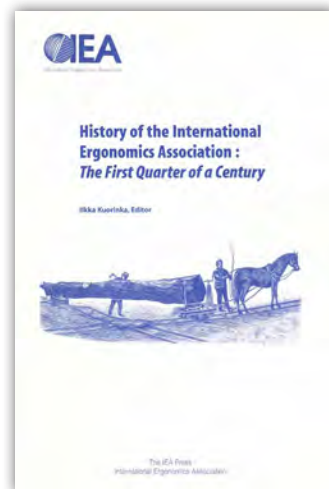




# History of the International Ergonomics Association

**1985-2018**

The first publication on the history of the International Ergonomics Association (IEA) was published in the year 2000, and covers the years 1959-1985 (*History of the International Ergonomics Association: The First Quarter of a Century*, Ilkka Kuorinka ed., IEA Press, 2000). The book can be downloaded as a PDF file from the IEA website, [www.iea.cc](http://www.iea.cc)



### Colophon

IEA Press, 2019

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## About this book

In summer 1973, as a student, I got the opportunity to participate in the IEA world congress in Amsterdam. Like Eric Wang writes in his chapter, I was overwhelmed by the amount and diversity of presentations, by the eagerness to share experiences and the enthusiasm of all the experts for the discipline. It was the start of a long journey in ergonomics and human factors. Almost all of my professional work was within these fields. Thanks to good employers I was able to attend 15 IEA triennial congresses (I only missed the 1976 one in Maryland, due to military service). I attended no less than 31 IEA Council meetings in different roles: as representative of the Netherlands' ergonomics society, as chairman of the 2006 IEA congress, as President of CREE and as a member of the IEA Executive Committee. All together it was not surprising that, in 2014, Eric Wang, then IEA President, invited me to be the IEA Historian. With impressive predecessors, Ilkka Kuorinka and Patrick Waterson, I must admit that I doubted to accept the job; which competencies did I have for that role? On the other hand, who else would not only be a more or less adequate candidate for the tasks to be performed, but would also have known so many key persons in the field? And of course, he or she should have time as well. Just being retired after 'forty years of working for better work', and not able to think up a better candidate, I decided to go for it. One task was to look after the IEA archive. The paper archive is generously hosted by CNAM in Paris, but needed to be sorted out and partially digitalized. And a digital archive structure had to be developed. Both these tasks have been achieved.



This book has been prepared in the context of the celebration of IEA's sixtieth anniversary. To edit a book like this has been an adventure with many faces. Thanks to all the authors, the history of a worldwide association is preserved for the future. Major achievements are demonstrated, like the certification of professionals, the publication of good practices for internationally developing countries and the international collaboration that stimulated the spreading and growth of the discipline over the globe. Lessons can be learned, including what worked well, and which plans were too ambitious. And in the final chapter a clear line towards the future is described.

I thank all the authors cordially for their contributions. I knew and have experienced that it is not always easy to write chapters like these next to a job, family and all other things that keep us busy. And finally, I wish all readers a pleasant and interesting time.

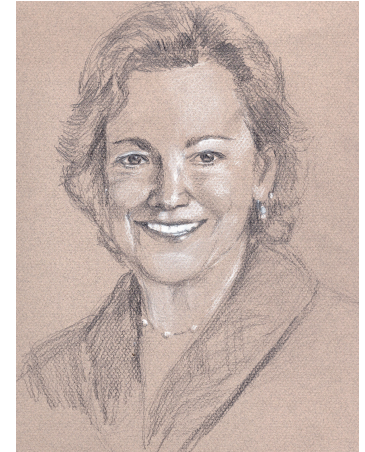
Ernst Koningsveld  
IEA Historian and editor

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## Kathleen Mosier

*IEA President 2018 - 2021*

The years between 1985 and 2018 comprised changes on a vast scale. Technology in particular transformed our world in ways that we could not have predicted. Children born since 1985 do not know a world without computers and cell phones. The internet rather than the library is the primary source of information and knowledge. Automation has become widespread and has taken over many human tasks and activities.



The history of the International Ergonomics Association during these years has a dual characteristic, which is reflected in the chapters of this *History Book* – particularly those chapters written by the past IEA Presidents. One thread tells the story of the continuing growth and evolution of IEA – changes to the IEA infrastructure and the composition of the leadership team, activities and priorities, stabilization of our financial base, standardization of the definition of ‘ergonomics’ and use of the term ‘human factors and ergonomics’ to encompass all the varied disciplines and approaches in the field, development of an IEA website, and digitalization of our archives. IEA experienced significant growth during these years, increasing from 18 members in 1991 to 52 members in 2018 (Chapter 14). Many of these additions were the direct result of outreach by the IEA officers to new human factors and ergonomics (HFE) societies. Outreach and support from IEA have also been key factors in increasing the number of members from Industrially Developing Countries (IDCs). Within IEA, networks such as FEES (Federation of European Ergonomics Societies), ULAERGO (La Union Latinoamericana de Ergonomia), SEANES (South East Asian Network of Ergonomics Societies), and ErgoAfrica enable societies in a given region to support each other and to work with IEA as a unit (Chapter 15).

Additionally during this period, IEA was strengthened by recognition from like-minded organizations such as the International Labour Organization and the World Health Organization, and established a working collaboration with ILO that produced jointly-published *Ergonomic Checkpoints* and *Ergonomic Checkpoints in Agriculture*, practical applications of ergonomics principles in an easy-to-use format. IEA now has collaborative MOUs with ILO, ICOH (International Commission on Occupational Health), IOHA (International Occupational Hygiene Association), INCOSE (International Council on Systems Engineering) and ISQua (International Society for Quality in Health Care). These liaisons have been maintained and nurtured, and currently our reach and recognition are much broader than in 1985.

The second thread in the *History Book* reveals the interaction among IEA, its members, and the profound changes in the world – primarily in work methods and work systems, and the technological revolution that has occurred since 1985. Continuing changes in technology and the globalization of industries during these years increased the need for HFE worldwide. New forms of work organization in the 1980s were accompanied by the introduction of ‘participatory ergonomics,’ that is, involving employees in the design of work systems. Computers became widespread for work and leisure, and increased the need for cognitive HFE. Now, in 2018, computers and cell phones are ubiquitous, come in all sizes, and are indispensable for work and for social interaction in the modern world. IEA and its member societies have been challenged to define the future of HFE principles and practices in a digital society, as reflected in the paper by Jan Dul and colleagues, *A strategy for human factors/ergonomics: Developing the discipline and profession* (J. Dul et al, *Ergonomics*. 2012;55(4):377-95) .

Essential IEA priorities have remained constant since 1985, and the same themes appear in Past Presidents’ goals, objectives, and accomplishments – albeit with different strategies and activities. For example, the implementation of outreach to Industrially Developing Countries has sometimes targeted specific HFE problems in a given IDC, such as the lighthouse project with Nicaraguan coffee growers and coffee bean harvesters (Chapter 11), and more recently has taken a facilitation approach, in which IEA works with and supports local societies to promote their own stakeholder-engaged systemic projects (Chapter 13).

The education and certification of ergonomists and HFE practitioners is typically near the top of the IEA priority list, and large strides have been made in defining the core competencies of certified HFE practitioners (Chapter 16). In fact, one of the first posts on the IEA website was the IEA ergonomics core competencies, outlining the cross-cutting requirements for certification of ergonomists from varied disciplines (Chapter 7). Comparable standardization of HFE education standards, requirements, and programs, remains more elusive, in no small part due to the multidisciplinary nature of our field. Promoting HFE in design is another consistent priority, reflected in the IEA Ergonomic Quality in Design Program (EQUID; Chapter 18), which extended through several terms. And of course, the Triennial Congress continues to be our most visible activity, in which IEA members present the most up-to-date HFE research and practice to a global audience (Chapter 16).

The essential message of IEA’s history, which permeates all of the chapters and the activities they describe, is that effective HFE is the key to enhancing the relationship between people and the world they inhabit. The leaders and members of IEA are dedicated to this goal and their efforts have improved the world and the work we do in it. I am proud to belong to this group, and hope to build on the accomplishments described in this *History Book*.

## Ernst A.P. Koningsveld

### *IEA Historian 2014 – 2019*

Who could have foreseen in 1985 what would happen in the world that would affect ergonomics and human factors, and thus the International Ergonomics Association? The world became smaller. Society evolved in many ways. Technology changes speeded up as a result of digitization. All these changes had a large impact on how we work and how we organize our work. Consequently, the way we act as ergonomists and human factors specialists has changed over the years. In this introduction, these changes are described to set the context and offer an appetizer for the chapters to follow.

#### Changes in society

When looking back over the last thirty years, internationalization is a key word for the changes in society. The trend from local to national to international, that had already started in the 1960s, became more and more evident. The world became smaller by enhanced technological means that allowed collaboration over great distances. The costs of travelling to other countries decreased substantially, while the options for travel increased at an even higher pace. Today many more people are dealing with people from other countries in their work than 30 years ago.

In many countries, the infrastructure for commuting and travelling has been considerably extended. However, the pace at which this was realized often turned out to be too low to keep up with the almost exploding traffic volume; daily traffic jams and overcrowded public transport have become an unavoidable part of life for many. Although these trends are apparent in most of the countries in the world, within countries large differences may apply.

Internationalization resulted in the outsourcing of low-quality work to places on the globe where labour is cheap. A reduction of low quality work in the rich countries, has resulted in an increase of it in poor countries, who see people leaving the countryside to work in towns in poor conditions in factories. Sewing sweatshops and dirty work such as demolishing ships are examples of this. Not only wages play a role in this trend, but also less strict rules about working conditions and the environment. This requires an increasing need for transparency and micro-control of processes in long international chains, if humane working conditions are to be maintained across the whole manufacturing process. The fires in Bangladesh and other shocking events were quite effective at raising awareness of the poor working conditions in the modern “sweatshops” of the world and forcing large international companies, concerned for their image, to address the issues.

At the same time, we see that higher-quality work, such as computer programming and customer support services, have also been outsourced to places in the world where there is abundant low-cost labour and many young people with higher qualifications. There are shifts from international cooperation and partnerships among nation states to individualism of state activities and decentralization. Examples are the dismantling of the Soviet Union, the exit of Britain from the European Union, and

other expressions of nationalism and separatism, redefined trade agreements such as NAFTA, increased migration and subsequent changes in policies. Meanwhile, in most countries, urbanization has been a continuing trend. People tend to move to large cities to find work. Compared to living in smaller communities, social structures weaken, and individualization increases; housing becomes poorer, the level of pollution increases and there is a higher crime rate. There is a tendency for people to look inward, because of perceived technological self-sufficiency, less need for team and community activity and smaller social circles. In other words, the basic need for 'a more or less secure source of income' may at the same time result in a lower quality of life.

The appeal to organize work in all countries according to safe and healthy standards is illustrated in the International Labour Organisation manual "Decent work indicators" (ILO, 2012). In this, the International Labour Organization has defined the components of decent work:

*Decent work sums up the aspirations of people in their working lives. It involves opportunities for work that is productive and delivers a fair income, security in the workplace and social protection for families, better prospects for personal development and social integration, freedom for people to express their concerns, organize and participate in the decisions that affect their lives and equality of opportunity and treatment for all women and men.*

For human factors and ergonomics (HFE) experts this definition could be extended to Decent Life, a sound quality of life, since our discipline focuses on humans in their work, in society, as well as in their private lives.

Work and gender issues should be mentioned along with the other changes in the society. The number of women in the workforce has increased, but there are significant differences in the type of work that they do, to that of males, even within the same company and sector, not to mention the differences in wages, a topic that is only recently being discussed with more power and taken seriously. However, it may take time to overcome this unfairness. Typical topics that relate to our discipline are: equal access of women to work, compatibility between work and home/raising children, equal opportunities, fight against harassment, and the suitability of safety protection measures for women (sizes of personal protective devices, load lifting limits, etc.). The issue of pregnant women at work requires consideration of the effects of noise and other influences on developing babies.

Since 1985 the world has experienced economic highs and deep lows. Overall there was major economic progress, resulting in a higher level of welfare for many people in the world. However, in the meantime, there is a growing gap between the rich and the poor, both between countries and within countries. The rich are also gaining political power so that it is becoming harder to get political support for labour protection, even in the developed world, and some protection measures are getting eroded, for example working hour limits.

The 1972 publication 'The Limits to Growth' by the 'Club of Rome' was the first step in a trend aimed at increasing care for the world. Though it took many years to get a firm foothold, sustainability has become a major world concern. Global climate change, the concern for natural resources as a global heritage rather than consumables, reduce-

recycle-reuse concepts to foster not only sustainability but less consumption, all may and do impact the work of ergonomists and human factors specialists both indirectly and directly.

Perhaps influenced by the sustainability trend, standard ISO 9000 was first published in 1987 by the International Organization for Standardization, but was based on previous standards in the USA and the United Kingdom. The ISO 9000 family of quality management system standards is designed to help organizations ensure that they meet the needs of customers and other stakeholders, while meeting statutory and regulatory requirements related to a product or service. ISO 9000 deals with the fundamentals of quality management systems, including the seven quality management principles upon which the family of standards is based. A major result is that today there is a tendency for end users to require certified quality standards from those who produce products (e.g. fair trade, safe work in low income countries). In line with ISO 9000 the IEA developed EQUID (ergonomics quality in design), first published in 2007, as a resource for designers, design managers and manufacturers to assess the ergonomic elements in product design. One chapter in this book provides EQUID's backgrounds and opportunities.

People get older, although not necessarily in a healthy state. Since 1985, the life expectancy in many countries has shown changes. Global average life expectancy increased by 5 years between 2000 and 2015, the fastest increase since the 1960s. Those gains reverse declines during the 1990s, when life expectancy fell in Africa because of the AIDS epidemic, and in Eastern Europe following the collapse of the Soviet Union. The 2000-2015 increase was greatest in the WHO African Region, where life expectancy increased by 9.4 years to 60 years, driven mainly by improvements in child survival, and expanded access to antiretroviral medications for the treatment of HIV.

With the rapidly increasing number of elderly in many countries, the question arises whether HFE (Human Factors and Ergonomics) experts have a responsibility towards people who are no longer employed. Can HFE experts play a role, and if, which role? Or should they take a more active role in shaping how work is divided between people? In the Western world, there is a need for people to retain independent living until an advanced age. Over recent decades, the costs for care for the elderly have rapidly increased and the number of workers in the health care sector has simultaneously decreased. For HFE experts, there are opportunities to help develop ways and means to support people to live independently as long as possible or help promote small self-supporting communities.

In the 1980s, many governments worked towards a 'makeable society': governments could, by regulations and stimulation create an ideal society. However, we learned that this is a misconception. Today there is a trend towards a focus on what is important from a safety perspective and what really needs to be arranged (a minimalist approach). For ergonomics and human factors this means our discipline is at the border, or even outside the scope of governmental interest. At the same time, the focus of many HFE specialists is moving towards smart work and smart products, while securing health and safety. Presumably, this will result overall in a more valuable contribution than before.

Recently, serious discussions of universal basic income (UBI) have started in policy making circles as a reaction to the displacement of humans and human capital by artificial intelligence and robotics. These are clearly topics for ergonomics and human factors.

### Changes in technology

Since the mid-eighties, digitization (also called digitalization) was the major trend in technology change. It led to a spectacular growth in the availability of information, while the information exchange goes faster and faster, and has become all pervasive in our lives. Where a computer used to be a separate apparatus, mini and microcomputers are now incorporated in large numbers of equipment, tools and gadgets, however small or large. These are now being increasingly linked to each other, which changes how manufacturing, maintenance and services are done or provided.

Much of this change has led to a higher pace of work in almost all work processes. In the world around us, this technology change has introduced much better information availability, e.g. on public transport. Drivers of cars are supported by information of many kinds. Despite an enormous increase in the number of cars, road traffic has become much safer in many countries. The same is true for air transport. Destinations can be easily located by global positioning systems, if one is driving, cycling or hiking. These positioning systems also help industries, such as construction, agriculture, mining, and the quickly growing parcel delivery sector.

E-mail was only introduced to the majority of the world around 1995, and today no-one can imagine life without it. Easier sharing of digital information via social networks, free teleconferencing, and digital journals have changed how communication, research and learning occur. However, faster, more fluid information exchange and increased flow may also have destabilizing effects on scientific journals, publications and conferences. Already in 1999, the first online Cyberg conference was organized on ergonomics and human factors.

Already seen today, but certainly more in the near future, artificial intelligence will impact on factory operations. More and more tasks will be accomplished by 'intelligent' machines. These are intended to "cooperate" with the (remaining) humans in the workplaces. Robots will become "cobots" (robot co-workers). Unavoidable physically demanding work can already be supported by exoskeletons to reduce health hazards. Exoskeletons also benefit those with physical limitations to perform regular work. It is evident that these changes have had, and will continue to have, a large impact on peoples' work and lives.

### Changes in work

Originally, a large part of the work of HFE specialists was related to physical aspects, from energetic workloads to back injuries. Due to the introduction of personal computers in the workplace (and to monotonous assembly work), repetitive strain injuries (RSI) arose as a major risk factor. The work related physical health complaints of workers tended to move from low back to upper limb disorders.

Whereas in 1985 much of the focus of HFE specialists was on the cardiovascular strain of work, they now have to deal with issues related to a lack of movement, caused by sedentary work or prolonged standing. Lack of adequate movement increases the risk of heart disease and stroke, which are leading causes of death and disability in much of the world. Finally, a lack of movement is considered to impact negatively on the development of dementia. Already in 1986 Antonio Grieco published "Sitting posture: an old problem and a new one" and proclaimed at a congress that 'the best posture is the next posture'.

