candidates

By *D. Kristen Gilbert*  
*Chair, Student Affairs Committee*

Applications are now being accepted for the Student Member with honors Award and the Outstanding Student Chapter Award.

# Bulletin

Volume 43, Number 5 May 2000

The *HFES Bulletin* (ISSN 1527-3660) is published monthly by the Human Factors and Ergonomics Society, 1124 Montana Ave., Suite B, Santa Monica, CA 90403 USA, <http://hfes.org>. Address inquiries and address changes to HFES, P.O. Box 1369, Santa Monica, CA 90406-1369 USA, 310/394-1811, fax 310/394-2410.

Copyright © 2000 by the Human Factors and Ergonomics Society. Printed in the USA. The *HFES Bulletin* is provided to members of the Society (\$10 of annual dues covers member subscriptions); nonmembers may subscribe for \$40/year. Periodicals postage paid at Santa Monica, CA, and additional mailing offices. USPS #018-206.

### Student Member with Honors

The purpose of this designation is to honor students who have made an outstanding contribution to the discipline or HFES during their tenure as a student. Students may apply for this designation when they apply for membership in HFES, or they may send in an application when they have met the eligibility requirements. Eligibility requirements are as follows:

- Class standing of junior or senior for an undergraduate or any graduate student
- GPA of 3.75 or its equivalent for graduate students (as evidenced by a transcript)
- GPA of 3.50 or its equivalent for undergraduate students (as evidenced by a transcript)
- Student member of HFES (or application pending)
- Successful completion of at least one human-factors-related course with a grade of A or its equivalent (as evidenced by a transcript or letter from the instructor)
- Two letters of recommendation, at least one of which must be from a full member of HFES.

Students must also possess at least two of the following: a human-factors-related presentation at a regional or national meeting (provide photocopy from program or letter from adviser), evidence of design contribution (e.g., award, patent, letter from supervisor), publication of human factors work in an approved journal (e.g., *Human Factors*, *Ergonomics in Design*, *Applied Ergonomics*, or any other journal approved by the awards committee), or significant service to HFES at the national or local chapter level (provide letter from committee chair or officer of the group).

### Outstanding Student Chapter Awards

The purpose of these awards is to honor student chapters that have made an outstanding contribution to the discipline, HFES, their campus, or their community in a particular year. Up to three student chapters may be honored each year.

Examples of outstanding contributions might include:

- Significant increase in percentage of members in the student chapter or numerous chapter activities, such as colloquia and field trips
- Service to the community, such as sponsoring a design competition at a local high school or involvement in a career day
- Participating in a design competition, developing a product, or conducting a research project
- Service to HFES at the national or local chapter level (e.g., coordinating the HFES international book drive)
- Notable electronic presence (e.g., innovative use of a Web site)

In order to apply for these awards, student chapters must provide supporting materials. These include letters of recommendation, a written description of the activities of the student chapter, and other materials that will support the application such as brochures, announcements, and videos.

For further information or to request an application for Student Member with Honors and/or Outstanding Student Chapter Awards, contact Kristen Gilbert, Ph.D., University of Montevallo, Station 6440, Montevallo, AL 35115; 205/665-6445; gilbertk@montevallo.edu. The deadline for application is *June 1, 2000*. ☒

## REGULATORY NEWS

### Ergonomics Rule Litigation Ends

Litigation over California's proposed ergonomics regulation came to an end on March 15, 2000, when Sacramento Superior Court Judge James T. Ford issued a modified decision upholding most of the original standard, but defeating the exemption for small employers. The Standards Board will revise the proposed regulation and send it on to California's Office of Administrative Law to ensure that it complies with the Administrative Procedures Act. The revised regulation is expected to be published in May. ☒

## NEWS

### OSHA Identifies Highest Injury and Illness Workplaces

The Occupational Safety and Health Administration (OSHA) announced on March 24, 2000, that 13,000 employers across the nation will need to correct safety and health hazards that are driving up injury and illness rates in their workplaces. OSHA identified the businesses with the highest injury and illness rates based on employer-reported data from a 1998 survey. Businesses with eight or more injuries and illnesses resulting in lost work days per 100 full-time workers were considered high-hazard work sites. Up to 4200 businesses may be inspected by the agency.

