

# THE PROFESSIONAL ERGONOMIST

## The Newsletter of the BCPE

Board of Certification in Professional Ergonomics • P.O. Box 2811 • Bellingham • Washington • USA • 98227-2811 •  
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SPRING 2001

VOLUME IX NUMBER 1

## Professional Certification Around the World

by Hal W. Hendrick, PhD, CPE, DABFE  
Chair, IEA Certification Program Endorsement Committee

If there is one clear trend in ergonomics internationally, it is the development of professional certification/registration programs at the national or regional level during the last decade\*. To date, six such programs have come into existence that potentially might meet the International Ergonomics Association's (IEA) criteria for IEA official endorsement. In addition to the BCPE's (CPE, CHFP), they are the professional ergonomist certification programs of CREE (Eur.Erg) for the European Union countries, Australia (CPE), New Zealand (CNZErg), Canada (CCPE) and, most recently, Japan (CPE). At present, New Zealand is in the process of applying for IEA Endorsement. It is anticipated that most, if not all, of the others will follow. Other ergonomics societies, such as Brazil (ABERGO), are actively working on establishing a professional certification program.

There are two primary bases for all six of the current programs, as well as those known to be under development. The first is the Ergonomist Formation Model (EFM) that was developed by the committee for Harmonizing European Training Programs for the Ergonomic Profession (HETPEP), published in 1992. The second is the IEA's Core Competencies document, developed over a period of years by the IEA's Education and Training Committee, with iterative reviews by the Federated Societies and an open meeting during the 1997 IEA Congress.

The EFM has six topical areas with a minimum number of contact hours of formal education/training associated with each. They are (a) Ergonomics Principles (20 hours); (b) Human Characteristics (80 hours); (c) Work Analysis and Measurement (100 hours); (d) People and Technology (100 hours); (e) Applications (projects pursued by the individual during education/training – 6 weeks); and (f) Professional Issues (20 hours). In 1995, the BCPE adopted the EFM as the fundamental architecture for professional competence in ergonomics. Additional details of the EFM model can be found in the BCPE's *Candidate Handbook: Certification, Policies, Practices & Procedures*.

The IEA core competencies document is intended to serve as a guideline for development of academic programs and

\*Prior to the 1990's there were several additional professional registration programs, with that of The Ergonomics Society (UK) being the earliest.

related accreditation programs, professional certification programs, and other purposes where such guidelines can be useful. It consists of nine separate units, covering the range of activities performed by professional ergonomics practitioners. Copies are available at the BCPE HQ, the IEA Federated Societies, and the IEA Secretariat. A comprehensive summary of this document will appear in a future issue of *The Professional Ergonomist*.

Tables 1 through 3 (on pages 2 and 3) provide a comparison of the six current programs in terms of their primary criteria for certification. The programs are listed in the order in which they began certifying ergonomists using their current criteria (Australia earlier had a program using a somewhat different set of criteria). All six either have, or are developing, re-certification procedures – a requirement for IEA endorsement and common to certification programs in other professions.

### *Commonalities and Differences Among the Programs*

As may be noted, all six certification programs are remarkably similar in terms of what constitutes the content of professional ergonomics. This is encouraging because it reflects general international agreement concerning the discipline. It also reflects general agreement with the HETPEP model and the IEA competencies document, which, as noted earlier, serve as the bases for all six certification programs.

The programs also are similar in that they all require some form of verification of one's education and training and demonstration of competency as a practitioner – most often requiring work products of various kinds as at least part of that demonstration. Two programs, those of the BCPE and Japan, also require passing of a comprehensive exam. Australia also requires passing a comprehensive exam for one of its four education and training criteria options.

Except for the BCPE, the respective national professional ergonomics societies have an involvement in the certification process, including each of the 11 European societies that participate in CREE. The Association of Canadian Ergonomists and the New Zealand Ergonomics Society do so through an independent board. The Ergonomics Society of Australia does so through its Professional Affairs Board.