We are living in a new industrial revolution, characterized by communication and digitization, robotization and artificial intelligence. Meanwhile, older topics have again become current: task allocation, meaningful work, the amount of employment, the right to work. It is essential that these basic competencies remain in the educational programs of HFE specialists.

There is a rapid increase in information, and certainly not only in office work. Even in originally monotonous jobs with little stimulation, we now see almost continuous information processing. The number of signals that can be and are monitored, is increasing rapidly. Task allocation between humans and systems must focus on which information should be processed by each.

Work in industry is decreasing in economically developed countries, while there is a major trend towards more and more work in services: education, healthcare (in hospitals but also in nursing homes or retirement residences), social work. There is a need for better approaches to HFE in these sectors: How do we analyse relational work, for example?

Despite all these changes, a lot of physically hard work remains. Typical sectors where physically straining work remains are health care, building and construction, moving and logistics (including the rapidly growing internet-sales sector), agriculture, mining, forestry, and transport.

### Changes in work organization

Over the decades, we have seen significant efficiency gains in most sectors and less 'room' for periods of decreased efficiency (e.g. breaks, sickness leave or leave to cope with personal stress situations). For people who cannot perform continually at a high level (e.g. the mentally and physically less fit) this can be a large problem. Alongside the introduction of automation, this efficiency gain was caused by a tendency to skip certain jobs, and to outsource or exclude all so-called inefficient tasks. Computers have reduced the need for some tasks, e.g. secretarial work, but created new occupations (programmers, website designers, other IT-specialists, electronic customer support services). Changes in types of work result in changes in risks. The quality of some jobs has been downgraded, as digital technology takes over more tasks traditionally done by people. Humans tend to be left only with surveillance or "emergency" intervention tasks.

Since the early 1990s, mental work strain (also called stress) is a growing topic in many countries. Monitoring started, and scientific knowledge of the topic has increased considerably. However, prevention of mental work strain and burnout poses continuing

challenges. It is notable that burnout frequently occurs in young people. Connected to this, the maintenance of a balance between work and private life has become a serious topic. Some companies have introduced protection measures, e.g. by blocking work e-mails over the weekend. However, globalization pushes towards a 24-hour economy and this counteracts the prevention measures. Today we can, and in some cases need to, work at any of the 24 hours of the day. Night and weekend work is increasing rapidly, with all the associated health consequences. Shift work has been associated with various health risks, including heart disease and cancer.

Digitization has made working at home or at a distance, or outside of regular working hours, more feasible. Positive effects are the reduction of time for commuting, reduced traffic and its consequences on the environment, and it may result in some improved control of work-life balance. Although many workers practicing tele-work stress the positive aspects, there are also negative aspects. It may certainly result in too little time to recover from work. Social structures in the workplace are reduced, as well as interruptions at work. The risk that work never ends is both a reality, and a state of mind: by going home, there is a clear division between work and private life. New related sources of strain may be isolation and loneliness, with depression as a potential risk. Virtual work and virtual collaboration change the way people work in teams. Two decades ago we were talking about the virtues of “telecommuting” as a means of improving efficiencies and productivity and easing peoples’ lives. This concept has evolved into differently from what we originally conceived, including: telework, contract work, “gig economy”<sup>1</sup>. Here people work independently and often alone, performing discrete tasks. An aspect surrounding these trends is the general isolation and alienation that people experience in their everyday lives where shopping, gaming and dating, which are also done alone, or at a distance. This detachment is comfortable for some, but as a social trend, there may be serious consequences for work requiring collaboration, coordination and sustainability as teams. The proliferation of freelance, gig and part time work creates a culture of workers without an organization, identity, or sense of place.

Large scale data systems (e.g., Enterprise Resource Planning software, warehouse management systems, AI based scheduling) are creating dramatic shifts in the way organizations and work are designed. Enterprise Resource Planning (ERP) systems<sup>2</sup> provide a good example. These are integrated, system-based software that provide management with real time information for better management decision making. However, these systems often require re-engineering business processes to meet the software demands. This involves changing how the work is performed, which can create resistance to change, conflicts between individuals/departments, while significant training and retraining, and serious change management may be required. Moreover, driving how, when, and who does the work from a top-down model can cause humans to experience alienation, loss of control and significance in their work.

Alongside changes in work organization, changes in employment patterns are occurring as well. At least over the past few years, there is a tendency toward more and more self-employed, who telework from home or from a multi-company building. In some cases, self-employed people do the same work at the same worksite as workers who are regularly employed. This could be called “Uberization” of work and it has been identified with job destruction or at least downgrading of working conditions.

### Changes in education to become an HFE specialist

In the 1970s and 1980s, there was a tendency to introduce master courses in ergonomics and human factors, or at least in specialized parts of the discipline, where those having a more generic bachelor’s degree could specialize. Over the years, several of these master courses have closed in Europe, while post-graduate HFE courses are at the same time increasing in developing countries. It is often difficult for professors to get permission to commence HFE courses because of the interdisciplinary nature of the profession. Consequently, education of ergonomists is only rarely done in courses titled “ergonomics” or “human factors” and, to become an HFE expert, courses often must be undertaken from a variety of institutions.

Additionally, typical ergonomics and human factors content is now taught under different titles, e.g. information and communication technology (ICT), mechanics, human kinesiology, applied psychology. Graduates of such courses may not call themselves HFE specialists, even when the HFE content is very high. Though this has a negative effect on the recognizability of our discipline, it does not necessarily mean that society lacks HFE expertise in the design of products and work, which is in many areas increasing.

In many countries higher education, especially graduate education, has become more expensive and alternative means of delivery have been developed. Twenty years ago, the virtues of distance education and distance learning were touted as the future. We did not see the potential for webinars, videos, blogs, MOOCs (Massive Open Online Courses) and other interactive and virtual media as ancillary or primary learning methods. It is unclear what the best methods are for delivering human, interaction based education for the ergonomics profession. Methods need to be refined to teach critical analytical, design and evaluation methods to future researchers and practitioners. Whatever the solutions, they will likely be different than ones used in the past because educational institutions are having to respond to economic and social pressures. Asynchronous, virtual, distance-based learning is likely to complement to existing models. Positive effects could be: education can be tailored to individual needs so that pupils in (real or virtual) classes can be at much more diverse levels of knowledge and skill than has been the case in the past. Additionally, learning can be more flexible in terms of time and place, such that several distance learning ergonomics courses have been developed in recent decades, opening the field to a wider group of people.

Networking skills are much more important today than in the past. These trends certainly have had an impact on teaching as a job and a task: for HFE there are opportunities to develop models for analysing educational activities.

<sup>1</sup> A gig economy is an environment in which temporary positions are common and organizations contract with independent workers for short-term engagements.

<sup>2</sup> [https://en.wikipedia.org/wiki/Enterprise\\_resource\\_planning](https://en.wikipedia.org/wiki/Enterprise_resource_planning)



A significant development for the professionalism of our discipline is the introduction and success of certification programs over the decades focussed on in this book. Today thousands of HFE specialists worldwide have become certified as ergonomists or human factors specialists. The IEA has introduced a system to endorse these programs, and efforts have been put into harmonizing the criteria for professional certification around the world. This topic is fully described in chapter 'Certification. Aims of the IEA for the profession - a history of the developments'.

### Changes in Ergonomics/Human Factors as a discipline

Over the years, HFE experts have contributed to healthy, safe and meaningful work, and functional and usable products. However, improving the working conditions in one way, may result in people (employers in particular, but workers as well) tending to increase output requirements, as the work becomes less strenuous, thus increasing the load in other ways. As an example, smoother floors for forklift trucks lead to higher driving speeds; the result is that overall vibration loads are often not reduced. As work becomes less physically demanding, (mini) breaks are seen as wasted time and the psychological demands are thus increased.

Over the years, the HFE discipline not only followed, but also tried to anticipate new technological trends. With the beginning of the introduction of personal computers at work, the first conferences on visual display work were organized. Complaints of eye strain were soon accompanied by problems of repetitive movements and prolonged sitting in forced postures. These became topics of ergonomics studies, recommendations and specifications. Today's equipment and software have benefitted. Although HFE has invaded nearly all domains of human activities, its image remains fuzzy for the general public. The discipline is not clearly defined or limited, even within the HFE community. Ergonomists that are members of IEA's Federated Societies cover a wide range of specializations within the discipline. Ergonomists and human factors specialists work as consultants, as employees in the industry, as civil servants, as researchers in universities and in R&D companies, and in many other contexts. It is estimated that under other names, hundreds, if not of thousands of experts work on topics that we consider to be HFE. As stated above, this may be a disadvantage for the discipline, but does not necessarily mean that too little attention is paid to ergonomics and human factors.

An increasing number of adjacent fields (HCI, Usability, Artificial Intelligence, Social Computing) have taken over large parts of the discipline. We can be happy and proud that there is so much attention to HFE related topics, though not necessarily under the names ergonomics or human factors. But, what's wrong with that if the goals are similar? Evidently it is undesirable if ergonomics principles are only applied to make products more appealing to consumers and sell better. Prevention of health impairment, promotion of safety and smarter work should predominate over the interests of our discipline. We also observe the publication of papers by HFE specialists under a different title in non-ergonomics journals, which further spreads HFE knowledge.

Applied human factors and ergonomics may become more important than theory and research. Where master level programs disappear, the development of new and high-grade knowledge is reduced. This subsequently weakens the position of HFE consultants: if our knowledge is not up-to-date, how much space do we get to be the expert? Being able to convince people of our points is an important competence. It is easier if our knowledge is top-level. If not, adjacent disciplines, may step into the breach. Intervening in and on organizations remains a major issue for ergonomics. We are in competition with others (e.g. advocates of lean management) and we need the competence to articulate our approach with those of the competitors.

Due to the width of our discipline and the specialization of master courses, many HFE experts are either specialist in physical topics or cognitive or social and organisational aspects, whereas in many jobs a combination of physical, cognitive and organisational stressors are found. Even though Bongers et al (1993) wrote one of the most cited articles in the discipline, exploring the interaction between physical and mental loads, still many projects in the field only consider one aspect of the workload.

An important milestone for ergonomics and human factors was the introduction of the NIOSH Lifting Equation in the mid 1980's, followed by updates. This allowed HFE specialists to work according to an internationally accepted method. Other such tools should be developed and widely promoted. The profession tends to require very high levels of scientific validation for risk identification tools but puts less effort into promoting their use or investigating how to improve workplaces. In this respect, it is interesting to mention the winning Liberty Mutual Award paper by Pieter Coenen et al (2015), in which they found that 'detailed assessment of low-back loads may not be worth the effort'.

Of similar importance to the NIOSH Equation was the ISO 9000 Standard, first published in 1987. The extent of this standard has already been described under the section on the IEA EQUID development.

In 2012, an IEA taskforce lead by Jan Dul produced a publication called 'Future of Ergonomics'. This publication addressed the issue of the core values of the discipline and started a discussion about how to proceed to promote the profession. A chapter is dedicated to this important document at the end of this book.

### Changes in the IEA organization

The most significant change over the decades is the increase of membership: 2/3 of the currently Federated Societies became members after 1984 (33 out of 52). IEA actively promoted the founding of ergonomics societies, especially in economically developing countries. There is a growing recognition of the importance of ergonomics and human factors in these areas. There is certainly a recognition in many of these countries that ergonomics can add efficiency, effectiveness and well-being to work.

The change from a society which mainly promotes scientific exchange to a professional society that additionally promotes the profession, already commenced in 1985, has continued.

As can be read in the chapters by the past IEA Presidents, the internal effectiveness of the IEA has improved over the years. The legal seat of the IEA was moved firstly

to Zurich and then to Geneva, giving it a truly international basis. The by-laws and operational rules have been updated whenever necessary, allowing council meetings to progress smoothly and efficiently. Many decisions are taken by consensus and approved unanimously, which does not mean that there is no room for disputes, but it signals good preparation and communication before meetings.

The financial position of the IEA has become healthy. This was possible by sponsorship, better governance of the membership fees, and by the fact that many officers and Executive Committee members find ways of obtaining external funding for their travel expenses.

A matter of ongoing attention is the three-year term of office for all members of the Executive Committee. According to the IEA rules, the newly elected President should have served at least one term on the Executive Committee (EC). However, being 'at the helm' is different to being one of the crew. The changing of many EC members every three years poses a genuine disadvantage to continuity, even though the past president usually supports the new officers considerably. The duties of the President, Vice-President & Secretary General and Vice-President & Treasurer require high levels of responsibility and are very time consuming. Consequently, the numbers of nominations for these positions is usually quite limited. Additionally, new members of the standing committees may struggle to take up the reins with little opportunity for handover from predecessors. The substantial work that has been done in recent years on the archives has alleviated this issue considerably.

A great example of IEA's externally oriented activities is the publication of the first Ergonomic Checkpoints (1996), followed by industry specific checkpoints for Agriculture, and Health Care Work. These publications provide practical and easy-to-implement solutions for improving safety, health and working conditions. The first two publications were made possible by collaboration with the ILO and the third was prepared by the Japanese Human Ergology Society and published by IEA Press. Other great externally oriented projects that the IEA funded were performed in India, Central America and Africa to promote ergonomic applications. In the 1980s and 1990s individuals (Alain Wisner, Adnyana Manuaba, Kamiel Vanwonderghem) were responsible for the IEA's support of industrially developing countries (IDCs). Today ergonomics societies in IDCs are more numerous and they are more likely to be regular Federated Society members. In the Past Presidents' chapters of this book, more attention is paid to the work of the IEA with ICs.

Although initially with reservation, the IEA now fully supports regional cooperation. Starting with the foundation of the Federation of European Ergonomics Societies (FEES), similar networks have been established in other parts of the world, namely in Latin America and Africa. In Southeast Asia, the former multi-country ergonomics society broke up into individual Federated Societies, but a regional network of ergonomics societies has been established and the BRICS network (Brazil, Russia, India, China, South Africa) is under development. Emphasis on the use of networks has, therefore, increased and there are more conferences and cooperative initiatives in Asia and Latin America than in earlier years. In a chapter in this book the backgrounds and actual situation of the networks is described.

The most visible activity of the IEA are the triennial congresses, which have taken place around the globe since 1961. In the related chapter in this book, an overview is provided of this usually five-day event. Based on his own extensive experience, the author chose a concise text: "One cannot describe what it means to experience a triennial congress. You simply go there, and you become addicted."

### Acknowledgement

This Introduction is based on a framework developed in a workshop held in January 2018 in The Netherlands. Next to the author, five Dutch professors in ergonomics or related topics participated: Anneke Goudswaard, Jan Dul, Michiel de Looze, Paulien Bongers, Peter Vink. The following current and past IEA EC members commented on the such developed framework: Andrew Imada, Margaret Graf, Pierre Falzon, Yushi Fujita.

### References

- Anon. Decent Work Indicators. Guidelines For Producers And Users of Statistical and Legal Framework Indicators. International Labour Organization. First published 2012, Second edition 2013.
- Anon. Ergonomic checkpoints : Practical and easy-to-implement solutions for improving safety, health and working conditions. ILO, Geneva. First published 1996, Second edition 2010
- Anon. ISO 9000 - Quality management". International Organization for Standardization. 1987 (1<sup>st</sup> version)
- Bongers PM1, de Winter CR, Kompier MA, Hildebrandt VH. Psychosocial factors at work and musculoskeletal disease. *Scand J Work Environ Health*. 1993 Oct;19(5):297-312.
- Coenen, Pieter; Kingma, Idsart; Boot, Cécile R.L.; Bongers, Paulien M.; van Dieën, Jaap H. Detailed assessment of low-back loads may not be worth effort: A comparison of two methods for exposure-outcome assessment of low-back pain. *Applied Ergonomics*, Vol.51, pp. 322-330.
- Grieco, A. Sitting posture: an old problem and a new one. *Ergonomics*. 1986 Mar;29(3):345-62.
- Meadows, Donella H; Meadows, Dennis L; Randers, Jørgen; Behrens III, William W (1972). *The Limits to Growth; A Report for the Club of Rome's Project on the Predicament of Mankind* (PDF). New York: Universe Books. ISBN 0876631650.
- Niu, Shengli & Kogi, Kazutaka. Ergonomic checkpoints in agriculture: Practical and easy-to-implement solutions for improving safety, health and working conditions in agriculture. ILO, Geneva. First published 1996, Second edition 2014.
- Yoshikawa, Toru et al. Ergonomic Checkpoints in Health Care Work. IEA Press, 2017

## Harry L. Davis

1985 - 1988



This chapter is not written by Harry Davis, since he passed away in 2003. This chapter briefly reflects on his term as IEA President. His team of officers included Ilkka Kuorinka as secretary-general and Brian Shackle as treasurer. They formed a sound team, visible and accessible. At the end of his term Harry wrote in the triennial report as important achievements: the development of a committee structure, the encouragement of conferences, symposia and publications, and the active assistance of newly emerging societies, this provided a foundation for the IEA to “reach out”. For the future, the resources of committed people, and money must be found to further develop this base. The IEA is at a crises point.

Technology was developing rapidly and the IEA should in his eyes develop pro-active means to guide the assimilation of this technology by its members. Failure of IEA to do this would have meant surrender of its preeminent position in world ergonomics because the field would become factionalized

Adopting all technology and a nurturing support for emerging and developing ergonomic efforts world-wide should also be given top priority.