### NSC 1999 Salary Survey Available

The National Safety Council's salary survey for safety and health professionals was featured in an article in the December 1999 issue of *Safety & Health* magazine. The article, entitled "Career Forecast," by Lisa Finnegan, notes that as the number of manufacturing jobs declines, high-tech and service sector jobs will become prime areas for safety and health professionals. Because of this trend, employers will look for workers who possess a variety of skills, including flexibility, good communication, and leadership, in addition to technical competence.

Copies of the December 1999 issue may be ordered for \$4.67 (plus shipping) by calling the National Safety Council's Customer Relations department at 630/775-2389 or visiting their Web site at <http://www.nsc.org/pubs/sh.htm>. ☒

## SHORT COURSES

**Occupational Ergonomics** (June 12-16, 2000), Center for Professional Development, University of Michigan, 2121 Bonisteel Blvd., Ann Arbor, MI 48109-2092; 734/647-7200, fax 734/647-7182; <http://www.engin.umich.edu/dept/ioe/cohse>.

**Safety Management Techniques** (June 19-23, 2000), National Safety Council, Southeastern Region Office, 3300 NE Expressway, Suite 7A, Atlanta, GA 30341-3941; 800/441-5103, ext. 16, fax 770/457-6189; sro@nsc.org, <http://www.nsc.org/osh>. ☒

and made significant investments in programs with human factors lessons at the core through multiple centers.

In March the *British Medical Journal* published a special issue on patient safety that in general illustrates the learning possible from interdisciplinary partnerships (though I have to admit most of the content is 15 years old at least, though stated clearly and compactly).

This process of learning, or even learning how to learn, can be slow, and the resources available have been very small. For example, many are frustrated by the inability of health care to absorb the lessons from incident reporting in other fields despite many efforts to distill and teach these lessons (e.g., see Billings, 1999). Despite these energetic discussions, real investment has been slow to develop; the NPSF small research grant program began in 1998 (about \$400K total annually), and the VA began making significant investments in 1999.

### **Aftermath of the Institute of Medicine Report**

In December 1999, the Institute of Medicine (IOM) issued a report on “medical error” (Corrigan, Kohn, & Donaldson, 1999). It used a guestimate of deaths to spur politicians and others to action (see Brennan, 2000, for a critique by one of the original estimators). Although the report completely fails to generate a coherent, consistent, and technically grounded way forward, the gambit of a “death toll” did ignite the desired political fire. The action has been swift and furious, with many organizations at national, state and local levels debating the issue and possible new programs (e.g., see the “Report of the Quality Interagency Coordination Task Force,” 2000, for the government’s response).

Human factors practitioners in health care have tried, and continue to try, to participate in the political response, orchestrated through the Federation of Behavioral, Psychological, and Cognitive Sciences and through these practitioners organizations’ roles in health care. One of the pieces that has been circulated as the basis for our input to Capitol Hill and to health care organizations is “Investing in Patient Safety: Six Points to Create Learning” (available from the author on request).

In the current debates interested parties in health care have recognized the relevance of the human factors research base, read a portion of it, and discussed the concepts with a few human factors professionals who have participated to one degree or another in the patient safety movement. What is striking in observing the health care field’s learning process is that it has demonstrated over and over a profound misunderstanding of the domains related to human performance, coupled with a persistent overconfidence that they have mastered these domains.

As we observe different communities within health care struggle with safety and failure, the danger I see is not reinventing the wheel – after all, the wheel is valuable even if the reinvention is inefficient. I see communities reinventing the same misconceptions – inefficient, unproductive, and demonstrating a curious inability to learn. This is profoundly frustrating in my view because there is so much we know that would help health care move forward constructively, avoiding false trails and dead ends.

