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Canine Factors and Human Factors: An Opportunity for Collaboration?

An Interview with William S. Helton

Studying how dogs are trained for occupational tasks may have significant implications for human work in domains such as homeland security. William S. Helton, an HFES member at Michigan Technological University, thinks that both human factors professionals and comparative psychologists could benefit by exchanging findings that could lead to improved performance in critical areas such as airport security screening.

In a paper presented at the HFES 49th Annual Meeting in September 2005, Helton examined similarities in the ways that humans and dogs learn (gain expertise) and maintain attention at a task (vigilance). For example, in the area of expertise, both learn skills by undergoing long periods of training and practice. They are motivated to improve, they receive feedback on well-defined tasks, and they must practice to gain expertise. Ironically, though, no one has directly tested the degree to which the difference between what a novice knows versus what an expert knows is attributable to deliberate practice and training or to talent. This debate in the human factors literature might be resolved by studying dogs' level of expertise because unlike humans, dogs do not need to willingly partake in the experiment, which removes an irksome bias.

In the area of vigilance, both humans and dogs are subject to vigilance decrement, a decline in performance efficiency when the worker is unable to sustain attention to the task. Determining the right work-rest cycle applies equally to the dog that is sniffing for evidence of land mines and to the baggage screener who is sitting in front of an airport X-ray machine.

HFES Bulletin Features Editor Pamela Savage-Knepshield posed some questions to Helton recently. Here are his responses.

What led you to pursue this line of research?

My wife is hearing-impaired. While I was in graduate school, we began training her first signal dog, Kiowa. Meanwhile, I was working on my graduate degree in human factors at the Univer-

sity of Cincinnati, doing research on sustained attention with Joel Warm and Bill Dember. I was reading an article on detection dogs; the article reported that dogs could search efficiently for only 45 minutes. This sounded familiar: *the vigilance decrement*. I looked up from the article and noticed Kiowa lying on the floor with one ear up and swiveling around, doing an auditory vigilance assignment. After that Zen-like epiphany, the path became very clear.



Pictured is a mine detection dog working with a handler in Afghanistan. Photo by Ian McLean, Geneva International Centre of Humanitarian Demining.

How do canine factors research methods compare with those used in the human factors field?

The methods used to study working dogs are nearly identical to the methods used to study working humans, except for verbal probes and questionnaires. For some HF/E researchers, the dog's lack of language will make all the difference in the world. For other researchers, a talking subject is not necessary. Human and dog workers are about the same for me. Dogs' working behavior is observable and their judgments and decisions can be assessed by their responses. I do not want to belittle verbal methods, but they are only

part of a complete human factors methodology. It would be nice to be Dr. Doolittle, but it isn't necessary.

One challenge faced by human factors practitioners is tapping the thought processes of their research participants. How have comparative psychologists dealt with this challenge?

Tapping into a nonlinguistic animal's thought processes is a little different from capturing the thought processes of a language user. For example, you cannot use verbal protocols. Nevertheless, as Robert Hoffman and colleagues suggest, you can use nonverbal tasks to elicit knowledge. There was an interesting paper in *Psychological Science* [Shaffer et al., 2004] where the authors investigated the heuristic dogs use to catch Frisbees. The research indicated, not surprisingly, that dogs use the same heuristic that humans do.

continued on page 2

What insights into human psychology have been gleaned through research conducted by comparative psychologists?

Reverse the question: "What insights into human psychology have been gleaned without comparative research?" As Dobzhansky said, "nothing in biology makes sense except in the light of evolution." If you believe in evolution and consider humans to be another animal species, then human psychology is a part of animal psychology. From this perspective, nothing makes sense in psychology without taking a comparative perspective. If, on the other hand, you reject evolution, then perhaps humans are specially created and nothing can be learned from taking a comparative perspective. Those of us willing to align ourselves with mainstream biological science would say that there are no real insights into human behavior without taking a comparative-evolutionary perspective. Note that I am not talking about the extreme modularity program of evolutionary psychology. This appears to be the case when you open an introductory textbook; most of the advances in psychology are attributed to a mixture of comparative and human research. Mark Koltko-Rivera and Peter Hancock gave a talk at the 2005 HFES Annual Meeting criticizing human factors for not having much theory. Although I am not sure I totally agree with this, perhaps their point is not surprising given the historical lack of a comparative perspective in ergonomics.