Costs incurred by these emerging societies were a significant and real concern. IEA needed to find the means to provide direct support and to develop self-help on the part of these societies so that they could play an active role in IEA development. Active means as Federated Societies, with equal rights.

Remarkable through today's eyes (2019) is the fact that in three years only one Executive Committee meeting was held. Remember that the Internet did not yet exist; word processing machines and the first PC's were introduced and that communication went by telephone, (air)mail and fax! International bank transfers of membership dues were complex and expensive.

At the end of this term, the International Ergonomics Association had 17 member societies: Brazilian Ergonomics Association, Ergonomics Society, Gesellschaft fur Arbeitswissenschaft, Human Factors Association of Canada/ Association Canadienne d'Ergonomie, Human Factors Society, Hungarian Society for Organisation & Management Sciences, Japan Ergonomics Research Society, Nederlandse Vereniging voor Ergonomie, Nordic Ergonomics Society, Polish Ergonomics Society, Societa Italiana di Ergonomia, Societe d'Ergonomie de Langue Francaise, South-East Asian Ergonomics Society (welcomed 1986, covering Brunei, Indonesia, Malaysia, the Philippines, Singapore and Thailand), the Ergonomics Society of Australia, Yugoslav Ergonomics Society, Österreichische Arbeitsgemeinschaft fur Ergonomie. The Human Ergology Society, Japan, was already by then an affiliated member. During the triennial period

two societies withdrew from the Association, two membership applications were pending (Southern Africa and Korea), and five national societies were considering membership.

### Internal affairs

Until 1985 the Association was organized only by the officers; Harry Davis took the initiative to establish five standing committees:

- Policy and planning, chaired by Ian Noy
- Science and technology, chaired by Hal W. Hendrick
- Education and training, chaired by Pieter Rookmaaker
- Publication, chaired by Walter Kleeman jr
- Promotion and public relations, chaired by Martin Helander.

Since then, a substantial part of the work of IEA takes place in IEA committees. The financial situation of the IEA became more stable. Income increased by increasing membership amongst the Federated Societies and better discipline in paying, and reduced expenses.

When reading the council meeting minutes of this term, one gets the impression that the IEA Council discussed a lot on better and new rules. An example: A motion was made, that new societies should be enrolled as a member only after their first membership dues have been paid. After serious discussion, the motion passed unanimously. A long and not successful project was the new IEA Brochure. The minutes of 1988 report: “The IEA brochure has been completed but the quality is not up to expectations. The brochure should be more creative and have a professional outlook. Harry L. Davis recalled that the logo in the brochure (and in the IEA stationary) stems from a 1976 congress in Syracuse, USA, symbolizing the theme: “Old world, new world, one world”. The original colors were black on green.

Toronto was selected as the venue for the 12th IEA congress, to be held in 1994. At that time the selection was done 7 years in advance, i.e. 1987. Later, this term was reduced to 6 so that selection of the congress venue was done at the better attended Council Meetings in the years of IEA triennial congresses.

Four new awards were established: Ergonomics Development Award, IEA Award for Outstanding Contributions of Technology Transfer, Outstanding educators Award and The Founders Award. The principles of the IEA Design Award were developed.

### Improving the quality and quantity of the IEA information: the IEA Newsletter

Negotiations with the journal ‘Ergonomics’ and its publisher Taylor and Francis on the transfer of the printing and mailing of the IEA Newsletter, ‘Ergonomics International’ were conducted. It was approved, that ‘Ergonomics’ may print the Newsletter as section of the journal, provided that it made sufficient reprints of the section and mailed the reprints at no extra cost according to the mailing list provided by the editor of the ‘Ergonomics International’. The editor of ‘Ergonomics International’ would collect and compile the material to be submitted to ‘Ergonomics’ for publication.

**Several co-sponsored meetings were held:**

- The International Symposium on Ergonomics in Developing Countries, Jakarta, Indonesia, 1985. The symposium . was organized by the Indonesian authorities in collaboration with ILO, WHO, IEA and South East Asian Ergonomics Society. It was an important turning point in the appreciation of the need and usefulness of ergonomics in the process of development. The symposium has led to other actions and initiatives by other agencies and organizations, first of all the World Bank. The 1988 Symposium “The role of Ergonomics in Development” in Bali, Indonesia is a spin-off of the previous meeting.
- ODAM - Organizational Design And Manegement, Vancouver, Canada 1986.
- INTERACT '87 - conference on Human-Computer interaction, Stuttgart, Germany 1987.
- Man-Machine Systems, Oulu, Finland 1988.

**Strengthening of the liaisons between IEA and ILO, ISO, WHO and World Bank.**

The discussion revealed several important issues in maintaining effective contacts to the international organizations: a) contacts to key people are extremely important, b) IEA should define its policy vis-a-vis the international organizations, c) maintaining of the relations could be delegated to the IEA member societies geographically close to the respective organizations headquarters (e.g. SELF -Geneva). The Secretary General was asked to make a working paper on the principles and procedures for maintaining liaisons with International Organizations.

At the end of Harry’s term as President, in 1988, the very successful triennial congress was held in Sydney, then celebrating Australia’s bicentenary. The congress was hosted by the Ergonomics Society of Australia, which then included ergonomists in New Zealand.

Harry was a strong personality, a leader with strong bonding capacities.

**Ilkka A. Kuorinka**

1988 - 1991



In the years 1970 – 1990, industrialized countries have encountered a new economic and social life megatrend, a globalized market and neoliberalism. The structure and location of industrial production and services, work tasks and their content changed radically. Without a doubt, ergonomics was also facing changes and new challenges. In a few words, the contents of the neo-liberalistic trend (as seen through an ergonomist’s eyes) can be outlined as follows: Traditionally paid labor was structured around employers’ and employees’ roles. The employer took care of the working tools, work organization, the work environment, and obviously, paid the salary. The employee was supposed to do a “fair day’s work”. The employee also demanded decent working conditions and wanted continuous and predictable employment with an optimal work exchange ratio (working conditions, payment vs. decent life).

Late eighties the employer - employee setting seemed to change, with the employer function and entrepreneur responsibility tending to become delicate. The organizations wanted to concentrate on their essential business, by outsourcing less important work to other companies that supposedly do the task more efficiently. The proportion of part-time employees is increasing and full-time salaried employees are supposed to enter into an ongoing competition situation to keep their expertise up to date and their portfolios well padded. To paraphrase John Kenneth Galbraith: earlier St. Peter might have been content asking at the gate to eternity what the candidate had done to increase the Gross National Product, in 1990 he would ask what qualities the candidate had improved on earth to be useful at work.

The reason for the neoliberal metamorphosis is basically to improve the use of resources - as such, this is nothing new - but the overriding goal changed to the increase in the profit of capital investment. Earlier, a decent profit was 5 % or so, but late eighties the goal would be 15 - 20%. Lazy money is definitely out. If the yield is not sufficient, investors will withdraw.

The pros and cons of the consequences of neo-liberalistic economics’ trends were widely analyzed and its results mediated. From an ergonomics’ point of view, no clear image of eventual future threats or positive opportunities could be outlined. On the macro-economic level, opinions published by OECD seemed to admit that problems may appear but that positive effects would be sufficient to counteract them. The International Labour Organization, ILO, seemed to be worried about the neo-liberalistic trends, but also their point of view was on a macro level. Howard Stein, the organizational consultant and a critic of neoliberal trends, criticized the development that occurred in the US in 1980 - 2000 as a threat to human dignity, when employees were considered exclusively as an item of cost that could be sacrificed to competition and proprietorship values.

**Parallelisms between participatory ergonomics and neo-liberalistic work organization**

In the 1980's a new term appeared in the ergonomics' vocabulary: participatory ergonomics. The background was an increasing awareness of Japanese industrial work organization, which proved to be efficient. It also stressed the need for worker participation. Quality circles, 'Toyotism', autonomous groups, and empowerment were some of the concepts promoted. The "Participatory Ergonomics" of Kazutaka Kogi and Andy Imada showed that links existed between ergonomics and the new forms of industrial work organization. It also showed that these forms of organization were an efficient means of improving production and that the experience could be transferred to North -American industrial culture.

The criticism of Taylorism had already in the beginning of the twentieth century shown the harmful effects, both psychological and physical, of 'parceled' and monotonous work, alienation. Many of the above points seem to be a response to Taylorism's critics and along the lines of participatory ergonomics' recommendations. They have also been shown to improve work efficiency.

But the negative aspects - proven or presumed - are also numerous. The company/ employer tended to withdraw from immediate responsibility: "You may do the job as you will, as far the results are there." The objectives could be negotiated, but if they were not reached, there is no safety net. Entrepreneur-workers seemed to do more unpaid overtime than in more traditional jobs. According to the case studies, burn-out is common. Industrial jobs were not the only ones involved. Nor are negative effects limited to the lowest level of organization. The middle level of the organization became the main target, and middle management did not escape either. Many service occupations were also affected, especially in health care, information technology etc. Around 1990 the full picture of the situation was not available.

**Ergonomics in the face of neoliberalism: Observer or initiator?**

What could be the role of ergonomics in that new situation? To remain an observer or intervene as circumstances require, or take a proactive stance, trying to predict problems and identifying corrective means? Whatever the choice, it should be understood that classical ergonomics' intellectual tools and concepts, which concentrate on workplace issues, may not have been sufficient to deal with new problems in work organization and working life. The boundaries between neighboring scientific domains may have to be crossed. Organizational psychology and elements of cultural anthropology (sociology) are the first two walls to come up against. The second question deals with the role of traditional ergonomics' interest areas in the new situation such as biomechanics, applied physiology or sensory psychology. Would Visual Display Unit workplaces still interest researchers? What about tools? When writing these lines in the early nineties, the author thought that ergonomists should begin to reflect on what role to assume, passive or proactive, with respect to the novel work organizations created by neoliberalism. An entirely passive stance might lead to missed important opportunities. An opposite position might require making a quantum leap to scientific areas where ergonomists generally have little experience.

Even in a successful case, the risk might be that some traditional interest groups would not be willing to follow, and ergonomics might lose them.

**What the IEA did in this term**

The Executive Committee (EC) consisted of:

Ilkka Kuorinka	President
Hal W. Hendrick	Secretary General
Brian Shackel	Treasurer
Ian Noy	Policy and Planning
Martin Helander	Promotion and Public Relations
Ogden J. Brown jr.	Science & Technology
Pieter Rookmaaker	Education and Training
Walter B. Kleeman	Publications, chaired by Heather Ward

At that time, the President was also responsible for the Awards, while the immediate Past President was not a member of the EC. In order to benefit from their experience rules were changed, so that the Past President stayed on as a member of the EC. In 1995 the awards became the responsibility of the Past President.

Martin Helander and Ilkka Kuorinka undertook several initiatives to build up a better relation with the International Labour Organization and the World Health Organization. This turned out to be successful: ILO agreed to support the development of a Checkpoints book for practical ergonomics interventions, primarily meant for industrially developing countries. The initiative for an anthropometric databank were welcomed, but despite good efforts by Martin Helander, such a project could not be started. Concrete arrangements with WHO turned out to be impossible due to the bad financial situation of WHO.

One of the targets was to improve the relations with the Federated Societies. For this a letter was sent by the end of 1989 to all Presidents of the member societies and to Science and Technology subcommittee members. The purpose of the letter was to have appraisal and proposals from the leading persons on the relations between the IEA and the member societies. Although the response rate was not 100%, the responses gave important information on the problem areas, despite the usual communication problems. In general, the response indicated that the profile of the IEA needed further clarification. Efforts to improve the exchange of the ergonomics information were proposed by several respondents. Some of the respondents wanted to increase IEA subsidized activities. It was also proposed, that IEA should promote education and training through student courses and by making available information on educational organizations abroad. The education and training activities should be organized based on limited geographical areas in order to minimize traveling costs and to increase interest.

Initiatives were taken resulting in discounts on subscriptions for certain scientific journals for members of Federated Societies.

The Science and Technology Committee started with 9 thematical subcommittees, and ended with 10. Attempts aimed to have a larger part of the IEA triennial congresses organized by these subcommittees. In the 1991 congress in Paris, this turned out to be a good way, and it has been so over all following years.

The Education and Training Committee focused on three themes:

- Accreditation and Certification. The basis for the actual situation regarding certification was laid.
- Methods of teaching ergonomics. The aim was to learn from other parts of the world. Although this worked for smaller events, this proved unfeasible for large events since national and local requirements turned out to be dominant.
- Education in industrially developing countries (IDCs). These initiatives were closely related to the activities to get ergonomics on the agendas in IDCs. Years later those initiatives resulted in for instance roving seminars. The book donation program was initiated; any publisher of journals, books and proceedings was encouraged to donate 10 copies to libraries at ergonomics centers in IDCs. Specific conferences in IDCs were made possible by financial support from funds from surpluses from previous IEA congresses (like IEA 1988).

Following a review of the IEA membership categories by the IEA Policy and Planning Committee, a decision was made to rename the category 'Affiliated society' to 'Affiliated member' to be defined in the Rules as follows: "Affiliated members will be other national or international professional societies that are ineligible for federated society status or national groups or organizations provided no federated society exists in their area. Affiliated members are entitled to send a non-voting representative to Council. The newsletter Ergonomics International has developed considerably under the editorial leadership of Stephan Konz. It is now published in the Ergonomics Journal three times per year and is also sent to approximately 400 individuals around the world. The newsletter is of utmost importance for the development of IEA. Since the financial basis of IEA has always been small, initiatives were undertaken to attract sustaining members. However, the results of this would be realized after this term.

Five societies were welcomed as Federated Societies of IEA:

- Hungarian Ergonomics Society
- Soviet Ergonomics Association
- Chinese Ergonomics Society
- New Zealand Ergonomics Society
- Spanish Ergonomics Society.

New council members were invited to attend an introductory workshop prior to council meetings. The aim was to help the new councilors, and to promote effective interaction during council meetings.

Finally, a major activity was the organization of IEA triennial congress 1991 in Paris. This became a big success, in quality of the presentations, in numbers of participants and in financial outcome. SELF, the organizing Federated Society, created a fund with the surplus of the congress for support of the development of ergonomics in IDCs.

The first part of this article is written by Ilkka Kuorinka in 2006. The text starting with 'What the IEA did in this term' was written by Ernst Koningsveld in November 2017, based on council minutes and annual reports.

The 30<sup>th</sup> anniversary of the IEA was celebrated In 1989 in conjunction with the conference Marketing Ergonomics in Noordwijk, The Netherlands.



A plaque was unveiled at the building where the initiative for establishing an international association of ergonomics was taken. Several individuals who were founding members or early officers of the IEA were invited for the small ceremony and for a festive dinner. Note that IEA started as an association of individuals, where later societies became the members.

The building at Wassenaarseweg 56, Leiden, The Netherlands, housed the Netherlands Institute for Preventive Medicine, later called TNO Prevention and Health.

In 2018 a major renovation of the building started; it will be converted into residential apartments. Attempts will be made to replace the plaque after the renovation.

## Hal W. Hendrick

1991 - 1994

In the IEA 50th Anniversary booklet, Dr. Hendrick summarized the accomplishments of his Presidency as follows. “Perhaps the most significant accomplishment during my tenure as IEA President was a 78% increase in the number of Federated Society Members, from 18 to 32. As a part of this effort, during both my tenure as Secretary General from 1988-1991, and as President from 1991-1994, I engaged in an active outreach program, visiting many of the existing Federated Societies and societies that subsequently became Federated Members of the IEA.” In addition to the increase in the number of new Federated Societies, the number of affiliated members increased to 3, with new members: the European Dental Ergonomics Society and the Bureau of the Hungarian Council of Industrial Design and Ergonomics. Some of the applications for IEA membership met with a certain amount of resistance due to recent political developments (for example, the request for IEA membership by both the Ergonomics Society of Southern Africa and the Ergonomics Society of Yugoslavia). Though membership issues occasionally created extensive debates, in all cases solutions were developed, acceptable to the various opinions. The outreach initiatives and membership resolutions were greatly facilitated by the positive support of the IEA officers, namely secretary-general, Pieter Rookmaaker and treasurer Ian Noy.



A second accomplishment was the expansion of the IEA Science and Technology Technical Committees, from an original group of eight to twenty-one. With Martin Helander as chairperson of the Science and Technology Committee the number of Technical Groups not only increased tremendously, a manual for their organization and procedures was written in order to support the success of the various TG's. Nevertheless, for some TG's it became difficult to realize a truly international composition of members, and some had difficulties in filling their vacant chair-position. Noteworthy is the fact that during this period, the IEA was involved in one way or other in the realization of more than 25 congresses, conferences, symposia, workshops, on different topics, for different target groups, all over the world! These activities contributed significantly to the understanding of ergonomics/human factors as an added value in many scientific and applied areas.

Related to that, IEA became known to global organizations like the International Labour Office (ILO). With the ILO, very fruitful relations were established. As the first significant product of this, the first edition of the Ergonomic Checkpoints was published. It was a handbook for practical and easy-to-implement solutions for improving safety, health and working conditions in industrially developing countries. It was prepared by ILO in collaboration with IEA (technical content was provided by

IEA) and translated in more than a dozen languages. A second edition was subsequently published in 2010. The champions of this very successful initiative were Kazutaka Kogi and Ilkka Kuorinka. Influenced by this and using the draft edition of the Ergonomics Checkpoints, in 1993 Kazutaka Kogi and Kamiel Vanwonderghem organized two highly successful 'roving seminars' in industrially developing countries (IDC's) to "teach the teacher" the basics of ergonomics. These were held in Thailand and Indonesia. This success of these seminars led to the extension of the program to South America and Africa.