The image of human factors reflected back at us by these interested outsider’s summaries of human factors should scare us, especially because health care is an extraordinarily challenging domain for human factors work, both technically and given the complex organizational context.

The organizational crisis triggered by the IOM report may provide another opportunity for progress and partnership. However, one would be wise to heed warning signs that political interests and common “folk” models may block the organizations’ ability to learn new ideas, especially from the foreign worlds of human performance (e.g., Woods & Tinapple, 1999).

- Will health care build on the lessons of the new look, or will folk models dominate?
- Will human factors be used as window dressing without any appreciation of the substance of the different technical areas relevant to human performance?
- Will interdisciplinary partnerships grow, or will the human factors role be hijacked by health care insiders or by quality groups?
- Can we sustain our ongoing, informal, charity work to tutor individuals and organizations in health care about human factors?
- Will organizations and political leaders eschew easy posturing to examine a technically grounded agenda?
- Will there be a sustained investment in substance, or is the patient safety movement a temporary hot button?
- Will the substance required for progress on patient safety be sacrificed to make the topic of safety “safe” for health care organizations in a politically charged environment?
- Will human factors organizations pander to the misconceptions of potential sponsors in the pursuit of resources?
- Perhaps most importantly, will health care escape the accountability trap? Blame, even if disguised as accountability, drives out information about systemic vulnerabilities, stops learning, and undermines the potential for improvement.

The opportunity/crisis of patient safety should spur us to reexamine our research base and our practice to ensure that we are not caught up in the same misconceptions and to consider how we can better help other stakeholders move forward in constructive ways in such highly charged environments.

### **Worldviews in Collision**

The misconceptions and controversies in health care on patient safety are rooted in the collision of two mutually exclusive worldviews. One view is that erratic people degrade a safe system so that work on safety is protecting the system (us as managers, regulators, and consumers) from unreliable people. This is a Ptolemaic worldview (the sun goes around the earth). To defend this worldview in the face of the data on human performance and how complex systems fail takes ever greater effort (more and more epicycles).

The other worldview is that *people create safety* at all levels of the sociotechnical system by learning and adapting to information about how we all can contribute to failure. This is a Copernican worldview (the earth goes around the sun). Progress comes from helping people make safety (Cook, Render, & Woods, 2000). This is what the science says, despite how odd it sounds – help people cope with complexity to achieve success.

We can blame and punish under whatever labels are in fashion, but that will not change the lawful factors that govern human performance, nor will it make the sun go around the earth.

The paradigm shift demanded if real progress is to be made on patient safety is, not surprisingly, extraordinarily difficult. Health care is an opportunity for human factors, but only if we are up to the sacrifices involved in building, extending, and deepening the ways we can help people create safety.

**References**

Billings, C. (1999). The NASA Aviation Safety Reporting System: Lessons learned from voluntary incident reporting. In W. Hendee, A. Scheffler, & L. Zipperer (Eds.), *Enhancing patient safety and reducing errors in health care*. Chicago: National Patient Safety Foundation.

Bogner, M. S., (Ed.). (1994). *Human error in medicine*, Mahwah, NJ: Erlbaum.

Brennan, T. A., (2000). The Institute of Medicine report on medical error – Could it do harm? *New England Journal of Medicine*, 342(15), 1123–1125 (editorial).

Cook, R. I., Render, M. L., & Woods, D. D. (2000). Gaps in the continuity of care and progress on patient safety. *British Medical Journal*, 320, 791–794.

Cook, R. I., Woods, D. D., & Miller, C. (1998). *A tale of two stories: Contrasting views on patient safety*. Chicago: National Patient Safety Foundation. Available at <http://www.npsf.org>.

Corrigan, J., Kohn, L., & Donaldson, M. (Eds.). (1999). *To err is human: Building a safer health system*. Washington DC: National Academy Press.