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# Professional Certification Around the World

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Table 1. Education and Training Requirements

BCPE	Master's degree in human factors or ergonomics, or an equivalent educational background in the life sciences, engineering sciences <i>and</i> behavioral sciences to comprise a professional level of ergonomics education. Uses HETPEP model as guide.
CREE	Three years at Bachelor's/Master's degree level. Must incorporate the HETPEP model content. Additional studies in ergonomics/work sciences equivalent to 1 year.
Australia	Undergraduate degree in ergonomics; at least 3 years of study. or Undergraduate degree in a related field of at least 3 years of study plus 1 year of postgraduate education in ergonomics. or Undergraduate degree in a related field of at least 4 years duration with major content in ergonomics, covering the three ergonomics domains of physical, cognitive, and organizational. or Undergraduate program in a related field of at least 3 years plus substantial number of continuing education educational programs in ergonomics in all three ergonomics domains, plus pass a comprehensive certification exam.
New Zealand	Route A: Three years of academic education in any field, of which 1 year must be in ergonomics. Must demonstrate competence in all six HETPEP areas. One year of supervised training. or Route B: A Master's degree in any field plus demonstrated competence in all six HETPEP areas (via peer reviewed journal publications and conference proceedings).
Canada	Bachelor's degree in ergonomics or cognate program. or Less than Bachelor's degree in ergonomics and 10 years of ergonomics experience.
Japan	Undergraduate level or equivalent education covering ergonomics subjects (at least 2 years).

Table 2. Professional Practice Requirements

BCPE	Route A: Four years of full-time professional practice or equivalent. or Route B: Twenty years of full-time professional practice for portfolio review.
CREE	One year supervised training experience plus 2 years of professional practice.
Australia	Three years of full-time professional practice or equivalent.
New Zealand	Route A: Two years professional practice (beyond the 1 year of supervised training) of which one is in NZ. or Route B: Six years in supervision and/or consultancy and/or applied research in ergonomics with at least 2 years being in NZ.
Canada	Three years, with 1 year being supervised training. or Five years without 1 year of supervised training. or Ten years without a Bachelor's degree in ergonomics or cognate program.
Japan	Two years of professional practice.

CREE has a European board and Council of representatives that set policy and practices and have final decision-making authority on certifications (registration).

All six programs have set 5 years as the period of certification prior to re-certification, although not all have yet completed development of their re-certification, including the BCPE. The 5-year requirement will not start until the re-certification process is officially in place.

Perhaps the greatest difference among the six professional certification programs is in their minimum practice criteria. For persons fully meeting the education requirements, these range from 4 years for the BCPE to 2 years for Japan. Most have a 3-year requirement. In some cases, one of the 3 years is a supervised training year (e.g., CREE; Canada).

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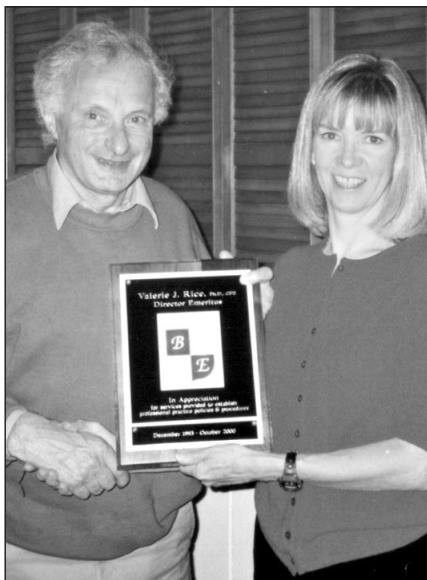
# Professional Certification Around the World

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Table 3. Other Requirements

BCPE	Submission of an acceptable work product. Pass a comprehensive written certification exam. or Submission of at least two acceptable work products in lieu of the written exam (20-year portfolio review only).
CREE	Examples of professional work (projects and publications).
Australia	Submission of three to five work samples or products, depending on education option submitted for qualification.
New Zealand	None explicitly stated. Must have demonstrated the ability to practice ergonomics as an intrinsic part of design activities.
Canada	Work samples, including publications, reports, designs, etc.
Japan	Provide list of work documents, such as work products, patents, books, articles, and photographs. Pass a written and oral examination.

Brian Peacock CPE, Director Emeritus, presents Valerie Rice CPE, Director Emeritus, with a plaque of appreciation for her six-and-one-half years of service as a Director of BCPE. Valerie first joined the Board of Directors in 1993 to finish out the term of another Director and went on to serve two additional terms of three years each. During that period she served as Vice President from 1994 to 1996 and President from 1996 to 2000.



# Certification: Perspective from Abroad

## Opinion

by Norman D. Schwalm, PhD, CPE  
BCPE Newsletter Associate Editor  
University of Haifa  
Haifa, Israel

### Initial Certification & Re-certification

Over the past few months I have followed carefully the discussions on re-certification, both inside the BCPE Newsletter and outside it. Reading the arguments for and against reminded me of the initial arguments around the issue of initial certification quite some time ago. Interestingly, as one who has one foot in the Israel human factors/ergonomics (HF/E) community and the other in the in the U.S. HF/E community, I am at once concerned with both certification and re-certification, respectively. Who said you can't be in two 'places' at the same time?