The Education and Training Committee, chaired by Margaret Bullock, published the "Third edition of the Directory of Educational Programs in Ergonomics/Human Factors"; a survey and description of existing educational programs in ergonomics/human factors all over the world. The preparation of the Directory was complicated due to the fuzzy definition of "educational programs in ergonomics/human factors". Dick Pearson was the leader of this task force. During this period too, there was increasing interest in the certification and registration of ergonomists for accrediting qualified practitioners. In the USA, the certification program was handled through the BCPE (Board of Certification in Professional Ergonomics) and in Europe through the HETPEP/CREE organization (Harmonising European Training Programmes for the Ergonomics Profession/Center for Registration of European Ergonomists). In addition, Australia and New Zealand were in the process of launching similar organizations. To provide leadership in the development of certification systems globally, the IEA hosted its first workshop on the topic during the Council meeting in Sicily in 1993. This effort gave impetus to harmonizing initiatives, including (1) a set of guidelines for Federated Societies to use in developing their own codes of professional practice, (2) the start of the development of the IEA Ergonomics Core Competencies Document, and (3) the development of criteria for IEA endorsement of national and regional professional certification agencies and programs in ergonomics.

The Policy and Planning Committee, chaired by Ogden (Ted) Brown, was involved with internally oriented issues concerning the IEA organization and topics related to the members. In this period updated editions of the IEA Basic Documents were produced. Attention was paid to a renewal of the IEA corporate identity, including the IEA logo. The question how to handle a request for IEA endorsement of conferences within the time-frame of the IEA Triennial Congress was resolved. A discussion was held concerning the quality of the IEA Council meetings in relation to the ever-increasing number of participants at the meetings, due to the increasing number of members. It was decided to continue the current approach with the Council meetings, however with certain adaptations.

The IEA finances were sharply improved due to the efforts of IEA treasurer, Ian Noy. In fact, no increase of the annual fees was needed over the period 1991 - 1994 to sustain operations and support Executive initiatives. As a result of its financial health and to further support initiatives by IDC's to organize IEA-supported conferences, Council decided to waive, under certain conditions, the capitation fee of delegates from IDC's. Additional consideration to IDC members was the establishment of specially-

earmarked funds. From the surplus of the 1991 Paris Congress, SELF donated 100.000 French Francs to establish the SELF Fund with the provision that the monies would be used to support ergonomics in IDC's. This was the first of several such funds. To learn more about the functioning of the federated societies and to know what support eventually was needed from IEA, an extensive IEA written survey was completed by the Federated Societies; the results were subsequently analyzed and published by the end of 1994.

Steve Konz, the editor of the journal 'Ergonomics International', solicited and disseminated important information about what was going on globally in ergonomics/human factors. He began to use electronic media (email) for disseminating the newsletter to IEA members. Interestingly, at that time various Council members were reluctant to do so, as some were not yet using email!

Hal wrote, "Late 1994, when finishing my tenure as IEA President, my focus on the future of ergonomics is the following. In light of the rapid and continuing changes in technology, in the nature of organizations and work, and globalization of all industries across nations and cultures, the need for ergonomics internationally is greater than ever. The IEA and its Federated Societies and their members have the potential to improve the human condition and add value to the design of systems, equipment and products that far exceeds the capability of any other profession of equivalent size. Yet, to reach our potential, our greatest challenge is to raise the consciousness of government and industry decision-makers of the value added of ergonomics. And to show that good ergonomics is good economics. This is particularly difficult for so small a profession with limited funds, yet it is essential that we find ways of meeting this challenge."

*Hal W. Hendrick passed away in 2011. This text is based on his publication in the IEA 50th Anniversary booklet (2006), and extended with valuable contributions of Pieter Rookmaaker.*

## Martin G. Helander

1994 - 1997

At the Council Meeting of the IEA in 1994 in Toronto, Canada, I was elected President. I succeeded Hal Hendrick, who was my mentor. The Council also elected Pieter Rookmaaker of The Netherlands as Secretary-General and Ian Noy of Canada as Treasurer. We were a collaborative team even during hard times.

Joined by six smart and enterprising human factors and ergonomics professionals, I could not ask for a better Executive Committee. The team members were:

Martin Helander	President
Pieter Rookmaaker	Secretary General
Ian Noy	Treasurer
Holger Luczak	Science & Technology
Ogden Brown Jr.	Policy & Development
Margaret Bullock	Education & Professional Development
Waldemar Karwowski	Publication & Promotions
Kamiel Vanwonterghem	Industrially Developing Countries (IDC)
Hal Hendrick	Awards



Markku Mattila of Finland was the 1997 IEA Congress Chair, and in that role joined the Executive Committee. It is important to note that Margaret Bullock was the first female to be appointed on an IEA committee chair. This paved the way for more females who were elected or appointed on the IEA committee in later years. My team groomed two future Presidents – Ian Noy in 1997 and Waldemar Karwowski in 2003. Our Council and EC meetings roved around the globe; in 1995 we met in Rio de Janeiro, Brazil, 1996 in Breckenridge, Colorado and 1997 in Tampere, Finland.

### My goals and accomplishments

The IEA was maturing as a global organization. To put the IEA on the world map, in 1994 at the beginning of my term as President, I formulated Ten Goals for the IEA (Helander, 1995). At the end of my term in 1997 I revisited these goals. Several were achieved during my term. There were also some long-term policies for IEA to consider for the future. The goals are presented below.

1. IEA is the only global organization in ergonomics and must take a global responsibility. To support ergonomics globally, IEA must create partnerships with other international or regional organizations, such as United Nations, European Union and ASEAN. Only a few of them employ ergonomists. Their awareness must increase, and IEA should look for opportunities to train employees of these organizations. I taught a course in



Ergonomics to Employees of UNDP in New York City. They were interested, however naïve, about the tools and methodologies that are available to an ergonomist. I also taught several courses to industry in Malaysia.

During 1996-1997 our contacts with ILO and WHO improved. This was partly due to the support received from officials at these international organizations. IEA also benefited from the joint publication with ILO entitled Ergonomic Checkpoints, which was published in 1997. The initiative was jointly led by Kazutaka Kogi of ILO and Ilkka Kuorinka from the IEA. The following individuals compiled the Ergonomic Checkpoints.

- Martin Helander, State University of New York, Buffalo, United States:
- Andrew Imada, University of Southern California, Los Angeles, United States:
- Kazutaka Kogi, International Labour Office, Geneva, Switzerland:
- Stephen Konz, Kansas State University, Manhattan, United States:
- Ilkka Kuorinka, Institute des Recherches en Santé et Sécurité de Travail de Québec (IRSST), Montreal, Canada:
- Tuulikki Kuorinka, IRSST, Montreal, Canada:
- Wolfgang Laurig, Institut für Arbeitsphysiologie, Dortmund, Germany:
- Najmedin Meshkati, University of Southern California, Los Angeles, United States:
- Houshang Shahnavaz, Luleå University of Technology, Sweden.

One problem in maintaining contacts with international organizations was their frequent reorganizations, shifting levels of funding and change of staff. Therefore we could not wait for them to take the initiative. Rather, IEA had to aggressively keep approaching UN and other organizations and present proposals.

## 2. IEA must continue to support ergonomics in countries where it has been neglected.

There are two reasons for supporting ergonomics in neglected regions. The first is simply that we want to help by expanding the knowledge of ergonomics through training and education. The second is that IEA wishes to recruit more members. In order to do so, one must first help in creating the necessary infrastructure and organization of ergonomists in the country. An ergonomics community and later a society must be organized.

In the past our focus was on advanced and developed regions of the world. However, during my term three regions were given impetus to grow, namely:

- Latin America: This was driven by efforts of Anabela Moraes, President of the Brazilian Ergonomics Association, who organized the first IEA world Conference in Rio de Janeiro, Brazil in 1995. She brought other countries in Latin America to the meeting.
- South Africa: This was driven by the efforts of Patricia Scott. Her book “*Ergonomics in Developing Regions: Needs and Applications*” was published in 2009.
- Southeast Asia: This diverse region of 10 countries was led by Halimahtun Khalid who was President of the South East Asian Ergonomics Society (SEAES). She recruited five member countries (Indonesia, Singapore, Thailand, Philippines and Malaysia) to the IEA making SEAES a network in 2000 that was called SEANES.

During the period 1994-1997 IEA training activities increased. Courses were held in Colombia, Hong Kong, Indonesia, Lithuania, Latvia, Malaysia, South Africa and Thailand. Some of these were in cooperation with ILO and WHO. Kamiel Vanwonterghem chaired the IEA Committee for Industrially Developing Countries (IDCs).

In addition, IEA stimulated ergonomics by supporting conferences at strategic locations where ergonomics was underdeveloped. There were only a few activities on the large continents of Africa and South America. Through the help of the Brazilian and the South African Ergonomics Societies, IEA was able to stimulate interest in bordering countries. Our book donation program too flourished. During this period, it was organized as ten library depositories in IDCs around the world. The student chapter of HFES at SUNY Buffalo, New York, took the initiative to collect books from HFES members. This was extremely successful, and we were very grateful for their help.

## 3. IEA must remain at the forefront of technology and scientific development.

The Science and Technology Committee chaired by Holger Luczak organized 16 Technical Groups, which arranged conferences, symposia and meetings of expert groups. New technical groups were proposed by federated societies and by interested individuals. Inactive technical groups were dissolved.

During the period 1994 - 1997 IEA sponsored 17 conferences around the world - about 6 per year. Many of these were held in IDCs. These were primarily attended by members of the IEA Council and the Executive. The Technical Groups helped in soliciting papers by organizing paper sessions for the 1997 IEA Congress in Tampere. About half of the papers were sponsored by Technical Groups. This practice has been in place ever since.

## 4. IEA must disseminate information about ergonomics on a global scale.

The newsletter ‘Ergonomics International’ was edited by Stephan Konz. It was distributed quarterly as a section of the journal *Ergonomics*, as well as via Internet. It was also mailed to about 250 individual ergonomists around the world.

Waldemar Karwowski, who chaired the Publication and Promotions Committee, established the ‘IEA Press’, with the main objective of making conference proceedings available at low cost. The ‘IEA Journal of Ergonomics Research’ appeared as a refereed Web journal. It was established for a similar purpose as IEA Press, to make information available at low cost, particularly to IDCs.

## 5. IEA must facilitate global communication among professionals.

During the years 1994-1997 global communication exploded by the quickly growing use of the Internet. IEA was well-prepared, and we established e-mail accounts for members of the Executive Committee. This motivated Council members to create e-mail accounts which simplified communication around the world. The IEA Web page was established and became the most comprehensive Internet source of ergonomics information for Federated Societies and Sustaining Members. The ambition was that, in the future IEA should organize an international register of e-mail directory of human factors and ergonomics professionals.

The first Web conference in ergonomics, the 'CybErg conference', was organized by Leon Straker and his wife, Clare Pollock of Curtin University, Australia. It was a great success.

*6. IEA must continue its leadership role in developing guidelines for educational accreditation and professional certification.*

The Education and Training Committee was chaired by Margaret Bullock. Helped by the New Zealand Ergonomics Society, guidelines for the certification of ergonomics professionals were published in 1999. The guidelines continued to evolve with the changing field of ergonomics.

Several workshops were held at IEA Council meetings and in member countries to refine the guidelines.

The Committee also reviewed human factors and ergonomics (HFE) programs offered by universities around the world to ensure that they met the requirements for certification of professional ergonomists as well as accreditation of HFE teaching programs. This initiative was further developed by future IEA leaders.

*7. IEA must increase its budget and seek new sources of funding.*

IEA relies on volunteer work and for this reason it could accomplish much at little cost. The IEA funding was provided by member societies, by donations and by income from conferences. However, the annual budget was inadequate to expand activities. It was difficult for IEA to sustain its international role. Additional sources of revenue were sought from: donations by individuals, sustaining membership fees from international corporations, grants for research and development, profits from publications. For this purpose, Ian Noy, the Treasurer, designed a "Bequest" brochure.

The Liberty Mutual Prize for best article in Ergonomics was instituted with the help of Tom Leamon, President of Liberty Mutual Research Centre for Safety, who was presented with the President's Award in 1997.

*8. IEA Council members must be given opportunities to help with IEA business.*

There were many opportunities for IEA Council members to be involved in special projects such as recruitment of new IEA members. Other activities included the 'Ergonomists across Border' initiated by Hal Hendrick. The Committee on Policy & Development led by Ogden (Ted) Brown Jr. formed a subcommittee comprising of, among others, Francois Daniellou (SELF) and Halimahtun Khalid (SEAES), to review specific policies that affect member countries.

*9. IEA must actively recruit new members.*

IEA recognized the importance of Sustaining members comprising companies and individuals. These helped to validate IEA's standing in industry and create opportunities for international collaboration. The membership fees added value to the IEA budget. This activity was the priority of the Policy and Development Committee.

During my term the IEA Fellowship was instituted, led by Hal Hendrick who chaired the Awards committee. The Fellowship is to recognize extraordinary or sustained superior accomplishments of an individual.

*10. IEA must promote an international debate on the goals of ergonomics.*

Ergonomics is practised differently in many parts of the world. To develop a common understanding, IEA must lead a global debate on the goals and means of ergonomics. Ergonomics must be explained or packaged so that the message is easy to understand for non-professionals. The purpose of ergonomics is to design systems that enhance productivity, safety and user satisfaction (Helander, 1997). With a clear message, we can effectively promote ergonomics. Several textbooks were written by IEA members. I contributed two books – *A Guide to the Ergonomics of Manufacturing* (1995) and *The Handbook of Human-Computer Interaction, Second Edition* (1997).

**Significant influences**

There were several global developments that influenced the direction of IEA during my tenure. I would like to cite the two following that impacted the IEA.

*Human Factors and Ergonomics Standards*

Prior to serving the IEA, I was Chair of the HFE Standards Committee. I took the initiative to organize Standards activities for HFES (HFE at the time). This involved setting up - through ANSI - the VDT Standards Committee and twelve other standards committees in Human-Computer Interaction. I then recruited Chairs and members of the committees among HFE members giving control to HFES over these important activities. I published descriptions in the HFE Bulletin of possible activities that HFE could undertake. The response was overwhelming. I received 19 proposals for standards activities. They were all accepted and 19 committees of 4-5 persons were established. This experience helped to expand the role of IEA in formulating ergonomics standards. Tom Stewart (UK) and Sadao Horino (Japan) represented the IEA on the ISO/TC 159 – Ergonomics.

*Emerging Knowledge Areas*

Towards the end of my term, Multimedia became a buzzword in IEA. Very few knew about multimedia or utilized IT-tools in the Council work. We were introduced by Halimahtun Khalid who gave a keynote on *Human Factors in Multimedia* at the 1997 IEA Congress in Tampere, Finland. Since then IEA used IT-technologies in presentations and for document management.

In closing my tenure as President, I delivered an address 'Forty years of the IEA: Some Reflections on the Evolution of Ergonomics' to the 1997 IEA Triennial Congress in Tampere. The evolution of ergonomics prior and after the foundation of the IEA in 1957 was analyzed. Ergonomics has broadened from considering work activities to include all types of human activities. The introduction of computers changed the premises for work and leisure, and Cognitive Ergonomics became important.

Ergonomics is a science of design. There are three important targets for ergonomics design activity: to improve safety, productivity and operator satisfaction. These were summarized using a systems approach.

**Reference:**

Scott, Patricia A. Ergonomics in Developing Regions: Needs and Applications. CRC Press, 2009

## Y. Ian Noy

1997 - 2000

I was elected President at the Council meeting during the IEA Tampere Congress after five rounds of voting in the most contested election of the Association. At the time, I directed the Ergonomics Division at Transport Canada and having been active on the IEA Executive body since the early 80's, I had traveled extensively in North America, Europe, Israel (where I was born) and Asia and developed a network of friends and colleagues throughout the IEA world. The election was a truly humbling experience considering I ran against such worthy contenders as Pieter Rookmaaker, Holger Luczak, Kazutaka Kogi, Margaret Bullock, and Reg Sell. The Congress banquet held the following day, was attended by over 700 delegates. The organizers delivered a magnificent event with live music. After the main course, I walked around the Hall and greeted the colleagues that I knew at various tables. I stopped to chat at one of the tables and an unknown person sitting next to my colleague looked up at me and asked if he could please have a second dessert. I instantly realized my dark suit looked similar to what the servers were wearing. I replied with a wink, "of course, let me see what I can do for you" and promptly headed towards the kitchen where I saw a trolley with trays of desserts. I grabbed one and took it back the delegate, whispering as I placed it down, "It's your lucky day - I managed to find an extra one." He thanked me and commented on my command of English. Later that evening, I made a speech as the incoming IEA President and presented Martin Helander, the outgoing President, a work of art as a token of appreciation for his leadership. At the breakfast the following morning, the delegate who got the second dessert came up to me and apologized profusely - we had a good laugh together. That was the start of my Presidency. My job, as I saw it, was to serve the Association and its members and to focus my leadership goals on the promotion of ergonomics more broadly.