In what ways might researchers from the two fields collaborate on a research project?

Researchers from the two fields could collaborate in two ways. First, they could collaborate on a project using nonhumans to investigate an issue of interest to HF/E researchers. Because society currently allows us to control the breeding and early lives of dogs, they would, for example, be good subjects for investigations on the behavioral genetics of work performance and capacity. Second, HF/E practitioners could assist animal behaviorists in understanding canine ergonomics. Some service dogs, for example, are expected to pull wheelchairs, but research indicates that this task is not ergonomically correct for the dogs. Human factors may help.

At the conclusion of your 49th Annual Meeting proceedings paper, you say, "Human factors researchers may learn more by incorporating a comparative approach than by an exclusive focus on human participants." What, if any, changes in attitude or approach would be necessary for your recommendation to be implemented?

The full impact of evolution needs to hit home. If someone suggests working with nonhumans to understand the basic physiology of sensation, few scientists balk at this. Obviously, many animals have roughly the same sensory equipment we have. If, however, someone like me suggests that we can learn about human work behavior by studying working dogs, more will start to balk. Although one could raise objections that dogs' lack of speech makes them too different from humans to be useful in studying complex working behavior, the simple fact is, language or not, dogs are good workers – sometimes better than humans.

What specific applications of human factors research do you think could benefit from knowledge gained from canine factors research?

Training and expertise are areas with potential for benefits. I imagine research on neuroergonomics would also benefit. The whole field of human-canine work interaction would open up, which involves both human and canine factors. Science fiction is often populated with smart robots and artificial intelligence systems, giving people the misperception of how well technologies work. There are many jobs in which dogs exceed technology by a wide margin.

If you were given unlimited funding and resources, what comparative psychology research directions would you pursue?

I would probably continue in the same direction I am now, understanding expertise acquisition and the role attention plays during skilled performance in both humans and dogs, but at an accelerated pace. Currently, I am interested in humanitarian demining operations. High-technology and whiz-bang gadgets are not going to work in this arena. The countries afflicted with mines are too poor to afford expensive gear. Basically, the sustainable option is in-country biological detection programs – for example, dog-human teams. This is an area of research one can feel good about. There is no moral ambiguity; you are clearly wearing the white hat.

What references are available for someone who wants to learn more about canine factors?


Since I coined the term in the 2005 proceedings paper, you will not find many references using the term. But if you are interested in working dogs, I would suggest Fjellanger et al. [2000], Furton and Myers [2001], and Helton [2004, 2005].

What references are available for someone who wants to learn more about comparative psychology?

Most articles in the journal *Animal Cognition* are highly recommended. Pearce [1997] is a comprehensive book on the topic.

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William S. Helton is assistant professor of psychology and director of the Differences in Expertise, Attention, Knowledge, and Stress (DEAKS) Laboratory at Michigan Technological University. He received his B.A. in philosophy from Evergreen State College in 1995, his M.A. in human factors from the University of Cincinnati in 1998, and his Ph.D. in human factors from the University of Cincinnati in 2002. His research focuses on expertise and attention. His 2005 Annual Meeting proceedings paper is Canine factors: Bridging the gap between human factors and comparative psychology. Proceedings of the Human Factors and Ergonomics Society 49th Annual Meeting, 876–880. ☒

FORUM

Federation-HFES Science Forum Expands Dialogue on Homeland Security

By Gerald P. Krueger, HFES Representative to FBPCS



From left to right: Wendy Rogers, Peter Hancock, Missy Cummings, Tom Sanquist, Gary Klein, Nancy Cooke.