I'll not discuss my views on re-certification here other than to say the following. I've been practicing HF/E for over 20 years, teaching the subject actively for nine of those years, and have been certified since BCPE's inception. In light of this, I am the last one to think that I need re-certification. Despite this, I am vehemently in favor of re-certification because I think it's critical. A look at the issue of initial certification of ergonomists and human factors practitioners in Israel will provide some perspective, I hope, on why.

### Human Factors/Ergonomics in Israel: Relevant Impressions

Israel is a very small country, but relatively big in industry generally and in high-tech specifically. Only about fifteen years ago, HF/E professionals could barely make a living here, and that's not because of the cost of living, or because of the fairly volatile regional issues that have occupied the news lately. It is because HF/E professionals weren't perceived as important or even as necessary nor desirable entities in industry. There simply was no perceived reason to employ them. The only exception was within the framework of the Israeli military, which, like the American military, has understood and respected HF/E for quite some time. To some of the veterans of our field like David Meister, Wes Woodson, Hal Van Cott, and others of that era, this situation is certainly familiar.

Impressive increases over recent years in both local and foreign investment has catapulted Israel to a higher level of commercial and industrial endeavor. This expansion has brought with it an initial cautious and tentative reception of HF/E, and, of late, a much more open and solid acceptance

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## Certification: Perspective from Abroad

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of the field, along with a fuller realization of its potential contributions to virtually every aspect of human performance. Three out of Israel's seven major universities and institutes of higher learning teach human factors as a specialization in the departments of engineering or psychology. All this points to an accelerating increase in overall interest and acceptance of the field as a viable and important part of military, industrial, commercial, and educational life in this part of the Middle East.

Attendant to this encouraging picture of our field has come a growing demand for HF/E professionals in the areas of safety, industrial engineering and design, and software and communications technology. Accompanying Israel's increasing reputation for excellence in the latter is a developing market specifically for HCI designers and practitioners of repute. As one who trains students precisely for successful integration of theoretical/academic with practical/commercial applications of human factors, I can say that the demand appears to be exceeding the supply for such professionals.

### *Qualifications and Expectations: Mismatch*

As was the case in the U.S., there is a down side to this picture. Since Israeli industry isn't quite sure yet what makes a good HF/E professional nor how to select one, the number of people actually practicing various aspects of HF/E in Israel is increasingly greater than the number who are qualified to do so. In my own consulting activities, I have been to pre-contract interviews where program and project managers have complained openly about having hired persons who claimed HF/E expertise and experience, only to find that their knowledge of the field and its application is limited to, if I might exaggerate to make the point, looking up information in a variety of textbooks and passing it on to the company as consultant's expertise. Further, I have received phone calls from past students of mine who have been hired by companies as human factors 'experts' when, in my best judgment, they are far from that. Despite the fact that I would like to think I do a fine job of educating and training my students, it is clear that no-one can produce an expert HF/E practitioner after a few courses in human factors and ergonomics. I know that, the experienced HF/E community knows that, but, as discussed below, industry doesn't seem to know that, and students who are enamored with getting a job in the field prefer, perhaps, not to know that.

The interesting point here is that the relative novelty of the HF/E field in Israel (as opposed to the U.S. and Europe, for example) has produced a certain level of naiveté in both potential HF/E professionals and in their potential employers. Purported HF/E professionals don't know (or don't want to admit) that they aren't as savvy as they need to be to produce quality work that will enhance their reputations as well as that of the field, and the would-

be employers aren't quite clear as to what they can or should expect from HF/E professionals, nor how much an HF/E practitioner can help them. Thus, although there appear to be instances of unqualified people selling themselves as HF/E professionals, and subsequently damaging the relatively nubile and delicate reputation of HF/E in Israel, dissatisfaction with the performance of a purported HF/E professional may more often be the result of inaccurate perception of the two parties to the exchange: The HF/E 'professional' overestimates his or her qualifications and the customer has an inaccurate and incomplete set of expectations.