Hendee, W., Scheffler, A., & Zipperer, L. (Eds.). (1999). *Enhancing patient safety and reducing errors in health care*. Chicago: National Patient Safety Foundation.

National Patient Safety Foundation. (1999, May 24). *Agenda for research and development in patient safety*. Available at <http://www.ama-assn.org/medsci/npsf/research/research.htm>

Quality Interagency Coordination Task Force to the President. (2000). *Doing what counts for patient safety: Federal actions to reduce medical errors and their impact*. Available at <http://www.quic.gov/report>.

Reason, J. (1997). *Managing the risks of organizational accidents*. Brookfield, VT: Ashgate.

Woods, D. D. (2000). Investing in patient safety: Six points to create learning. Columbus, OH: Ohio State University, Institute of Ergonomics.

Woods, D. D., Johannesen, L., Cook, R. I., & Sarter, N. B. (1994). *Behind human error: Cognitive systems, computers, and hindsight*. Dayton, OH: Crew Systems Ergonomic Information and Analysis Center.

Woods, D. D., & Tinapple, D. (1999, September). W3: Watching human factors watch people at work. Presidential address, presented at the 43rd Annual Meeting of the Human Factors and Ergonomics Society, Houston, TX. Multimedia production available at <http://csel.eng.ohio-state.edu/hf99/>.

David D. Woods is professor in the Institute of Ergonomics at Ohio State University, immediate past president of the Human Factors and Ergonomics Society, board member of the National Patient Safety Foundation, and associate director of the VA's Midwest Center for Inquiry on Patient Safety. ☒

**Placement Is On-Line!**

The HFES Placement Service is now on-line at the HFES Web site, <http://hfes.org>. The service, which is free to job seekers, is platform-independent and can be accessed 24 hours a day, 7 days a week.

*Announcement deadlines: 1st day of the month prior to the desired issue; for events or deadlines within the first 3 weeks of a month, send information at least 2 months in advance. Items are published according to space availability.*