On November 17, HFES and the Federation of Behavioral, Psychological, and Cognitive Sciences (Federation) cosponsored a day-long Science Forum, “Homeland Security: Applications of Human Factors Research.” More than 70 representatives of the HF/E community and many federal government agencies involved in homeland security issues gathered in Washington, D.C., to hear presentations and engage in discussion. Agencies represented included the Department of Homeland Security (DHS), National Institute for Standards and Technology, Federal Aviation Administration, Transportation Security Administration, National Science Foundation, and House Science Committee.

Six HFES members highlighted potential applications of HF/E research work already accomplished and predicted increased participation of human factors professionals to help improve U.S. homeland security. Featured HFES speakers included Wendy

Rogers, Nancy Cooke, Thomas Sanquist, Peter Hancock, Gary Klein, and Missy Cummings. The agenda and PowerPoint slides of the presentations may be found at http://www.thefederationonline.org/HFES_2005.pdf.

In promoting an exchange of knowledge and ideas, the Forum provided examples of current HF/E research relevant to issues of homeland security, identified gaps in the human factors literature and databases pertinent to security topics, called for improved understanding of the needs of the DHS and the research requirements that HFES members might help to fulfill, and identified those federal agencies linked to homeland security that provide research opportunities for behavioral science and HF/E researchers. It is hoped that the lively discussions that ensued on these topics will help to facilitate much-needed coordination between HF/E professionals and those in government who could best apply the results of our work.

With a charter to “Educate, Advocate, and Communicate,” the Federation regularly conducts Science Forums and other advocacy activities. As a Federation member, HFES is committed to cosponsoring at least one such event per year on human factors/ergonomics research topics relevant to the needs of the federal government and its agencies. In October 2004, HFES cosponsored a Science Forum on human factors and patient safety. For more information, consult the Federation Web site at <http://www.thefederationonline.org/welcome.html>. ☒

MEMBERSHIP

Have You Renewed Yet?

HFES is grateful for your continued membership. If you haven’t yet renewed, please log in at <http://hfes.org> to submit your dues and update your contact information. Renewal materials are also available in PDF format at <http://www.hfes.org/web/Membership/renewal.html>.

The cutoff date to avoid the \$15 postage surcharge and to ensure that your address update appears in the 2006–2007 HFES Directory and Yearbook is January 31, 2006. ☒

HFES Awards Nominations Invited

Each year during the HFES Annual Meeting, the Society honors outstanding persons who have made significant contributions to the human factors/ergonomics discipline. Nominations are requested from HFES Full Members for six of these awards, and technical groups are especially encouraged to nominate exceptional colleagues. Nominees are not required to be HFES Members. Students are encouraged to compete for the Alphonse Chapanis Student Paper Award by submitting a paper for the meeting with an award application form, available to accepted authors in May. Award submissions are due on or before *March 31, 2006*.

To submit a nomination for one of the awards, the nominating Full Member must

- submit the candidate's résumé or curriculum vitae, a nominating letter, and at least two and not more than three letters of support from individuals who know the candidate well enough to assess his or her candidacy in terms of the award's criteria
- send all nomination packages to HFES, c/o Lynn Strother, P.O. Box 1369, Santa Monica, CA 90406-1369, or lynn@hfes.org. E-mail submissions are strongly preferred; please submit the package as a single file in PDF format.

Nominations are sought for the following awards:

Distinguished International Colleague Award. This award recognizes a non-U.S. citizen who has made outstanding contributions to the human factors/ergonomics field.

Paul M. Fitts Education Award. This award recognizes a person who has made exceptional contributions to the education and training of human factors specialists. Candidates should either be currently or previously engaged in college or university teaching of human factors material or should have written significant textbooks in the human factors field. The principal criteria for evaluation are the influence that the candidate has had on students and/or how extensively the candidate's work has been used by educators in general. If the criterion for the award is student influence, as many as five testimonials from current or previous students may be submitted in addition to the curriculum vitae and letters of recommendation.