### *Certification*

Israel's HF/E community is quite small and close-knit. Although it is growing quickly, it is still a more-or-less intimate 'family', where many if not most of the active professionals know each other fairly well. Moreover, there are relatively few HF/E veterans (20+ years in the field) in Israel. Before writing this article, I discussed the issue described above with a number of my colleagues, both academic and professional (all of them veterans, by the way). There was unanimous agreement that keeping the 'imposters' out of the field is a desirable goal, although some brought up the issue of what characterized an 'imposter' and who would decide whether any particular individual was one or not. My colleagues also supported the idea that it is, in fact, important that potential HF/E professionals know and are forthcoming about their strengths and limitations, and that potential customers know what to expect from a HF/E professional.

When actual certification was discussed, my colleagues' wariness centered on a variety of practical and political difficulties in creating and empowering a certifying body like BCPE. Questions such as "who makes the rules?", "how would certification be enforced?" arose, much like the questions that were asked some ten years ago when the HF/E community in the U.S. first toyed with the idea of certification. Some expressed concern with the possibility that self-interest might prompt a governing body to use certification as a tool for limiting the professional advancement of potential HF/E professionals (apparently, Israelis are too politically minded!). Others conveyed uncertainty with regard to the standards and criteria against which potential certificants would be evaluated. Questions arose such as: Would or should such criteria be equivalent to those the BCPE uses? Are such standards to be viewed as *internationally applicable* – after all, HF/E is HF/E all over the world, no? Or, alternatively, should standards and evaluation criteria be developed in view of Israel's level of educational and professional opportunity?

In summary, there is definitely concern in Israel's HF/E community that non-qualified persons in some areas of HF/E specialty (HCI/UI Design being the most prominent), are selling dubious wares to unsuspecting and non-circumspect 'buyers', a situation that all agree is not healthful for the field in Israel. There is therefore, in

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## Certification: Perspective from Abroad

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principle, significant perceived value to the concept of certification in Israel, primarily, it appears, because the established HF/E professional community, like its U.S. counterpart, would like to establish and maintain a suitable standard for HF/E performance on the part of its practitioners.

### *Déjà Vu*

Yes, it most definitely seems like I've been here before. Based on the simultaneous discussions I've been involved in on re-certification in the U.S. and initial certification in Israel, it is hard to argue with the fact that the seasoned professional HF/E person would like to see his or her field atop the ladder of excellence. Further, although it is clear that there may be a considerable number of worthy HF/E practitioners who are not certified, and even a few *non-degreed* practitioners whose work may be excellent, there is very little doubt that evaluation procedures that are fair and reasonable on the one hand, and rigorous and discriminating on the other, are of great value in contributing to maintaining excellence in the human factors/ergonomics profession. And it appears to make very little difference whether the implementation is by way of certification in Israel's relatively new and budding HF/E community, or re-certification in the U.S.'s more established and time-honored HF/E community. Both procedures are directed at maintaining standards of excellence, and excellence is, by all accounts, an admirable goal for our profession.

## Thanks for On-time Payments

BCPE thanks the many professionals who pay their certification maintenance fees on time. It saves payment of late fees and helps BCPE avoid wasting staff time and postage on second invoices and late-payment letters.

## Change of Address?

If you have a change of work or home address, phones or emails, please advise us! You may update your contact information, as necessary, by phone: (360) 671-7601, fax: (360) 671-7681, email: [bcpehq@aol.com](mailto:bcpehq@aol.com), or online by visiting: [www.bcpe.org/update.htm](http://www.bcpe.org/update.htm). Thank you for your efforts to keep us up-to-date!

## Advertisements

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## BCPE's 2000 Financial Summary

by Karel Jahns, BS  
Financial/Information Systems Manager

BCPE's financial picture for 2000 is one of continued growth, matched with an ongoing struggle to meet income with expenses. Overall, income is up about \$10,000 over 1999's figures. Application revenues (22% of total revenue) increased 37% over 1999, while certification maintenance fees (73% of total revenue), BCPE's primary revenue source, remained fairly stable compared to 1999. Expenses, which exceeded revenue by 3%, were up in 2000 due to increased marketing efforts, standards development, equipment rental and employee costs. If you have any questions about the 2000 Financial Summary, please call Karel Jahns at BCPE Headquarters.