To help me accomplish those goals, I needed the help of colleagues who possessed leadership talent and were as passionate about the IEA as I was. We already had a great start with the elected officers; Sec. General: Waldemar Karwowski (secretary-General) and Kazutaka Kogi (Treasurer), Martin Helander (Past President), and Hal Hendrick (2000 Congress Chair). The people who graciously accepted to join the Executive Committee included Ken Laughery (Science and Technology), Patricia Scott (IDC), John Wilson (Education & Training), Pieter Rookmaaker (FEES), Markku Mattila (Policy & Planning), Andy Marshall (Newsletter), and Ilkka Kuorinka (Historian). We had ambitious plans, perhaps too ambitious. The regular activities carried out by the various committees - including Science and Technology, IEA2000 Triennial Congress Planning, Publications, and Industrially Developing Countries - were straining

our resources (both human and financial, since we were all volunteers). We needed to review our objectives and prioritize those activities that were aligned with our vision in an effort to achieve the greatest possible impact. As I saw it, our first order of business, therefore, was to create a strategic plan, a first for the Association, that would articulate our goals, establish priorities and rationalize our work.

Our first set of meetings was devoted to creating a plan that addressed the needs of IEA member societies, the discipline and society as a whole. We Involved the IEA Council in a participative effort to define both short-term needs as well as long-term aspirations. Because this was accomplished in close cooperation with the Council, the objectives and priorities outlined in the strategic plan reflected an international consensus, representing the range of interests and views within the ergonomics community. Among the strategic priorities, the four that represented my personal priorities were to: (1) develop definitions for ergonomics and human factors, (2) create an entity to be named, Federated European Ergonomics Societies, (3) launch the IEA-Liberty Mutual prize and medal for occupational safety and ergonomics that I, as IEA Treasurer, had negotiated with Tom Leamon in 1996 (then Director of the Liberty Mutual Research Institute for Safety), and (4) convene a high-level group to make strategic recommendations with the aim of establishing IEA education as a core academic program. The next few paragraphs outline the rationale and achievements relative to these four key initiatives.

### Definitions for ergonomics (or, human factors).

This initiative is perhaps the most significant of my tenure. First, I note that the term 'ergonomics' is meant to encompass 'human factors', since these terms have become synonymous over time. Historically, they represented distinctly different traditions ('ergonomics' having European origins and largely focused on physical work; 'human factors' having North American origins and largely focused on human performance and cognitive work) but over time they became so intertwined in usage that these distinctions disappeared and they became interchangeable. The choice of 'ergonomics' was simply because that was the term used in the name of the Association. Interestingly, in the spirit of inclusion it is now vogue to speak of 'human factors and ergonomics' (HFE).

Over the years leading to my Presidency, I struggled with and engaged in endless philosophical discussions and differing perspectives concerning the underlying essence of ergonomics and what makes it unique in relation to related/adjacent disciplines. Consequently, I felt particularly passionate that the time had come for the IEA to define the field. I proceeded to draft the first version of the definition and presented it to the Executive Committee with the intent to get its endorsement and approval to present to Council for further deliberation. When raised in Council, however, this initiative met with greater skepticism than I had anticipated. I had some premonition that was not going to sail through since some Executive members seemed hesitant. Still, I was surprised that it evoked emotionally-charged concerns, if not resistance,

even from prominent members of the community. In retrospect, that it became a hotly debated topic for the next two years was actually helpful in addressing a range of core issues. The main impediment was that the IEA represented a diverse community, with different cultures and approaches to ergonomics. A further complication was that some referred to ergonomics as a branch of science while others referred to it as a profession. Nevertheless, it was my firm opinion that a global definition was needed to (a) elaborate and clarify the nature and scope of the field for internal and external audiences, (b) to establish the IEA as the global authority in the field, and (c) to begin the task of developing a precise scientific/technical language, taxonomy, and terminology that would serve to facilitate dialogue with external stakeholders about the subject matter of HFE so they are better informed and able to formulate and communicate their needs concisely and accurately.

Thankfully, despite differing perspectives, the majority on Council recognized the value of promulgating a definition as a means to promote understanding and communication within the ergonomics community as well as with professionals and lay people outside the field. As a result, the IEA Executive and Council worked cooperatively to reach consensus on definitions for the discipline of ergonomics, and its three predominant domains of specialization. It took three years of deliberation and compromise to formulate the definition that was finally ratified by the IEA Council and promulgated at the IEA Congress in San Diego, 2000. In its final form, the definition recognizes the importance of encompassing both the scientific discipline and the profession. Ergonomics (Human Factors) was defined as “*the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance*” (IEA Triennial Report, 2000).

Domains of ergonomics were also defined to include:

**Physical ergonomics** is concerned with human anatomical, anthropometric, physiological and biomechanical characteristics as they relate to physical activity. (Relevant topics include working postures, materials handling, repetitive movements, work-related musculoskeletal disorders, workplace layout, safety and health.)

**Cognitive ergonomics** is concerned with mental processes, such as perception, memory, reasoning, and motor response, as they affect interactions among humans and other elements of a system. (Relevant topics include mental workload, decision-making, skilled performance, human-computer interaction, human reliability, work stress and training as these may relate to human-system design.)

**Organizational ergonomics** is concerned with the optimization of sociotechnical systems, including their organizational structures, policies, and processes. (Relevant topics include communication, crew resource management, work design, design of working times, teamwork, participatory design, community ergonomics, cooperative work, new work paradigms, virtual organizations, telework, and quality management.)

While there continue to exist regional differences in focus and approach to ergonomics, this definition has been promulgated widely and proven valuable for nearly two decades. For example, it was adopted as a core construct in the award-winning paper by Dul et al. on the Future of Ergonomics (2012). Nevertheless, there is a small but vocal community that continues to oppose the distinction between science and application, though a careful reading of the definition can readily accommodate both views. Indeed, the IEA strategic vision continues to be guided by this definition.

#### **Federated European Ergonomics Societies (FEES).**

This initiative derived its impetus from the formation of the European Union, and specifically the creation and/or reorganization of pan-European research projects under the auspices of the European Commission. Some European academic Council members had reported that they were facing new challenges as a result of the loss of national funding in favor of EC projects. Our initial attempts to establish contact with the EC Directorates proved unproductive as the EC was not open to representation by groups outside of the EU. Hence, to ensure that European societies would have a united voice and influence over research policy in Europe the idea emerged to create FEES as an independent organization, but affiliated with the IEA. Surprisingly, the proposal to create FEES was not universally embraced within the IEA and, even more surprisingly, especially by European federated societies who questioned the purpose and feasibility of FEES, and were concerned over control by the IEA. I was a strong advocate for this initiative as I believed this presented a unique opportunity for European societies to create a unified position and advocate for ergonomics education, research and policy at the EU level. The irony was that I was Canadian trying hard to persuade European colleagues of the value of creating a unified European perspective to influence European affairs. Of course, I did it as IEA President in the belief that positive outcomes in Europe would benefit societies everywhere. After lengthy debates within and outside meetings, the proposal was finally approved and Pieter Rookmaaker was named Chair.

#### **IEA-Liberty Mutual prize and medal for occupational safety and ergonomics.**

Liberty Mutual agreed to sponsor what has become the most prestigious prize in the field. The purpose of the prize was to recognize individuals whose research efforts have contributed to the reduction or mitigation of work-related injuries. In particular, the prize was established to award an original activity leading to a better understanding of preventing or mitigating occupational accidents or injuries, or to the rehabilitation and return to work of injured workers. The main criteria, therefore, included significant advancement of theory and understanding, innovation and development of new directions or approaches. In the original formulation, there was an annual Prize, with a cash award of US\$5,000 and one triennial Medal to be presented at the IEA Congress to the most worthy of the three previous Prize winners. The Medal carried a further cash award of \$15,000. This formulation was transformed in 2009 into an annual Liberty Mutual Medal consisting of a cash award of US\$10,000. The first Prize was presented at the Global Ergonomics Conference in Cape Town, September 9-11, 1998.

### High-level group to make recommendations about IEA education.

The IEA formed a Task Group under the Professional Practice and Education Committee to explore whether and how the IEA might organize an international high-level work group (like a NATO workshop) that would assess the current state of the education infrastructure in ergonomics and develop a comprehensive multi-level model and recommendations to promote ergonomics as a delineated branch of science in its own right. Surveys had indicated that most ergonomics training was pursued at the post-graduate level within a variety of departments such as psychology, engineering, kinesiology and others. Hence, the primary allegiance of most ergonomists was not necessarily to ergonomics per se, but rather to their original discipline. This meant that many were not affiliated with the formalised ergonomics community and, therefore, did not benefit from networking within the field. Moreover, many of these formative disciplines varied in their representation and orientation towards ergonomics. This was regarded as an impediment to the growth of ergonomics as a discipline, especially as it had little or no academic presence prior to graduate studies. What was needed for the discipline to truly develop, were programs devoted specifically to the science of ergonomics at the undergraduate level and even courses in high schools, as well as centers of scholarship in ergonomics. After initial deliberation and fact finding, the small Task Group reached the conclusion that universities were not likely to be responsive to structural changes given the complex and entrenched political environment typical of most academic institutions at the time. As a result, it was not able to make recommendations and the initiative was abandoned.

Apart from the above initiatives, there were a number of new endeavors. One of our near-term objectives was to create a website for the IEA to help promote ergonomics and facilitate outreach and communication. This was viewed as a first of many initiatives to implement information technologies, which offered efficiencies over traditional approaches to conducting business, delivering services, promoting ergonomics, and advancing international cooperation in scientific and professional matters. The website was viewed as an effective channel for communicating the work of the IEA and reaching new audiences. Among the first documents uploaded to the website were the output of the Professional Practice and Education Committee, including the Core Competencies for Practitioners in Ergonomics, Minimum Criteria for the Process of Certification of an Ergonomist, Criteria for IEA Endorsement of Certifying Bodies, and Guidelines for the Process of Endorsement of Certifying Bodies. The first website was hosted by Ergoweb, and it was later migrated to a dedicated IEA server. The website initiative had far broader impact on the work of the IEA as it forced us to organize and structure our various programs to be informative, comprehensive and engaging for our constituency as well as for visitors unfamiliar with the IEA. Today, websites are ubiquitous, but not so during this period. One of the spinoff benefits of the first IEA website is that it facilitated the creation and publication of the IEA Triennial report 1997-2000, another first for the Association. Publishing a Triennial Report took on a special significance given the fact that the upcoming IEA Congress was going to be the largest-ever gathering of ergonomics and human factors professional for a long time to come. Over 3,000 delegates were expected to attend the

forthcoming IEA Congress, which was to be combined with the HFES Annual meeting, chaired by Hal Hendrick. The Triennial Report was also to be the launching instrument for the formal definition of ergonomics. We seized the unprecedented opportunity to communicate about the IEA to a very large and interested group of ergonomists, human factors professionals and affiliates. In preparation, Waldemar Karwowski and I spent a considerable amount of time pouring over detailed input from Executive Council members to design the content and structure of the Report. The final product was particularly meaningful to me as it presented the accomplishments of the IEA during my tenure as President.

In my conversations with individual Council representatives over my many years of involvement leading to my Presidency, I detected a desire to make better use of the time afforded by the Council meetings to discuss common issues of a more substantial or intellectual nature, to share best practices and to deliberate more fundamental issues facing the field. After all, many of them travelled long distances to attend the Council meeting and wanted more from the meeting than deciding on traditional items of business such as dues, rules, admission of new members, hearing reports of subcommittees and sponsored conferences. To provide the opportunity for greater interaction among the IEA member societies and engagement in the work of the IEA, we organized breakout workshops at each IEA Council meeting to tackle more substantial issues such as the IEA definition. One of the interesting outcomes of this initiative was greater awareness that while the majority of Council representatives were effective in their role as liaison between the IEA and their respective societies, not all Council representatives communicated IEA matters back home or represented the actual views of their societies (as opposed to their personally-held views). In fact, in some cases, the newly-elected officers of IEA member societies actually knew very little about the IEA because their society representatives did not brief them on IEA programs or activities. Although uncommon, impediments to open engagement with member societies became more evident and problematic in a more collaborative Council. To address this and facilitate greater inter-society dialogue, we organized the first by-invitation forum at the 2000 IEA Congress in San Diego for Council representatives as well as Society presidents, which was well received.

Of course, a great deal of time during my tenure was devoted to organizing the IEA Congress, which due to its projected size and scope presented many challenges. One of the many challenges of the 2000 Congress was finding a way to engage both the HFES TIG<sup>3</sup>s and the IEA Technical Committees in a cooperative manner. Hal Hendrick's thoughtful leadership was key to the success of that combined event. There were other activities that merit mention here. Towards the end of this period, at the urging of Waldemar Karwowski, we began to explore the idea of creating a program to recognize ergonomics quality in design (EQUID) through a certification program.

<sup>3</sup> Technical Interest Groups

EQUID was conceived to help consumers make informed purchasing decisions about specific products, services and work systems offered by manufacturers or suppliers who would apply for certification. This was to be accomplished through a network of experts who would evaluate the extent to which these met user needs and were compatible with user limitations and capabilities. This initiative was to become a focus of Waldemar's Presidency over the next three years.

The position of IEA Historian was formalized at the 1998 Cape Town Council meeting, followed by the appointment of Ilkka Kuorinka to that position, succeeding Brian Shackle who had previously served that role unofficially. Ilkka undertook to edit the "History of the International Ergonomics Association: The First Quarter of a Century". This publication captured in remarkable detail the formation and early history of the Association. The founding leaders' original accounts, either through their own writing or interviews with Ilkka, were assembled and published in time for the 2000 San Diego Congress.

In an effort to make ergonomics knowledge accessible to users who may not have access to current periodicals, we undertook to publish a Web-based peer-review journal of original research, evaluative reviews of the literature, and articles dealing with development and advancement of methods and theories. The *IEA Journal of Ergonomics Research*, under the Editor-in-Chief, Martin G. Helander, was launched at the start of 1999 and was available online on the IEA website, free of charge. Unfortunately, this effort proved to be unsustainable and was disbanded after a few issues. The IEA K.U. Smith Student Award was launched in 1997 through an agreement with the St. Paul Foundation, which provided overall management of the Fund. The award was established to recognize deserving students for their applications of or contributions to ergonomics.

After the very successful publication of the first Ergonomics Checkpoints a few years earlier, we concluded an agreement with the ILO (involving Dr. K. Kogi for the IEA and Dr. J. Takala, Chief of the ILO Occupational Safety and Health Branch and officials from the Publications Department) to prepare a second Ergonomic Checkpoints Book with "agriculture" as the subject area.

Clearly, there was more to do than time in which to do it. To alleviate workload issues and improve efficiencies, we initiated plans for an IEA part-time office. The main reasons for this was to provide stability and continuity (e.g., changes in officers) for IEA office operations, ease transition of officers, off-load officers and committee chairs from routine day-to-day administrative tasks, provide better tracking of documents and correspondence as well as other activities. The expected benefits included improved efficiency, better coordination of activities, improved image, and, perhaps most importantly, to make it possible for new individuals to become actively involved. The proposal, at an estimated annual cost of \$10,000, was approved by Council but the office was not implemented during my tenure due to a myriad of logistical barriers. I look back at this period as unequivocally the most rewarding and enjoyable of my

extracurricular career. While we did not succeed in all of our endeavors, we did progress a number of strategic goals that we undertook at the start of my tenure at the Tampere Congress. Reflecting on that Congress brings back very fond memories. A few minutes after I brought the unfamiliar delegate a second helping of dessert I was taken aside by Hannu Stalhammer, then President of the Finnish Ergonomics Society, who asked me if I were willing to sing a special surprise song with him at the Closing Plenary. I agreed without hesitation, happy that it would not be a solo performance. You see, I had been practicing this Finnish song for three years (and I probably could have used three more). The story behind this goes back to the 1994 Congress banquet aboard the Mariposa Toronto Island cruise when, as then Congress Chair, I made the rounds of different tables and remarked to my Finnish colleagues how much I enjoyed their singing in unison and with such fervor. I told them that I wished I could sing along with them, at which point my friend, Tuulikki Luopajarvi, a long serving Council member, said that if I promised to sing at Tampere she would send me a song. A few weeks later I received a cassette with a page containing the Finnish lyrics and English translation. It was actually a folksy love song, which from the English translation was quite funny. Fast forward to Tampere, within 30 minutes of Hannu and I hatching the plan of our surprise performance, Tuulikki caught up with me and asked if I would sing the folk song that very night – it seemed so appropriate. Knowing that I had already agreed to sing with Hannu at the closing, I declined saying I didn't feel I knew the song well enough to sing in public. She persisted and tried to reassure me, but I shook my head dispondently. My heart sank to see her so clearly disappointed. I knew this was going to be righted at the closing plenary, but I could not tell her our plan, so I apologized and told her how badly I felt in letting her down. At the Congress closing plenary, Hannu and I made our respective remarks and after thanking all of the people who had organized the Congress we called onto the stage two very special ladies, Tuulikki Luopajarvi and Anja Hakkarainen (the congenial Congress on-site meeting planner). We presented each a bouquet of roses and proceeded to serenade them with our song. It took me three years to learn it, but I was told it came across as perfectly authentic, especially to non-Finnish listeners. I was also told that the Tampere Hall was the largest concert hall in Scandinavia. Needless to say, Tuulikki forgave me – she was absolutely thrilled.

#### Reference

Dul J et al. A strategy for human factors/ergonomics: developing the discipline and profession. *Ergonomics* 55,2012,4.