A. R. Lauer Safety Award. This award recognizes a person for outstanding contributions to human factors aspects in the broad area of safety. This includes human factors work that has led to reduced accidents and injuries in such areas as industry, aviation, surface transportation, and consumer products.

Alexander C. Williams, Jr., Design Award. This award is intended to recognize those who have made outstanding contributions to the conception or design of any product, service, or system that has had a significant impact on users and exemplifies the excellent use of empirical human factors design principles. In addition to the curriculum vitae or résumé and letters of support, other evidence of the success of the design will be accepted, such as testi-

monials from users' performance evaluations or papers or reports that substantiate the extent to which the submission is based on experimentally derived human factors design principles.

Jack A. Kraft Innovator Award. This award honors a person for significant efforts to extend or diversify the application of human factors principles and methods to new areas of endeavor.

O. Keith Hansen Outreach Award. This award recognizes members and nonmembers who engage in significant activities that broaden awareness of the existence of the human factors/ergonomics profession and the benefits it brings to humankind. ☒

ANNUAL MEETING

Joint EDTG and HCTG Session

By *ConneMara Bazley, Environmental Design TG Program Chair*

The Environmental Design Technical Group and the Health Care Technical Group are requesting proposals for a joint session for the HFES 50th Annual Meeting. Submissions should focus on any aspect of environmental design in a health care environment (e.g., hospitals, operating rooms, outpatient centers, home care environments) examining lighting, noise, wayfinding, space layouts, and similar topics. Both research- and practitioner-oriented proposals are invited. For more information on the joint session, go to <http://www.humanics-es.com/ed-tg.htm>.

Call for Demonstrations

By *Ronald L. Boring, HFES Technical Program Committee*

The HFES 50th Annual Meeting will afford presenters greater opportunities to submit alternative format sessions, including demonstrations, than has been the case for previous HFES meetings. Demonstrations are presentations that emphasize an interactive walkthrough of a process, method, tool, interface, or product. Demonstrations are an ideal venue for presenting work in progress, in which the research centers on innovative development processes related to human factors and ergonomics. Authors are encouraged to provide hands-on presentations of their work in this dynamic and engaging forum.

Authors will submit demonstrations either to one of the Society's 22 technical groups or to General Sessions. Authors should determine the following:

- Is the presentation targeted to a specific technical group or more broadly as a General Session?
- Is the presentation best suited as a formal paper to a large audience, a poster with one-on-one discussions, or an interactive demonstration?

As with papers and posters, authors of demonstration papers will have a fully peer-reviewed five-page paper published in the meeting proceedings.

Individual Differences Proposals Sought

By James Szalma, IDIP TG Program Chair

The Individual Differences in Performance Technical Group (IDIP TG) invites proposals for lectures and posters to be presented at the 50th Annual Meeting in San Francisco. Proposals for topics and speakers for panels are also encouraged.

The IDIP TG consists of researchers and practitioners who share an interest in how individual differences in physical, perceptual, or cognitive processes and skills, as well as affective traits, influence the interaction of individuals with technology. Members share a common view that the study of these differences as they relate to human performance may lead to better selection, training, and interface design and more accurate models of human performance. As practitioners, members of this TG are concerned with individuation in the design of interfaces, training regimes, and operational environments. This reflects the transition from "one size fits all" design to tailoring the technology to the individual. Questions may be sent to me at jszalma@mail.ucf.edu. ☒

IEA

Call for Nominations for IEA Awards

By Michelle M. Robertson, HFES IEA Representatives Committee Chair

The International Ergonomics Association (IEA) invites HFES members to nominate members for IEA awards. Descriptions of all awards, nomination forms, and a list of past recipients may be found at the IEA Web site, <http://www.iea.cc/awards>.