### Statement of Revenues and Expenses

January 1, 2000-December 31, 2000

#### Revenues

Application Fees	\$ 22,860
Certification Maintenance Fees	76,270
Directory, Candidate Handbook, Disks and Search Fees	272
Miscellaneous	761
Newsletter Subscriptions	457
Exam Retake Fees	640
Networking Reception Sponsors	2,000
Meister's Practice of Ergonomics	<u>1,297</u>
<b>Total Income</b>	<b>\$104,557</b>

#### Expenses

Salaries	\$43,746
Payroll Taxes, L&I, SUTA & FUTA	4,436
Rent	8,200
Medical Insurance	3,534
Casualty Insurance	440
Hard/Software Maintenance	497
Capital Improvements	338
Equipment Rental	2,157
Office Supplies	1,136
Business Meetings	9,180
Information Dissemination	
Telephone/Fax	2,280
Copying/Printing	1,459
Postage/Shipping	3,022
Marketing	2,263
Newsletter	4,205
Website	870
Standards Admin,	
Eval & Development	3,448
Legal & Accounting	778
Bank Charges	2,044
Promissory Note	12,000
Miscellaneous	<u>1,570</u>
<b>Total Expenses</b>	<b>107,603</b>

**Excess Expenses over Revenues** (3,046)

# Striving to be Premier

by Kris Alvord, BS  
BCPE Executive Administrator

The BCPE was recently contacted by one of its certificate holders regarding the growing number of individuals who have been certified in ergonomics by organizations and institutions he has never heard of. He wondered what BCPE's position was on these other certifications and how, if at all, was his BCPE credential different from the credentials offered by these other organizations.

To respond, the BCPE is aware of the growing number of ergonomics certifications. Certification, unlike licensure, is a voluntary process, not regulated by government. Any one person or organization can develop and offer a certification program. It is the responsibility of the individual seeking the certification and/or the clients of the certified individual's services to determine the quality of a particular certification program and its credential(s). Useful resources for obtaining information to make such a determination include the National Organization for Competency Assurance (NOCA) ([www.noca.org](http://www.noca.org)), its accreditation body, the National Commission for Certifying Agencies (NCCA) ([www.noca.org/ncca](http://www.noca.org/ncca)), and another accreditation body, the Council for Engineering and Scientific Specialty Boards (CESB) ([www.cesb.org](http://www.cesb.org)).

As for the BCPE, it is an independent, nonprofit (501(c)6) organization incorporated for the sole purpose of providing voluntary certification to human factors/ergonomics professionals. The qualifications and exam content for each of its certification programs were developed by job task analyses and require periodic review via additional task analyses. The BCPE has no competing interests in that the organization does not provide education, training, or preparation for either of its

certification programs, other than a set of sample test questions and a recommended reading list, available in the BCPE's *Candidate Handbook*.

The BCPE, additionally, is and has been for a number of years, an organizational member of NOCA, and adheres to its competency assessment criteria and policies. Furthermore, the BCPE is the only ergonomics certifying body to have a reciprocity agreement with CREE, the Centre for Registration of European Ergonomists. Via this arrangement, both CREE and the BCPE have agreed to recognize each other's certificate holders for specific circumstances of practice and residency. Also, the BCPE is the only ergonomics certifying body to be recognized by the American Board of Industrial Hygiene (ABIH). A formal relationship between the BCPE and the ABIH was established in April of last year by the passing of comparable resolutions.

As for accreditation, the BCPE is working towards third party endorsement. Certain issues, such as the cost of accreditation and implementing a re-certification program, must, however, be addressed. Once this is accomplished, it is expected that the BCPE will be one of the first ergonomics certifying bodies accredited by the International Ergonomics Association (IEA) (see related article, *Professional Certification Around the World*). Accreditation by the Human Factors and Ergonomics Society (HFES), if implemented, will also be sought. In the future, the BCPE may also seek NCCA or CESB accreditation. However, recognition from within the profession is our present priority.

In closing, the founders and past directors of the BCPE have striven to ensure that BCPE's certification program is a quality one. Continuing the high level of standards established by these individuals is of great importance, for without it, we will be unable to achieve our vision of being "the premier ergonomics certifying body, and BCPE certificants accepted as essential for practice across application domains and specializations."