# Waldemar Karwowski

2000 - 2003

I was elected IEA President at the San Diego Council meeting in July 2000. However, my journey to IEA Presidency began much earlier, back in 1988, when Hal Hendrick who then served as IEA Secretary General (1988-1991) invited me to attend my first IEA Council Meeting held in Sydney, Australia, as an observer. Knowing my strong interests in ergonomics internationally, Hal has taken a personal interest in me and wanted me to experience first-hand the operations of the IEA. The following year, after the IEA Council meeting in Noordwijk, Netherlands (1989) Harry Davis, then IEA past president (1985-1988), joined me in the elevator going back to our hotel rooms. I had only met Harry once before, but Harry quickly recognized and greeted me, and then he surprised me by immediately asking if I was serious about contributing to IEA. I said, "Absolutely yes" and explained that indeed I was very interested in contributing to the profession of ergonomics and human factors at the international level. Harry replied, "Well, in that case you might as well start getting ready to become the IEA president one day." I was of course quite surprised by his comments, but his encouragement for me to contribute to IEA at a greater level indeed had a lasting effect on my future service to IEA.



Following the above events, and thanks to Hal Hendrick's mentorship, I had an opportunity to serve as HFES representative to IEA Council during his IEA Presidency (1991-1994). I had also the privilege of serving in the same capacity during the 1994-1997 term. Next, I was appointed as chair of the Promotion and Publication Committee and became a member of the IEA Executive Committee (1994-1997) during the Presidency of Martin Helander. It was during that time that I established the first IEA website and secured the design of the new IEA logo that was developed by my colleague, Professor Jerzy Grobelny, and his students at the University of Technology of Wroclaw, Poland. This logo is still used by IEA today (i.e. 2017). Finally, I served as Secretary-General (1997-2000) during the Presidency of Ian Noy.

As incoming president, I set forth the following main objectives, reflected in the IEA mission and newly defined strategic goals:

- To enable IEA to lead in developing the ergonomics/human factors profession and ergonomics practice globally by securing a higher level of financial resources to IEA,
- To develop a program to enhance public understanding of the meaning of ergonomics quality in design of products, work systems and services,
- To reduce "ergonomics illiteracy" by facilitating the development of educational programs in ergonomics/human factors,

- To promote and facilitate the development of ergonomics worldwide,
- To validate and restructure the *IEA Basic Documents* in order to reflect the IEA approved rules, policies, and operating procedures that had been continually evolving (with a significant level of inaccuracies, contradictions, and language inconsistencies) over the 30+ years prior to my election.

In this Chapter, I provide an account of the main challenges and accomplishments of the IEA Executive Committee and IEA Council during my Presidency (2000-2003). I am pleased to say that while meeting the above goals was quite challenging, and we have not succeeded in realizing them fully, working together with the IEA Executive Committee, the Council and various IEA committees, our leadership team has made significant progress on several fronts. I was honored to work with very committed and talented individuals, including other elected IEA officers, Pierre Falzon (France), Secretary-General, Kazutaka Kogi (Japan), Treasurer, and Ian Noy (Canada), Past-president and Chair of Awards Committee, as well as members of the Executive Committee who accepted my invitation to collaborate with us. These individuals were Klaus Zink (Germany), Chair of Policy and Development Committee; John Wilson (U.K.), Chair of Professional Standards and Education; Ken Laughery (USA), Chair of Science, Technology and Practice Committee; Michael Smith (USA), Chair of Communications and Public Relations; Pat Scott (South Africa), Chair of Industrially Developing Countries Committee, and Andrew Marshall (UK), Editor of IEA Newsletter (ex-officio), Min Chung (Korea), Chair of 2003 IEA Congress, Seoul, Korea (ex-officio).

Our collaborative leadership at IEA was guided by the *IEA Strategic Plan*. In addition, through the work of the IEA Policy and Development Committee, chaired by Klaus Zink (Germany), we developed an Action Plan (2000-2003), which allowed us to translate our strategic goals into specific activities. As a result of the above, and following the main objectives I set for my Presidency, together we have:

1. Launched a successful IEA Campaign for Development, and reinvigorated the IEA Sustaining Membership Program
2. Developed a framework for the IEA Ergonomics Quality in Design (EQUID) Certification Program
3. Designed a framework for facilitating development of educational programs in ergonomics/human factors worldwide
4. Promoted development of ergonomics worldwide
5. Validated and restructured the IEA Basic Documents ("IEA constitution")
6. Established IEA Archives at CNAM, Paris (France) and secured operation of IEA Office.

### IEA Campaign for Development and Sustaining Membership Program

One of my first observations after becoming president was that, while the IEA Officers, chairs of the Standing Committees, Council members, and various IEA committee members donated considerable time and effort on a voluntary basis, significant financial resources were still needed to accomplish the IEA long-term initiatives and sustain our daily operations outside of the fees paid to IEA by our member societies. Therefore, in coordination with Kazu Kogi, IEA Treasurer, we launched the *IEA Campaign*

for Development with the original goal of securing \$100,000 on a three-year cycle (\$33,000/year). Through the invigorated *IEA Sustaining Membership Program*, we were able to generate a total of \$82,800 of total support. This amount included in-kind services valued at \$5,000/year provided to IEA by ErgoWeb, Inc., which hosted and managed our IEA website ([www.iea.cc](http://www.iea.cc)). The total amount of outside support was close to the annual membership dues we were receiving from the IEA member societies. Compared to the end of fiscal year 1999, by the end of my Presidency in August 2003, total IEA assets had grown by 31.5%. It should be noted that between 2000 and 2003 we also increased the IEA membership from 36 to 40 national societies.

### IEA Ergonomics Quality In Design (EQUID) certification program

Early in my academic career, I noted the ever growing proliferation of claims (often not validated) for “ergonomically designed” products and systems that appeared in a variety of magazines, trade journals, and websites. Given the scale of this phenomenon, towards the end of Ian Noy’s Presidency, I proposed to the Executive Committee for IEA to take a more active role in assuring that the public at large was well-informed and educated about the value of ergonomics and that it understood the premise and benefits of human-centered design. After the elections of 2000, during our first lunch together in San Diego, California, I shared this idea with Pierre Falzon who from the very beginning was my partner in this undertaking and who played a significant role in advancing the concept and developing the future framework of this new program. Consequently, we started our work developing foundations for *IEA Quality Ergonomics Design (QED) Certification* program and reported our work in the Executive Committee document dated March 15, 2001. Subsequently, two subcommittees were formed:

- 1) *QED Subcommittee (QED-S1): Criteria for Assessment of the Design Process for “Products”* (composed of Pierre Falzon and Waldemar Karwowski (Co-Chairs), Ken Laughery, Andy Marshall, Mark Porter, Ian Noy, and Martin Helander), and
- 2) *QED Subcommittee (QED-S2): Criteria for Accrediting the QED Certification Body* (composed of Ian Noy and Klaus Zink (Co-Chairs), B. Beith, Hal Hendrick, Peter Budnick, Pierre Falzon, and Waldemar Karwowski). This effort was later renamed the *IEA Ergonomics Quality in Design (EQUID) Certification Program*. I would like to note that it was Pierre who came up with the acronym “EQUID” during one of our early Executive Committee meetings.

We started this new program on the premise that *EQUID* would be of great benefit to IEA in order to enhance the public understanding of the meaning of ergonomics in general. We also envisioned that such a program would have a profound impact on the implementation of ergonomics principles in practice, and could help the public make informed decisions about the value of ergonomics in the design of products, work systems, and services. As the first step, we focused on defining the processes that could help organizations design consumer products according to accepted ergonomics knowledge and methods. IEA Council formally approved development of the *IEA Ergonomics Quality in Design (EQUID) Program* in Florence in September 2001, and a Core Working Committee (EQUID Committee) consisting of Pierre Falzon, Klaus Zink,

Ian Noy and myself as Chair was formed. The EQUID Committee held its first meeting on November 17–18<sup>th</sup>, 2001, in Kaiserslautern, Germany, hosted by Klaus Zink. Two draft documents were developed:

- IEA Criteria for Accrediting Ergonomics Quality in Design (EQUID) Certifying Bodies
- IEA Certification for Ergonomics Quality and Design (EQUID) Program: Part I - Process Requirements for Product Design

Two other working meetings were held in March and May 2002 in Paris (France) hosted by Pierre Falzon. The EQUID Committee also met again on February 6–7<sup>th</sup>, 2003 in Kaiserslautern, Germany. We have further advanced the development of two draft EQUID documents above, and discussed the potential application for accrediting EQUID program by the European Accreditation Forum (Foundation). An implementation schedule and future organizational framework for the EQUID Certification Program were also discussed. The IEA Council has formalized the status of the EQUID Committee as the IEA Standing Committee at its meeting in Seoul, Korea in August 2003. For more information about EQUID program developments after 2003, please see a chapter by Ralph Bruder in this volume.

### Development of educational programs in ergonomics/human factors and promotion of “ergonomics literacy” worldwide

Enhancing ergonomics education worldwide was another one of the main objectives of my Presidency. Through the work of the *IEA Professional Standards and Education Committee*, chaired by John Wilson (United Kingdom), we developed an online *Directory of Educational Programs in Human Factors/Ergonomics* (2003). This Directory was made available to the public on the IEA website. We also originated development of the model of the *Core Ergonomics Curriculum* for the *Master’s Degree in Ergonomics* in order to assist those interested in launching new ergonomics programs in academia worldwide. In addition, on October 10, 2001, the *IEA Subcommittee on the Endorsement of Professional Certification Programs in Ergonomics* (chaired by Hal Hendrick, IEA Past-president) recommended and the Council approved the first IEA endorsement of the *CPE/CHPE Professional Certification Program* by the *Board of Certification in Professional Ergonomics* (BCPE, USA). This event occurred at the BCPE Networking Reception during the HFES Annual Meeting in Minneapolis, Minnesota. This was a culmination of the hard work by the *IEA Certification Endorsement Review Group for the BCPE Application* (chaired by Carol Slappendel of New Zealand; with Francois Daniellou of France and Elizabeth Bunker of Australia as members).

Thanks to the *IEA Technical Committee on Ergonomics for Children and Educational Environments* chaired by Cheryl Bennett, in 2002 we also supported the first successful legislative act, “Ergonomics in Education,” adopted in the State of New Jersey, USA, which endorsed the critical role of ergonomics in designing classroom environments for children. On November 22, 2002, I sent a letter on behalf of IEA in support of establishing the *Ergonomics in Education Study Commission* in the State of New Jersey that aimed to determine “how ergonomics can be brought most effectively into the New Jersey schools.”



Through the work of the *IEA Communication and Public Relations Committee*, chaired by Mike Smith (USA) we continued development of the IEA website ([www.iea.cc](http://www.iea.cc)) aiming towards enabling us to introduce an *ergonomics portal* that would serve the needs of the ergonomics community globally. We also published the IEA newsletter, *Ergonomics International*, which was developed and produced by Andy Marshal (United Kingdom). Through such efforts, we aimed to reduce “ergonomics illiteracy” around the world. In many cases, governments, institutions and the public poorly understood ergonomics. We saw a particular need and opportunity to assist decisions makers at various levels in understanding ergonomics as it relates to improving the quality of life and facilitating social progress through increasing economic competitiveness. In 2001, the Executive Committee and IEA Council also approved a new \$ 1,000 award (presented every 3 years) for the best paper published by the *International Journal on Occupational Safety and Ergonomics* (JOSE). This new award was proposed by Prof. Danuta Koradecka, Editor-in-Chief and Director of CIOP, Poland.

### Developing ergonomics profession worldwide

One of my goals as president was to promote and facilitate the development of new ergonomics societies around the world, and help the cause of the ergonomics profession and ergonomics discipline in developing countries. In 2002, through the work of the *IEA Industrially Developing Countries Committee*, chaired by Pat Scott (South Africa), we participated in the organization of the “Roving Seminar” in Namibia, Africa. Another educational initiative was the internet based long-term development project led by the IDC Committee. Its goal was to deliver distance-learning materials to developing countries that contain basic ergonomics training, yet were flexible enough to be modified to represent the unique needs and abilities of each specific developing country. To this purpose, we have also opened active communication with the several new societies in order to help them to join the IEA family in the near future, including the *Ergonomics Society of Thailand*, *Egyptian Ergonomics Society of Fitness and Disability*, *Ergonomics Society of Venezuela*, and *Ergonomics Society of Argentina*. Following one of our main objectives, on September 2-3, 2002 we organized the IEA Symposium on “Developing Ergonomics in a Developing World” that was held in Santiago, Chile. The logistical support for this Symposium was provided by the IEA Science, Technology and Practice Committee, chaired by Ken Laughery, with the financial and logistical support from the ACHS of Chile, the Chilean Ministry of Labour, *Prevencion-integral.com* of Spain, and the Chilean Society of Ergonomics. This successful symposium was the largest gathering on ergonomics in the history of South America at that time, with over 700 participants from Chile, Guatemala, Venezuela, Argentina, Mexico, Cuba, Peru, Brazil, and Panama, as well as Africa, Europe and North America. During my Presidency we also entered into a new level of collaboration as a non-governmental organization (NGO) with the World Health Organization (WHO) and the International Labor Organization (ILO). On November 13, 2000, I signed a formal MOU on behalf of IEA with the International Occupational Hygiene Association (IOHA), which was co-signed by Dr. Vernon Rose, President of IOHA on November 17, 2000. Dr. Vernon Rose and Mr. David Zalk, Executive Director of IOHA, expressed their interest

in developing strong ties with IEA. As the first step of our cooperation, we were invited by IOHA to participate in the technical program of the 5<sup>th</sup> IOHA International Scientific Conference, that was held in Bergen, Norway, June 10-14, 2002. Consequently, David Zalk who has since been elected as president of the IOHA accepted my invitation for him to be our guest at IEA Congress in Seoul, Korea, August 24-29, 2003.

That same year we received a formal letter from the ILO office in Geneva confirming that IEA has the official non-governmental organization (NGO) status with the ILO. In connection with the development of the WHO 2002-2005 Global Work Plan and their requirements for IEA to define our collaboration through specific projects, I was invited to attend the Sixth Network Meeting of the WHO Collaborating Centers in Occupational Health that was held in Iguacu Falls, Brazil, February 21-22, 2003. Since Kazu Kogi was already planning to participate in the Board meeting of ICOH, scheduled for the same place and time, he represented IEA at that meeting.

I have also communicated with Pieter Rookmaaker, President of Federation of European Ergonomics Societies (FEES) regarding activities of FEES during 2002. The formal launching of FEES occurred during the GFA Anniversary Conference in Munich in May 2003. At the end of my Presidency, the IEA Council at its August 2003 IEA Congress meeting in Seoul, Korea formally approved the membership of FEES. FEES was the first IEA Network and serves as a model for regional cooperation between various ergonomics societies under the common umbrella of IEA.

During my tenure as President, I received several invitations to visit and speak to the leadership and members of IEA member societies around the world. While, due to time and schedule constraints, I could not accept all such invitations, it was an honor for me to represent IEA at more than 15 meetings world round.

In preparation for Executive Committee’s mid-Year meetings and IEA Council meetings, the elected officers held several IEA Summit meetings. The first such Summit meeting took place in Warsaw, Poland, on October 27-28, 2000 in preparation for the start-up EC meeting held in Louisville, USA on November 10-11, 2000. Other 2001 Summit meetings were held in Paris on March 3-4, July 2-3, and September 10-11 in preparation for the 2001 IEA Council meeting in Florence. I vividly remember our first IEA Council meeting that was held in Florence, Italy on September 25, 2001, just two weeks after the terrorist attacks in the United States. This was very emotional time for all of us, with many of the Council members offering their strong words of moral support and hope for the better future. Subsequent officer Summit meetings were held in 2002 and 2003 before the Executive Committee and Council meetings. These Summits proved to be very useful for our planning of the IEA agenda for 2002-2003 period and beyond. I very much appreciated the support of Pierre Falzon (Secretary-General) and Kazu Kogi (Treasurer) in organizing these important meetings and their active engagement in our shared leadership of IEA during that time.

### Validation and restructuring of the IEA Basic Documents (“IEA Constitution”)

Towards the end of my term as IEA Secretary-General (1997-2000), I noted that many of the rules, policies or operational procedures as stated in the *IEA Basic Documents* (our organizational “constitution”) were not up-to-date. These IEA approved rules, policies

and operating procedures had been continually changing over the last 30+ years prior to my election, and suffered from significant level of inaccuracies, ambiguities, omissions, contradictions, and language inconsistencies. Therefore, a major effort was undertaken, led by Secretary-General Pierre Falzon, to validate, update, and reorganize the text of *IEA Basic Documents*. Having evolved over so many years, these documents required major rewriting to remove a multitude of inconsistencies, errors, repetitions, and outdated material, in order to assure that they truly reflected the *IEA Rules and Operating Procedures* adopted by IEA Council in the past. The significance of this tedious task cannot be overstated since the *IEA Basic Documents* served and continue to serve as the “IEA Constitution,” which specifies and communicates to the outside world who we are and how we operate.

One of the important policy issues we had been discussing with the IEA member societies was the structure of IEA membership. As President, I believed that IEA was in a unique position to embrace all other human factors/ergonomics-related organizations and bring under one common umbrella various societies and organizations that embraced the premise of ergonomics. I was of the opinion that as the Association that represents ergonomics worldwide, IEA could be more effective in fulfilling the needs of the global society by working together with other societies to design our living and working environments for the benefit of all people.