IEA Fellow Award

HFES members are particularly encouraged to nominate HFES Fellows and Honorary Fellows for the IEA Fellow Award. The IEA Fellowship was created to recognize extraordinary or sustained, superior accomplishments of an individual to the ergonomics profession or discipline at an international level.

To be considered by the IEA Awards Committee, candidates must meet two eligibility criteria: (a) international service (including such activities as service to IEA, an extensive publication record in international journals, international consulting, or service to

the United Nations or similar organizations) and (b) membership in an IEA-federated (e.g., HFES) or -affiliated society for at least 10 years. HFES endorsement for this award further requires that the nominee be an HFES Fellow or HFES Honorary Fellow.

Other IEA Awards

The IEA Distinguished Service Award is presented to individuals for outstanding contributions to the promotion, development, and advancement of the IEA.

The IEA Outstanding Educators Award is presented to a person(s) in recognition of outstanding contributions in the area of ergonomics education for having developed ergonomics education programs, produced new methodology and/or materials for teaching ergonomics, or graduated persons who have become outstanding ergonomists.

The IEA Award for Promotion of Ergonomics in Industrially Developing Countries is given to a person(s) who has made significant and outstanding contributions to the development of the infrastructure of ergonomics in an industrially developing country.

The IEA Ergonomics Development Award is presented to persons who have made a contribution or development that significantly advances the state of the art of an existing ergonomics sub-specialty or opens up a new area of ergonomics research and/or application.

The IEA President's Award is presented to a person(s) who has made outstanding contributions to the furthering of the ergonomics discipline, and whose contribution does not clearly fall into one of the other award categories.

The IEA K. U. Smith Student Award honors a deserving student responsible for an application of or contribution to human factors/ergonomics. Any student enrolled in an accredited post-secondary institution worldwide is eligible.

The IEA/Liberty Mutual Prize in Occupational Safety and Ergonomics recognizes outstanding original research leading to the reduction or mitigation of work-related injuries and/or to the advancement of the theory, understanding, and development of occupational safety research.

Deadline and Contact Information

All nominations are due to HFES by *March 1, 2006*. Note that the deadline for the IEA Fellow is earlier than that shown on the IEA Web site because nominations from HFES require prior endorsement from the Society before they are forwarded to the IEA. For the IEA Fellow nomination, send an electronic copy of a completed nomination form, a copy of the nominee's current CV, and any supporting material to Michelle M. Robertson, HFES IEA Delegate Committee Chair, michelle.robertson@libertymutual.com. Questions may be directed to Executive Director Lynn Strother at lynn@hfes.org. For additional information regarding the IEA Awards, please contact IEA Award Committee Chair Waldemar Karwowski at karwowski@louisville.edu.

All IEA awards, as well as the IEA Fellows for 2004 and 2005, will be presented at the opening ceremony of the 2006 IEA Congress in Maastricht, the Netherlands. ☒

2004 Financial Report

The Human Factors and Ergonomics Society's 2004 audited financial report, received by Secretary-Treasurer Carol Stuart-Buttle in December 2005, was prepared by Castillo & Associates, an accountancy corporation. The firm audited the following statement of assets and liabilities – cash basis – of the Human Factors and Ergonomics Society (a nonprofit organization) at December 31, 2004, and the related statements of revenues and expenses – cash basis, and of changes in fund balance – cash basis for the twelve months then ended. These financial statements are the responsibility of the Human Factors and Ergonomics Society's management. The firm's responsibility is to express an opinion on these financial statements based on its audit.

In addition to the regular Society funds, the firm reviewed the A. Chapanis Award Funds. These funds had a balance of \$21,233 at January 1, 2004; at December 31, 2004 the balance was \$21,410.

The firm conducted its audit in accordance with generally accepted auditing standards. Those standards require that the firm plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statement. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. The firm believes that its audit provides a reasonable basis for its opinion.