- ★ **139th Meeting of the Acoustical Society of America**, May 30-June 3, 2000, Atlanta, Georgia. Acoustical Society of America, Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502; 516/576-2360, fax 516/576-2377; <http://asa@aip.org>.
- ★ **Digital Human Modeling for Design and Engineering: International Conference and Exposition**, June 6-8, 2000, Dearborn, MI. Society of Automotive Engineers International, 400 Commonwealth Dr., Warrendale, PA 15096-0001; 724/776-4811, fax 724/776-5760; [sae@sae.org](mailto:sae@sae.org), <http://www.sae.org>.
- ★ **12th Annual American Psychological Society Convention**, June 8-11, 2000, Miami, FL. Randall Engle, 404/894-2680, fax 404/894-8905; [re23@prism.gatech.edu](mailto:re23@prism.gatech.edu), <http://www.psychologicalscience.org>.
- ★ **International Conference on Psychology: "Psychology After the Year 2000,"** June 12-14, 2000, Mount Carmel, Haifa, Israel. Comtec, P.O. Box 68, Tel-Aviv 61000, Israel; +972-3-566-6166, fax +972-3-566-6177; [conferen@psy.haifa.ac.il](mailto:conferen@psy.haifa.ac.il), <http://psy.haifa.ac.il/conference>.
- ★ **Designing for the 21st Century II: An International Conference on Universal Design**, June 14-18, 2000, Providence, RI. Adaptive Environments Center, 374 Congress St., Suite 301, Boston, MA 02210; 617/695-1225; [mdilorenzo@adaptenv.org](mailto:mdilorenzo@adaptenv.org), <http://www.adaptenv.org/21century/>.
- ★ **Threats, Countermeasures, and Situational Awareness: Teaming for Survivability, Symposium and Exhibition**, June 20-22, 2000, Virginia Beach, VA. Naval Surface Warfare Center Crane Division, Code 4072, 300 Highway 361, Crane, IN 47522-5001; 812/854-3611, fax 812/854-6835.
- ★ **International Society for Ecological Psychology 2000 North American Meeting: Applied Issues in Perception and Action**, June 23-24, 2000, Clemson, SC. Rick Tyrrell, Department of Psychology, 418 Brackett Hall, Clemson, SC 29634-1355; 864/656-4984, fax 864/656-0358; [cpagano@clemson.edu](mailto:cpagano@clemson.edu).
- ★ **International Color Association 9th Quadrennial Congress**, June 24-29, 2000, Rochester, NY. ISCC, 11491 Sunset Hills Rd., Reston, VA 22090; 703/318-0263, fax 703/318-0514; [iscc@compuserve.com](mailto:iscc@compuserve.com), <http://www.iscc.org>.
- ★ **ASSE Professional Development Conference and Exposition**, June 25-28, 2000, Orlando, FL. American Society of Safety Engineers, 33477 Treasury Center, Chicago, IL 60694-3400; 847/699-2929, fax 847/768-3434; <http://www.asse.org>.
- ★ **RESNA 2000 Annual Conference**, June 28-July 2, 2000, Orlando, FL. Rehabilitation Engineering and Assistive Technology Society of North America, 1700 N. Moore St., Suite 1540, Arlington, VA 22209-1903; 703/524-6686, fax 703/524-6630; [info@resna.org](mailto:info@resna.org), <http://www.resna.org>.
- ★ **6th International Congress of Hard of Hearing People**, July 2-7, 2000, Sydney, Australia. Hard of Hearing Congress Secretariat, GPO Box 128, Sydney, NSW, 2001 Australia; +61 2 9262 2277, fax +61 2 9262 3135; [hoh2000@tourhosts.com.au](mailto:hoh2000@tourhosts.com.au), <http://www.ifhoh.org>.
- ★ **First National Conference on Occupational Health and Safety Management Systems**, July 6-7, 2000, Sydney, Australia. Warwick Pearse, University of Western Sydney Macarthur, P.O. Box 555, Campbelltown, NSW 2560 Sydney, Australia; +61 2 4620 3343, fax +61 2 4625 4252; [w.pearse@uws.edu.au](mailto:w.pearse@uws.edu.au).
- ★ **IEA 2000/HFES 2000**, July 30-August 4, 2000, San Diego, CA. Human Factors and Ergonomics Society, P.O. Box 1369, Santa Monica, CA 90406-1369; 310/394-1811, fax 310/394-2410; [hfes@compuserve.com](mailto:hfes@compuserve.com), <http://iea2000.hfes.org>.

★ new listing. ☒

# Bulletin

Volume 43, Number 5

May 2000

Communications Director: Lois Smith  
Student News Editor: Kelly A. Spain  
Editorial Assistant: Den'Al McElhiney  
Advertising: R. C. Bublitz & Associates,  
818/992-0366

**POSTMASTER:**

Send address changes to the *HFES Bulletin*,  
Human Factors and Ergonomics Society,  
P.O. Box 1369, Santa Monica, CA 90406-1369 USA,  
310/394-1811, fax 310/394-2410.

General Information: [hfesdm@aol.com](mailto:hfesdm@aol.com)  
Editorial/Advertising: [hfes@compuserve.com](mailto:hfes@compuserve.com)  
Placement Service: [hfesps@aol.com](mailto:hfesps@aol.com)  
Annual Meeting: [hfes@compuserve.com](mailto:hfes@compuserve.com)

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.

## FLASH!

- **June 21 – Early registration deadline (after this date, registration fees increase by \$50)**
- **July 1 – Deadline for reserving hotel rooms at the Congress discount**
- **July 14 – Last day to request a refund for cancellation of Congress registration fees**



**Human  
Factors  
and  
Ergonomics  
Society**

P.O. Box 1369  
Santa Monica, CA  
90406-1369 USA

PERIODICALS  
POSTAGE PAID  
AT  
SANTA MONICA, CA  
AND ADDITIONAL  
OFFICES