#### IEA Archives at CNAM, Paris, France

In March 2002, we have signed a formal agreement with CNAM, Paris, France, establishing the permanent IEA Archives, which now house records documenting the development of IEA since its inception in 1959. Upon the recommendation of Pierre Falzon, starting January 1, 2002 we retained Ms. Jackie Jorrot of CNAM, Paris, as IEA Executive Assistant in charge of the IEA office. We established an IEA office to manage effectively the demands of the day-to-day administration of IEA affairs. These demands, including coordination of the work of the Executive Committee, various Standing Committees, IEA Technical Committees, Council meetings, and relations with outside organizations, have grown considerably in over the years.

In summary, it was my privilege and honor to serve IEA as President during the 2000-2003 term with a sense of common purpose and shared leadership and responsibility. I am proud of what we have accomplished together during those three years. During my Presidency, I was glad to observe ample evidence of the growth of ergonomics discipline and profession worldwide. Today in 2018, I still believe, as I believed then, that our profession is in the unique position to contribute to the improvement of living conditions in all parts of the world, regardless of political or economic limitations. Such limitations are first and foremost the limitations that the theory and practice of ergonomics/human factors aims to overcome through principles of human-centered design. I do hope that, as our discipline becomes a science and practice that plays an ever-increasing role in changing world, IEA will always be in the center of those changes.

## Pierre Falzon

2003 – 2006

The achievements of a Board’s term do not rest only on the dedication of the IEA President! It results also from the activity of the other Officers and of the Executive, and from the contribution of Council members, who help in orienting IEA policies and making decisions.

Between 2003 and 2006, the elected officers were Sebastiano Bagnara (Secretary General), from Italy, and Ken Laughery (Treasurer), from the USA.



The Standing Committees Chairpersons were:

- Science, Technology and Practice (STP) Committee: Eui Jung (Korea). Eui had to resign in March 2005, due to lasting health problems. Pascale Carayon then accepted to take charge of the STP Committee on top of her assignment as Chair of the EQUID Committee
- Professional Standards and Education (PSE) Committee: Stephen Legg (New Zealand)
- Communications and Public Relations (CPR) Committee: Andrew Marshall (UK)
- International Development (ID) Committee: David Caple (Australia)
- Development (D) Committee : Jan Dul (Netherlands)
- EQUID Committee (and from 2005 STP Committee): Pascale Carayon (USA)

The past IEA President, Waldemar Karwowski, served as Chair of the Awards Committee, as per our procedures.

It is to be noted that several modifications were made to the Standing Committees. The “Policy and Planning” Committee was transformed into the Development Committee, the “Industrially Developing Countries” Committee became the International Development Committee, a new Committee (EQUID) was created.

#### Democracy and communication

In November 2003, as newly-elected President of the IEA, I received a letter from the President of the New Zealand Ergonomics Society (Don Borthwick) expressing concerns on the activities of the IEA. In particular, the NZES President wrote : “*It is a concern of mine and members of the NZES Committee, past and present, that as a Society, and as individuals, we do not receive a lot of feedback on what happens to our annual subscription to the IEA. [...] Our primary question is: What can the IEA do for the NZES and its members? Our secondary question is: “What can the NZES and its members do for the IEA?”*”

The opinion of the Executive Committee was that this letter was sending a very strong signal. The immediate action was to pay a visit to the societies of New Zealand and

of Australia to meet with the chairs of the PSE and ID Committees (Stephen Legg and David Caple) on one hand, with the societies (NZES and HFESA) on the other hand. The second effect was to reconsider the interactions between the IEA EC and the Federated Societies. It appeared that actions undertaken by the IEA were little known by the Societies, even though they had been discussed within and approved by the IEA Council. A letter was then sent to Societies' Presidents to express our concern on this issue, and discussion sessions were held during the following Council meetings to assess the expectations and needs of Societies. A synthesis of these discussions was later sent to the Societies.

One of the problems that appeared prominent was that of IEA internal democracy. We needed to have a better linkage with Federated Societies (not only with Council delegates but also with Federated Societies' Presidents) and to find ways to better understand the needs of Federated Societies. A plan of action on these issues was devised and put into action by the Development Committee.

We also decided to reshape the role of the IEA towards Federated Societies: the IEA needed to be more proactive, encourage networking between Societies (the creation of IEA networks was already a first step in that direction), and provide help for sharing of concerns and solutions.

Finally, we needed to make better use of the Council meeting itself: the idea was to spend less time on administrative matters and more time on discussing issues with Societies' delegates. We had very positive feedback on the way meetings were conducted (very much thanks to the cleverness of Jan Dul), which gave much more opportunity for delegates to actively participate, get to know each other and better understand the issues at a national level. The ultimate consequence of these actions has been the launching of the Best Practice Initiative (BPI), involving a significant number of members of the Council, aiming to prepare sessions to be held during the IEA'2006 Congress under three topics: Promotion of ergonomics in external networks, Communication within the society, Professional development of ergonomists. The aims of the BPI sessions were to allow participants to share experiences, to better specify the needs of Federated Societies and to provide useful inputs for the future work of the IEA.

#### Democracy and finances

Another aspect of internal democracy concerned attendance at Council meetings. Attendance at Council meetings is not the same for all Federated Societies. Some Societies are always represented, others hardly ever come. This has several causes: Societies may not fund their delegates travel expenses, so that some cannot come; this is all the more so when societies are small and young and when the country is not very wealthy; the choice of a location for the meeting plays a role too. The consequence is that decisions may be taken by a biased sample of IEA members.

This last issue was also related to IEA finances. The budget of the IEA rested (and still rests) essentially on dues from Federated Societies. Simple mathematics were sufficient to see that the rules we used at that time to compute these dues did not benefit small

societies and societies of developing countries. How many of the larger societies would accept to use the 20% rule (i.e. dues = 20% of their income) that is proposed for these small societies? None of course. There were two paradoxes:

- first we proposed this very taxing rule to small, newly born societies, that is to societies that were struggling to simply exist;
- second, while the IEA dues constituted a large part of these Societies' budgets, they represented a very small part of the IEA budget!

We clearly needed to revise our rules on this issue. This was finally done in 2006, using a scheme proposed by the IEA treasurer, Ken Laughery.

#### Ergonomics science: technical committees

The Executive Committee's opinion was that the IEA had to develop a more proactive scientific policy. Following this view, specific attention was given to the development of Technical Committees and to the increase of IEA-sponsored Conferences.

Concerning Technical Committees, a review of existing TCs was conducted in order to assess which would need to be revitalized, or refocused and which new TCs should be created. New committees were created:

- Gender and work (Karen Messing)
- Slips, trips and falls (Wen-Ruey Chang)
- Ergonomics in design (Lina Bonapace)
- Off-highway vehicles (R. Montanari, F. Tesauri & S. Marzani)

#### Ergonomics science: EQUID program

The objective of the EQUID program was to establish a system of certification of the design process of products. This meant first developing texts on a) ergonomics criteria of product design process, and b) accreditation criteria and processes. A number of different scenarios of implementation of the program have also been investigated. It was thought that a successful implementation of the EQUID program would have several benefits, contributing to the development of the EHF profession, by encouraging employment of trained ergonomists in design projects, and contributing to the recognition of the discipline and the profession by the general public.

The EQUID program progressed a lot between 2003 and 2006, due to the strong involvement of its contributors, notably Pascale Carayon, chair of the EQUID and STP committees, and Waldemar Karwowski, past President, who launched the program.

#### Ergonomics science: relationships with Taylor and Francis

The IEA has had a close relationships with Taylor and Francis (T&F) for many years, and more precisely since 1961, when the IEA General Assembly decided to consider *Ergonomics* as the "Official Journal of the IEA". Since then, the journal carried this mention on its cover. Taylor & Francis was a Sustaining Member of the IEA, at the Diamond level, i.e. the top category of sustaining membership.

We faced a complicated situation in 2006. This began with the decision of the IEA'2006 Congress organizers to publish the Congress plenary papers not in *Ergonomics*, as

usually done in the past, but in *Applied Ergonomics*. This decision resulted from a call for bids which was won by Elsevier. The call for bids originally only included the publishing of the proceedings, but was later extended to the plenary papers. T&F was unhappy with the result of this process and inquired about it. I interacted extensively with the IEA'2006 organizers and with the person in charge of ergonomics publication at T&F.

During this process, T&F realized that the IEA had been endorsing a number of other journals over the years (the list can be found on the IEA website). In 1961, *Ergonomics* was the only journal (in English) devoted to ergonomics. Over the years, many other journals were created, covering areas of ergonomics that were not so much addressed by *Ergonomics*. The IEA has taken this into account and has endorsed, quite naturally, these other journals, following a review process described in an IEA Policy. T&F then decided that it was no longer needed for *Ergonomics* to carry the mention "Official journal of the IEA" on its cover and informed us of this decision. Although the IEA was saddened by this decision, they acknowledge the many years of support for the IEA provided by T & F who still continue to publish *Ergonomics*.

### International development

The IEA has been collaborating with the ILO for a long time. Three important projects have been active between 2003 and 2006. They all concerned the joint publication of "Checkpoints" documents. Responsibility for these projects has rested on the Chair of the International Development Committee, David Caple. The major contribution of Dr. Kazutaka Kogi is gratefully acknowledged.

#### IEA/ILO Ergonomics Checkpoints

The first edition of the IEA/ILO Ergonomics Checkpoints, originally published in 1996, was revised for a second edition. The ILO agreed to provide funding for this revision. A workshop was held in Bali, Indonesia (in conjunction with the meeting of the SEAES) in May 2005. The purpose of the workshop was to review the checkpoints (CPs) one by one and to provide all necessary inputs (deletions of CPs, additions of new CPs, merging of CPs). This included also checking the illustrations for consistency, clarity and comprehensibility. The workshop gathered 16 attendees, among whom some of the original contributors to the first edition.

Following the workshop, year 2005-2006 was devoted to a rewriting of all CPs along the lines previously defined. Illustrations have been redrawn entirely. It is to be noted that illustrating the checkpoints is a complicated business: the artist has to consider cultural dimensions, and to "draw for everyone"...

#### IEA/ILO Checkpoints in Agriculture

In 2006, the first edition of the IEA/ILO Checkpoints on Agriculture was its final stage of preparation. A full version of the text was completed. Illustrations were drawn in Vietnam. The ILO funded a workshop, which was held in conjunction with the Indian

Society for Ergonomics meeting in December 2006. The purpose of the workshop was to assess the Checkpoints in consideration of the Indian agricultural/cultural context (the CPs was developed mostly in the context of Vietnam, Cambodia, Laos and Japan). 23 persons contributed to the workshop (plus 11 students). The workshop used the methodology developed by ILO for training people to use the documents. The output of the workshop were of two different kinds. On one hand, it allowed a number of improvements to be specified (e.g. lack or insufficient development of some topics like animal husbandry or women's work, need to take into account different climate zones). On another hand, it demonstrated the need for assessing the CPs in an African context. Contacts were taken in that respect with African colleagues.

#### More IEA/ILO Checkpoints?

The recent developments were judged very satisfactory by both the IEA and the ILO. The two organizations have discussed the possibility of developing a series of Ergonomics Checkpoints on a variety of subjects, such as Office work, Forestry, HCI, Tourism, Healthcare, etc. As a matter of fact, an IEA/ILO Checkpoints for Healthcare project was later launched.

It is to be emphasized that developing the two existing Checkpoints was possible only because of the dedication of the IDC Chair and of K. Kogi, who devoted a lot of time and effort to them. Developing new Checkpoints, certainly a very worthwhile goal, would similarly require much involvement of dedicated individuals. It would also necessitate active participation of the IEA Technical Committees.

#### Education standards

The Professional Standards and Education (PSE) Committee, chaired by Stephen Legg, had three main tasks: developing guidelines for education in ergonomics, developing and encouraging certification programs, developing the code of ethics and conduct. The contribution of the IEA for homogenizing education in ergonomics was not new. Several texts were developed in the past with that perspective. During the 2003-2006 term, the goal was the development of guidelines for Masters programs. A first draft was developed and submitted for review.

The strategy was to hold specific IEA sessions on the subject during Federated Societies' conferences. In all there were 5 workshops (APERGO/ABERGO conference 2004, UK ES 2005, NES 2005, SEAES 2005). This process has allowed the text to be improved. This issue remains a very important one. Professional certification programs rely on an evaluation of the candidates' training in ergonomics. Input from the IEA is thus very much needed.

A revision of the IEA "Code of Ethics" was undertaken by the PSE Committee. The goal of the revision was to produce a "Code of Conduct", and to end with a more concise document, better grounded in fundamental principles of beneficence (doing good), veracity (truthfulness, accuracy, integrity), autonomy (respect for persons), justice (fairness), and more clearly relevant for ergonomists rather than mainly ergonomics researchers.

### IEA communication

The Communications and Public Relations (CPR) Committee, in charge of IEA Communication, was chaired by Andrew Marshall.

The publication of the IEA Newsletter was suspended in 2005, since it was felt that it lacked a clear purpose and target. There was however a need for an IEA policy, or strategy, on communication, encompassing many targets: public authorities, international bodies, companies and the general public. The IEA had to define priorities and share the communication efforts with the Federated Societies in a concerted way. The IEA website has of course become a major tool for communicating IEA goals and activities. The IEA Roster (previously handled by the Secretary General) was maintained directly on the website, which improved homogeneity of information. The website saw a large increase in visits. The most visited pages (apart from the home page) were the IEA definition of ergonomics and the directory of ergonomics programs.

### Awards

Awards play two main roles: they acknowledge the contribution of individuals to the development of ergonomics and they provide visibility to the discipline. It was noted that there was unequal interest and involvement by Federated Societies in that matter. Some societies regularly propose names of deserving individuals, while other societies do it rarely. The reason may be in part cultural, but we felt that it might also be related to the definition of IEA Awards, which insists on international impact. Consequently, it was difficult for a Society to nominate someone who has played a major role in the development of the discipline in a specific geographic area. This could be revised, since such people make important contributions to the worldwide dissemination and implementation of ergonomics.

An extension of the K.U. Smith Student Award to support ergonomics students in developing countries was considered, this included the following aspects : helping the development of a library, or an educational program, or a student research project, or the establishment of a new ergonomics training program for students, or providing a general benefit to students.

### Reflections

#### *A half-century of ergonomics*

In 1957, a seminar organized by the European Productivity Agency was held in Leiden, Netherlands, on “Fitting the job to the worker”. During this workshop, the decision to found an international association was taken. This organization was to become the International Ergonomics Association. Thus, 2006 (the end of my term as President) was both the 50th birthday of the IEA and the 60th birthday of ergonomics. Year 2006 thus provided an opportunity to reflect on the evolution of the discipline and on the changing and diverse needs of ergonomists worldwide. In which context was ergonomics developed? Is it able to meet the social and economic needs of today? Is it still adapted to a changing world?

Ergonomics was born in western countries, i.e. countries with an industrial history, and in a post-war context of reconstruction, search for productivity and economic

growth. The next 50 years have seen major changes. Technological changes first: automation, computerization, and the digital society. Changes of production systems too: new methods of industrial production, quality management, lean production, etc. And today globalization, with its effects in terms of technology transfer and migration of jobs. These changes have had consequences both on work activities and on the demands addressed by ergonomics. Distance work, interaction work, community based distributed work have grown. Systems reliability has become a crucial issue, as well as environmental concerns and sustained development.

Simultaneously, ergonomics has expanded geographically. There are ergonomics societies in most countries. In 2006, the IEA federated 42 societies, from all continents. These societies differ in their age, number of members, membership rules and level of activity. The countries they belong to also differ widely in terms of economic development, cultures and policies. As a consequence, the type of ergonomic issues that are of interest to Ergonomics Societies vary according to countries' social and economic situations. A glance at the programs of national societies conferences provides a good picture of this diversity.

Several ergonomics societies were created in the 1996-2006 period (Mexico, Colombia, Chile, Argentina). This is a good sign, both for ergonomics and for the economics of these countries. However, the expansion of the IEA is slowing down. The main reason is that, in order for an ergonomics society to exist in a given country, its economy must have reached a high enough level of development. There is a paradox: some countries that badly need ergonomics action in order to improve working conditions and economic performance do not have an education system, an administrative organization and legal policies that allow ergonomists to be trained and ergonomic actions to take place. South Africa was in 2006 the only African country represented in the IEA. However, there are reasons for hope. An ergonomics society was born in 2006 in Tunisia; another one was about to be founded in Nigeria. Similarly, these are signs of further development in Asia and South America.

#### *A diversity of needs*

*So here is the challenge. IEA membership is diverse and the IEA must make sure it accommodates a diversity of needs: the needs of the “established” ergonomics societies, which face new issues, and the needs of young societies of developing countries.*

Considering the former, particular attention was been paid in 2003-2006 to the improvement of communication between member societies and the IEA. Three directions of improvement were set by the IEA Development Committee: improve communication within the IEA, improve involvement of member societies in IEA actions, improve awareness of Societies' needs. As explained above, this has led to the development of the “Best Practices Initiative”, the goal of which is to gather and share experiences of ergonomics societies. Several sessions of the IEA'2006 Congress were dedicated to the Best Practice Initiative. In the long run, this gave birth (in 2010) to the “Future of Ergonomics” committee (appointed by the IEA) and to the publication (in 2012) of a position paper “A strategy for human factors/ergonomics: developing the discipline and the profession”.