As described in Note 1, these financial statements were prepared on the basis of cash receipts and disbursements, which is a comprehensive basis of accounting other than generally accepted accounting principles.

In the firm's opinion the financial statements referred to above present fairly, in all material respects, the assets, liabilities, and fund balances of Human Factors and Ergonomics Society, Inc. as of December 31, 2004, and its revenue, expenses, and the changes in its fund balances for the twelve months then ended, in conformity with the basis of accounting described in Note 1.

**Statement of Assets and Liabilities – Cash Basis
December 31, 2004**

Assets

Cash on deposit	
Bank of America	\$609,533
Total Cash on Deposit	\$609,533

Investments

Vanguard STAR Fund, at cost (Note 7)	7,288
Total assets	\$616,841

Liabilities and Fund Balance

Reserve for current payable (Note 3)	\$12,000
Total liabilities	\$12,000
Fund balance	604,841
Total liabilities and fund balance	\$616,841

**Statement of Changes in Fund Balance – Cash Basis
for the 12 Months Ended December 31, 2004**

Balance - January 1, 2004	\$374,894
Less: excess of expenses over revenues	(29,947)
Balance - December 31, 2004	\$604,841

**Statement of Revenues and Expenses – Cash Basis
for the 12 Months Ended December 31, 2004**

Revenues

Individual memberships	\$609,923
Sustaining memberships	13,400
Publications	359,696
HFES Institute	22,670
Annual Meeting	355,093
Placement	63,672
Miscellaneous	4,948
Total revenues	\$1,429,402

Expenses

Publication Expenses:

HFES Bulletin	\$39,392
Human Factors	115,340
Directory and Yearbook	27,413
Ergonomics in Design	59,188
Books	1,480
Proceedings	1,147
Other publication expense	9,318
Total publication expense	\$253,278

Member Services:

Mailings expenses	\$22,244
Placement Service	36,135
Committee and other (Note 4)	99,868
Annual Meeting	90,993
Member Services	41,754
Computer, Web site, & related expenses	32,668
Interorganizational	12,538
Total Member Services	\$336,200

General and Administrative Expense:

Salaries and related costs	481,762
Office expense	110,020
Accounting and legal	18,195

Total General and Administrative Expense **\$609,977**

Total Expenses **\$1,199,455**

Excess of revenues over expenses **\$229,947**

Note 1 – Summary of Significant Accounting Policies

This summary of significant accounting policies of Human Factors and Ergonomics Society, Inc. (the organization) is presented to assist in understanding the organization's financial statements. The financial statements and notes are representations of the organization who is responsible for their integrity and objectivity.

Activity. The organization is a nonprofit entity. The organization is an interdisciplinary organization of professional workers concerned with the role of humans in complex systems, the design of equipment and facilities for human use, and the development of environments for comfort and safety. The membership is composed of psychologists, engineers, physiologists, and other scientists from the United States and around the world.

Human Factors and Ergonomics Society, Inc. promotes research and the application of human factors in the design, development, use, and evaluation of machines, systems, environments, and devices.

Basis of accounting. The organization's policy is to prepare its financial statements on the cash basis of accounting; consequently, certain revenues are recognized when received rather than when earned, and certain expenses and purchases of assets are recognized when cash is disbursed rather than when the obligation is incurred.

Note 2 – Property and Equipment

It is the organization's policy to expense all capital assets purchased throughout the year.

Note 3 – Reserve for Current Payable

This represents a segregation of surplus for bills due at December 31, 2004. This represents \$12,000 for miscellaneous payables.

Note 4 – Committee and Other

Chapter Affairs	\$ 2,915
Miscellaneous	37,219
HFES Institute	33,504
Technical Program	1,017
Executive Council	24,213
	\$99,868

Note 5 – Concentrations of Credit Risk

The organization maintains its cash balances at several financial institutions located in Santa Monica, California. Accounts at each institution are insured by the Federal Deposit Insurance Corporation up to \$100,000. At December 31, 2004, there was an uninsured cash balance of \$509,553.