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## Upcoming BCPE Events

- |                     |   |
|---------------------|---|
| April 2, 2001       | BCPE Exam at various locations throughout the United States and Canada.<br>Application deadline passed.   |
| April 27 & 28, 2001 | BCPE MidYear Meeting Denver, CO   |
| June 3, 2001        | BCPE Exam in New Orleans, LA at the American Industrial Hygiene Annual Conference and Exposition.<br>Postmark deadline for application: April 3, 2001.    |
| October 7, 2001     | BCPE Exam in Minneapolis, MN prior to the Annual Meeting of the Human Factors and Ergonomics Society.<br>Postmark deadline for application: Aug. 7, 2001. |
| October, 2001       | BCPE Annual Meeting Minneapolis, MN   |
| December 10, 2001   | BCPE Exam in Las Vegas, NV at the National Ergonomics Conference and Exposition.<br>Postmark deadline for application: Oct. 10, 2001.                     |

## Changes to the BCPE Roster

Exam certified human factors/ergonomics professionals and associates since December are:

### CPEs/CHFPs

James A. East MSc CPE  
Lynda A. Enos MS CPE  
David A. Kobus PhD CPE  
Lois A. Van Lente BSIE CPE

### AEPs/AHFPs

Stephen R. Krajcarski MSc AEP  
Heather E. Reed MS AEP  
Trevor M. Trainor MSc AEP

One applicant qualifying for associate certification by waiver of Part I of the examination since December is:

Michael J. Monroe MS AEP

No longer current in their certification are: Aileen Sullivan BS and Janet Lynch MSc.

These changes bring BCPE's total number of currently certified to 901: CPEs/CHFPs 791, AEPs/AHFPs 78, and CEAs 32.

A special thanks goes out to Rick Imker MA CPE for helping proctor the Las Vegas, NV exam.

## Correction

We apologize for misspelling the name of Atiya K. Syverson MS CPE in the last issue of *The Professional Ergonomist*.

## Upcoming Conferences

*American Industrial Hygiene Conference and Exposition (AIHce) 2001*  
New Orleans, LA, June 2-7, 2001.  
Visit the AIHA web site for more details ([www.aiha.org/conf.html](http://www.aiha.org/conf.html)).

*XV Annual International Occupational Ergonomics & Safety Conference*  
Fairfax, VA, June 4-7, 2001.  
Visit the ISOES web site for more details ([www.iso.es.org](http://www.iso.es.org)).

*Safety 2001, the Annual ASSE Professional Development Conference*  
Anaheim, CA, June 8-16, 2001.  
Visit the ASSE web site for more information ([www.asse.org/annual.htm](http://www.asse.org/annual.htm)).

*SAE Digital Human Modeling for Design & Engineering Conference and Exhibition*  
Arlington, VA, June 26-28, 2001.  
Visit the conference web site for more details ([www.sae.org/dhmc](http://www.sae.org/dhmc)).

*The International Conference on Affective Human Factors Design*  
Singapore, June 27-29, 2001.  
Visit the conference web site for more details ([www.unimas.my/cahd2001](http://www.unimas.my/cahd2001)).

*Computer-Aided Ergonomics and Safety*  
Maui, HI, July 29-August 1, 2001.  
Visit the conference web site for more details ([www.ergonet/caes2001.html](http://www.ergonet/caes2001.html)).

*HCI International 2001*  
New Orleans, LA, August 5-10, 2001.  
Visit the conference web site for more information (<http://hcie2001.engr.wisc.edu>).

*Safety of Modern Technical Systems*  
Saarbruecken, Germany, September 12-14, 2001.  
Visit the conference web site for more details ([www.techsafe-2001.org](http://www.techsafe-2001.org)).

*45th Annual Meeting of the Human Factors and Ergonomics Society*  
Minneapolis, MN, October 8-12, 2001.  
Visit HFES' web site for more information (<http://hfes.org>).

## Call for Newsletter Articles

It has always been the goal of *The Professional Ergonomist* to publish four issues per year. To date this goal has not been met. Lack of material for publication has been the main reason. We welcome article submissions by BCPE Certificants.

Ideal articles will be:

1. Positive, professional news for CPEs, CHFPs, AEPs, AHFPs, and CEAs, and
2. Original (not previously published in a trade publication). An exception may be made for an article edited for reprint if particularly germane to our interests.

We would truly like your help to upgrade the quality, variety, and frequency of our publication. Please submit articles as attachments to email. We prefer Microsoft Word documents. If you have further questions, please don't hesitate to contact Karel or Kris by phone, fax, or e-mail ([BCPEHQ@aol.com](mailto:BCPEHQ@aol.com)).



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## ***BCPE's VISION:***

*To be the premier ergonomics certifying body,  
and BCPE certificants accepted as essential  
for practice across application domains and specializations.*

## ***BCPE's MISSION:***

*To protect the public, the ergonomics profession,  
and its professionals by defining and assuring standards  
of competence, and advocating the value  
of ergonomics and certification.*