Note 6 – Pension Plan

The organization has a tax-deferred annuity plan using Teachers Insurance and Annuity Association-College Retirement Equities Fund (TIAA-CREF) Annuities that meet the requirements of section 403(b)(1) of the Internal Revenue Code.

Benefits are provided by individually insured contracts issued by TIAA-CREF to each participant. The guaranteed rate basis for premiums applied to TIAA Retirement Annuity contracts is in accordance with the terms of the participant's individual annuity contract.

The plan is a defined contribution plan, which covers all full-time employees with two years of service. The plan calls for contributions of 10% of compensation for participants for the first three years in the plan and 12.5% of compensation thereafter.

Note 7 – Investments

The organization has the following mutual fund with the Vanguard Group.

	Cost	Fair Market Value
407.651 shares of Vanguard STAR Fund	\$7,288	\$7,369

Note 8 – Income Tax Status

The organization is exempt from federal income tax under Section 501(c)(3) of the Internal Revenue Code. However, income from certain activities not directly related to the organization's tax-exempt purpose is subject to taxation as unrelated business income. For 2004 the organization has no tax on unrelated business income. In addition, the organization qualifies for the charitable contribution deduction under Section 170(b)(1)(A) and has been classified as an organization other than a private foundation under Section 509(a)(2).

LATEST FROM HFES:

Reviews of Human Factors and Ergonomics, Volume 1

Edited by
Raymond S. Nickerson

The Human Factors and Ergonomics Society is proud to announce the publication of the first volume in a new annual series, *Reviews of Human Factors and Ergonomics*. The series is intended to condense human factors/ergonomics knowledge in specific subject areas into a form that will provide HF/E professionals with a comprehensive understanding of each topic – its current state, important new research findings and technology, and current issues and research needs. In addition, the series seeks to inform specialists outside the HF/E community and laypersons who have an interest in the problem areas addressed.

A major distinguishing feature of *Reviews of Human Factors and Ergonomics* is that it focuses on findings that are applicable in real-world contexts, especially to the design of devices, systems, or processes that people use or with which they interact. The chapters in each volume note ways in which research results inform theory or methodology for future research and also emphasize the practical implications of the research that is reviewed. In this way, volumes in the series will highlight both research and practice.

Accordingly, in Volume 1, three chapters focus on research areas:

Biomechanical Modeling

By William S. Marras & Robert G. Radwin

Human-Automation Interaction

by Thomas B. Sheridan & Raja Parasuraman

Technology and Aging

by Wendy A. Rogers, Aileen J. Stronge, & Arthur D. Fisk

and three emphasize areas of application:

Driving Safety

by John D. Lee

Improving Product Safety and Effectiveness in the Home

by Deborah A. Boehm-Davis

Reducing and Mitigating Human Error in Medicine

by Daniel Morrow, Robert North, & Christopher D. Wickens

Volume 1 will be available soon! 0-945289-25-1, 6 x 9", est. 264 pp., paperback, \$80 for HFES members, \$95 for non-members, plus \$10 shipping/handling. To place advance orders, please contact the Human Factors and Ergonomics Society, P.O. Box 1369, Santa Monica, CA 90406-1369 USA; 310/394-1811, fax 310/394-2410, <http://hfes.org>.

Bulletin

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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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and
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FLASH!

50th Annual Meeting Call for Proposals

The Call for Proposals for the HFES 50th Annual Meeting is now available on the HFES Web site at <http://www.hfes.org/web/HFESMeetings/06annualmeeting.html>.

Presidential Address Now Available

The address given by Immediate Past President Wendy A. Rogers at the HFES 49th Annual Meeting in Orlando is now available on the HFES Web site. Her address, as well as many others from HFES presidents throughout the years, can be downloaded at <http://www.hfes.org/Publications/ProductDetail.aspx?ProductID=66>.

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