Developing countries are the target of the action of the Development Committee. The Committee seeks to facilitate access to ergonomics knowledge, through the development of distance learning courses and the provision of educational material. The Committee also conducts joint actions with various partner organizations at an international level, notably with WHO and with the International Labour Organization. During the 2003 - 2006 period, two joint publications progressed : the revision of the "IEA/ILO Ergonomics Checkpoints" was completed, and the design of the "IEA/ILO Checkpoints for Agriculture" manual progressed. Its publication took place in 2012. After 2006, the IEA continued working on the setting up of the "Ergonomics Quality in Design" program. The objective of this very ambitious program is to establish a system of certification of the design process of products. The program is related to several IEA goals (development of the profession, recognition of the discipline and of the profession). Hence, it is a strategic effort. It led to the publication, in 2017 (eleven years later...) of the "EQUID Design Process Guidelines". Considering all this, one observation can be made: such international endeavours require a lot of effort, involve a number of volunteers and take time. But their outputs are worthwhile for our community.

*Ergonomics: a discipline and a practice*

In 2000, the IEA adopted a new definition of ergonomics/human factors. The new definition differs in several respects from the preceding one, written in the 70s. A major difference lies in the first two paragraphs. The first paragraph defines ergonomics as a discipline in its own right (and not as a gathering of disciplines). The second one defines what ergonomists do. Thus, the definition acknowledges something that was not true originally: the existence of a profession, of ergonomists, of human factors specialists.

As a consequence, the action of the IEA must address ergonomics as both a discipline and a practice. Concerning the discipline, a proactive scientific policy has been developed by the Science, Technology and Practice Committee, leading to the creation and revitalization of IEA Technical Committees. Similarly, the creation of several IEA-sponsored conferences was proposed, notably Healthcare Ergonomics and Patient Safety, Design Ergonomics, and Education in Ergonomics.

Considering practice, during the 2003-2006 period, the Professional Standards and Education Committee completed the elaboration of a code of conduct, a text that any profession needs. The final text is grounded in fundamental principles of beneficence (doing good), veracity (truthfulness, accuracy, integrity), autonomy (respect for persons), justice (fairness). It is clearly relevant for ergonomics practitioners.

*A road map for Ergonomics/Human Factors*

My presidential address at the 2006 IEA Congress in Maastricht, Netherlands, tried to sketch a roadmap for the future, based on a constructive view of ergonomics. My main argument was that knowledge and knowledge development appeared more and more as a strategic element for both economic growth and individual and social progress.

The question for E/HF specialists then becomes: how do we design work systems so that they assist and encourage processes of knowledge production? How can we design enabling environments that contribute to human-system performance and offer a sustainable work context?

Enabling environments can be defined from three standpoints.

From a *preventive standpoint*, an enabling environment is an environment that is not detrimental to the individual and that preserves their capabilities to act in the future. In this classical view, the goal is to detect and prevent risks and hazards and to suppress task demands that result in long-term impairment or have negative psychological effects.

From a *universal standpoint*, an enabling environment is an environment that takes into account inter-individual differences (in anthropometric characteristics, in age, gender, culture, ...), that compensates for individual deficiencies (due to aging, illnesses, incapacities) and that prevents exclusion and unemployment. This is also not revolutionary, quite classical.

From a *constructive standpoint*, an enabling environment is an environment that allows people to be efficient, to enlarge their possibilities of action, to increase their autonomy, to develop new skills and knowledge. It is a learning environment for individuals and for teams.

This third standpoint is of course the most innovative one. It encourages E/HF to adopt a more proactive view. Being protective is no longer enough, is not ambitious enough. Our goal should be to devise environments that allow workers the highest efficiency and the full use of their competencies and that encourage the development of their skills and competencies.

Development should be thought of as a key dimension of constructive ergonomics. I believe this target is still valid.

## David Caple

2006 – 2009

After completing a Master of Science in Ergonomics at Loughborough University in the UK, I was working in Sweden with a fellow graduate when I had the opportunity to represent my home country Australia, at the 1980 IEA Council meeting in Oslo, Norway. My wife, Nancy and I drove from Stockholm in our little Volkswagen and set up our tent at the Holmenkollen camping ground in Oslo. We were welcomed by the IEA Secretary General, Harry Davis and we hosted an IEA party at our tent. Harry became a good friend and invited us to come to Rochester, USA to work with him at Eastman Kodak. Harry encouraged me to continue my IEA involvement which I did alongside Margaret Bullock and Roger Hall, as the delegate for Australia and in 2006 I was elected as the 16<sup>th</sup> IEA President in Maastricht. This friendly welcoming approach from the IEA members influenced the achievements during our term.



Having the great role model of the previous President, Pierre Falzon, the transition to develop a new executive committee was fast tracked and fun. Pierre continued to support us as the Past President and Chair of the IEA Awards committee. Pascale Carayon was elected as Secretary General and Min Chung was elected as Treasurer. Pascale in particular, did a wonderful job juggling the many demands of this role and my endless emails with new ideas and opportunities for us to explore. Her election as IEA Secretary General was the first time a woman was elected to an Executive role for the IEA. Our executive committee included Halimahtun Khalid (Science Technology and Practice), Jan Dul (Development), Lina Bonapace and Ralph Bruder (EQUID), Tom Smith (Professional Standards and Education), Marcelo Soares (International Development) and Sheng Wang (Chair IEA Congress, 2009). We were a wonderful team and it was a privilege to work together for the three year term.

During our term in office, the team worked on developing a range of initiatives that have already been initiated by previous executives such as EQUID, and supporting the IEA Congress preparations in Beijing, China in 2009. The Council members were very engaged with the IEA during our term and attendance at the annual Council meetings was around 50 to 60 delegates. My thanks to the Societies who hosted these meetings during our term. These were HFES at Liberty Mutual in Boston, USA in 2007 and the Icelandic Society at Reykjavik in 2008, as well as the Chinese Ergonomics Society in Beijing in 2009.

A major achievement was the formal registration of the IEA in Switzerland. This required an extensive administration process and a legally driven project to obtain

the necessary approvals to register the IEA as a Not for Profit Association. Prior to this registration the IEA had bank accounts in Canada and an advertised mailing address with the HFES in the USA, however, we had no formal registration in the world. Many thanks to the Swiss Ergonomics Society for their guidance and support to achieve this outcome.

This term saw further growth in the membership of the IEA. During the 2006-2009 period, four societies were accepted as federated societies. These were:

- Ecuador - Asociacion Ecuatoriana de Ergonomia (AEERGO)
- Latvia - Latvijas Ergonomikas Biedriba
- Indonesia - Perhimpunan Ergonomi Indonesia (PEI)
- Tunisia - La Société Tunisienne d'Ergonomie

During this period we also welcomed one society as an affiliated member:

- Nigeria (Ergonomics Society of Nigeria ESN).

The activity from the Ergonomics Societies in South East Asia continued to grow with each country developing their own independent Society, as well as supporting a regional network of Societies. Applications for the 2009 Council meeting were approved from:

- Ergonomics Society of Singapore – ERGOSS
- Ergonomics Society of Thailand – EST

An application was also approved for a new regional Network:

- South East Asian Network of Ergonomics Societies - SEANES

It was evident that the basis for Society membership varied between countries. Some Societies were open to all who were already qualified and active researchers or practitioners in ergonomics. Other Societies were open to all who were interested to participate in the professional development programs offered by the society, but may not be fully qualified in their studies of ergonomics. This prompted the IEA to consider further debate on who should be called an “ergonomist” and what process should be used for international consistency. During 2007, there was extensive consultation on the definition of an ergonomist and specifically a certified ergonomist. This debate highlighted the various types of ergonomists that can be defined depending on their interest in education, research or practice. The definitions adopted in relation to these were:

- “an Ergonomist is an individual whose knowledge and skills concern the analysis of human/system interaction and the design of the system in order to optimize human well-being and overall system performance”.
- “an IEA Recognized Certified Ergonomist is a professional ergonomist whose practice and training have met the quality criteria set by an IEA endorsed certifying body”.

The number of countries who offered a Certification program for ergonomists also grew. The Professional Standards and Education committee approved an endorsement for the:

- Japan Ergonomics Society Certification Program For Professional Ergonomists
- Board for Certification of New Zealand Ergonomists (BCNZE)

Certifying bodies that had been previously accredited by the IEA included:

- Australia (Certification for Professional Ergonomists - CPE)
- Europe (Committee for Registration of European Ergonomists – CREE)
- United Kingdom (CIEHF)
- United States (BCPE)

The Code of Conduct was agreed at the Council meeting in July 2006. This has subsequently been added to the IEA website and adopted by individual ergonomics societies. This was an important initiative for all Societies to adopt, particularly if concerns of professional conduct were raised in relation to Certified Ergonomists. During the term, this was used when one ergonomist was referred to the IEA as a result of potential misconduct.

I was concerned about the sustainability of ergonomics education at the post graduate level during our term as we had heard of so many courses in ergonomics ceasing, particularly in established universities in developed countries. Without continued university courses in ergonomics, the future of the science will be at risk.

The key focus areas during our term were aligned with the IEA Strategy developed under Ian Noy's presidency. These included:

### Inclusiveness

There was a focus on ensuring that all members of IEA Societies feel included in all the IEA has to offer and to identify as part of the "IEA family". It was evident that members primarily identify with the Society in their country to whom they pay their dues. They often perceive the IEA as an Executive Committee who run the international association. One of our goals was to make every member of a Society identify that they are also part of the IEA family. During the term of office, I had the opportunity to visit 25 countries to represent the IEA and to support conferences and meetings of the local Societies. This enabled an opportunity to make all members feel they are part of the international scene through the IEA. It was wonderful to see the interest in the IEA and ergonomics specifically from Ministers of Government, Senior Government officials and University leaders who joined the meetings with the IEA President. I found if the IEA President attended the local Society this provided a lever to encourage high level officials to also attend and learn more about ergonomics globally, as well as in their own country. We particularly were keen for students and members from developing countries to have every opportunity to participate in IEA meetings and conferences. This involved provision of financial support from the IEA, as well as specific support from member Societies in developed countries to members from developing Societies. Communication directly to Society members from the IEA was made a priority. A

monthly emailed IEA Newsletter was initiated during the term, and every month provided an opportunity to share news and events from member Societies. It also included support to Societies impacted by national disasters such as fires, floods, tsunamis and university shootings. The mutual support and understanding from the IEA members provided a family sense of solidarity. The links created between Society members enabled a great sense of a global community through the IEA. The focus on digital communication enabled frequent and direct communication with member societies, technical committees and external parties.

A complete redevelopment of the IEA website was undertaken to enable Society members, as well as members of the community to have a broad understanding of the IEA activities across the world. With assistance from Alan Hedge at Cornell University, USA we added access to educational materials on ergonomics, as well as case studies for all to freely use. Each IEA Technical Committee was encouraged to add details of current topics and research to assist in sharing knowledge.

### Participation

Opportunities to link the IEA into a broader global agenda were optimized during this term. Feedback was received early in the term from the International Labor Organization (ILO) and World Health Organization (WHO) that the IEA is just one of many professional based international associations who wish to engage directly; however, greater impact can be achieved through joint collaboration with other associations. As a result, a Memorandum of Understanding was signed with the International Commission on Occupational Health (ICOH) and the International Occupational Hygiene Association (AIOH). This resulted in the Presidents attending each other's major conferences and providing a presentation on their respective association and their current key issues to their members.

The three associations were invited to sign the ILO / International Social Security Association (ISSA) Seoul Declaration in Korea in 2008, on behalf of all OHS related disciplines.

Direct funding was provided to the IEA from the ILO to host two separate workshops for the development of new Ergonomics Checkpoints. Professor Kazutaka Kogi facilitated one workshop in Bali, Indonesia and another in Kuala Lumpur, Malaysia to develop new checkpoints for manufacturing and agriculture respectively. The ILO funding enabled a participative ergonomics approach for the workshops involving members from developing countries. We were also grateful to Dr Khi and Dr San in Vietnam for the illustrations for these publications.

To retain the NGO accreditation for the WHO, the IEA submitted a range of projects to contribute to their research objectives. These mainly related to tools suitable for non-ergonomists to use for assessing musculoskeletal disorders. Ralph Bruder represented the IEA at the WHO World Assembly as part of our support for their research program. One initiative proposed to the WHO during the period of Avian Influenza and SARS in Asia was to provide facial anthropometric data of the Asian



population for use in the design of face masks. Whilst this was a practical resource that could be provided to manufacturers, the WHO finally decided not to proceed due to the potential for commercial suppliers to claim their product was endorsed by the WHO. Future opportunities to directly link ergonomics research findings into public health challenges should continue to be a priority for the IEA Technical Committees.

A close partnership was also established with the International Organization for Standardization (ISO). The involvement of IEA Technical Committee members in relevant Standards committees was discussed in Geneva as a way of integrating ergonomics research into Standards. Arrangements were made for ISO TC 159 to host their annual meeting at the IEA 2009 Congress in Beijing to enable closer collaboration between the IEA and the ISO.

Connections were also established with the International Committee of Societies of Industrial Design (ICSID) to promote ergonomics as an essential research area in industrial design. This provided an opportunity for promoting each other's conferences as part of an informal partnership.

The partnership between the IEA and Liberty Mutual established by Ian Noy continued with the annual award for ergonomics research. A marketing company in Canada was engaged by the IEA to assist in the promotion of this award. This resulted in an increase in the number and diversity of applications for the award. The opportunity to continue our close links with Liberty Mutual assisted the IEA to use their funding to promote excellence in ergonomics research.

The IEA Technical Committees (TCs) reflected the changing diversity of ergonomics over the three years. Like all volunteer based organizations, the sustainability of the TCs was a reflection of the passion and commitment from their leaders. As some TCs ceased to be active, others were emerging. Due to the leadership of the STP Chair, Halimahtun Khalid, there were five new Technical Committees formed and three TCs, that were no longer active, were disbanded. Halimahtun worked tirelessly using her extensive international connections to form these new TCs.

A further example of the IEA family approach was to promote membership and participation in IEA TCs to all, and not just the research leaders. This approach was to encourage students and new graduates to join international TCs to network and learn from the global leaders in their fields. This open participation in the TC processes was another example of our inclusiveness approach.

Tom Smith and the Professional Standards and Education Committee developed a range of resources for the Societies to use. These included the overview of a one year post graduate education program for use by Universities to benchmark their ergonomic program. They also developed the accreditation requirements for a university to cover. This included the technical and practical course content areas. This sub-committee reviewed the IEA document relating to "Guidelines on the minimum specifications for a Master's Degree in Ergonomics / Human Factors (including guidance about distance learning)". This debate focused on the need for education programs to be appropriately structured and conducted to produce a range of competencies from the graduate. Consequently, the inputs to the program varied depending on the educational stream within which the program is conducted.

The IEA Council identified that the major requirement for support from the IEA would be for developing countries or courses seeking external support. There are many well established courses around the world which currently provide excellent educational outcomes without seeking guidance from the IEA.

The concept relating to the IEA accrediting organizations that assess the educational programs conducted by universities around the world was discussed by the IEA Council. It was agreed that the IEA itself does not have the resources nor capability to independently accredit every education program that was listed on the IEA website. However, each Society was provided the resources for developing their own accreditation programs as well as certification programs by the IEA during this term. The University of Nottingham freely provided the content of their Distance Learning program to the IEA to use as the basis of an international resource for developing countries. The Portuguese Ergonomics Society continued to assist the IEA by translating these materials from English to Portuguese. The plan was to make these materials available for Portuguese speaking countries in Africa such as Mozambique. However, the program was stalled due to lack of resources in Africa at the time.

The IEA continued to support and promote those journals who seek endorsement due to their focus on publishing research relating to ergonomics and human factors. The Science Technology and Practice committee selected 13 journals that were endorsed by the IEA. All these journals were profiled on the IEA website. Agreements were made for the publishers to highlight key articles on the IEA website as a way of promoting ergonomics research. The publishers of the journals provide a discounted subscription rate for all members of IEA federated societies as an additional benefit for their membership.

The IEA welcomed Elsevier as a Diamond Level Sustaining Member in 2007. They also were the successful publisher who provided interest in publishing the keynote addresses for the IEA 2009 Congress. The IEA Council also agreed that other publishers would be welcome to negotiate with the Chinese Congress Committee to select, and publish, follow up research papers from those presented at the Congress. Lina Bonapace and Ralph Bruder continued to conduct EQUID workshops in Europe to define the key process steps to ergonomics design. The drafts of this document were circulated to the Council members for feedback, and the opportunity to revise and promote the EQUID resource into the public domain was explored.

### Ergonomics – future challenge

In my travels over the three years, I became aware of the diversity in ergonomics methodologies, areas of application, and methods of assessing sustainable impact. This diversity of our multidisciplinary science brings the strength of adopting methodologies that reflect excellent research in developing theoretical basis to our scientific understandings. It also adopts methodologies which reflect the needs within the areas of application and practice to provide the desired outputs of improvements to human wellbeing and systems performance. Diversity within the Executive remains an ongoing challenge. Although Pascale Carayon was the first woman elected to an IEA

Executive there has yet to be a woman elected as IEA President and the majority of EC members are male. Encouragement for greater diversity within the leadership of the IEA is required to ensure the goals of inclusiveness can be achieved.

One of the underlying challenges for the future related to managing the overall framework that encapsulates the ergonomics approach to addressing workplace, and community issues. One aspect of confusion about what is ergonomics from those outside of our domain who I met in my international travels, appeared to be an unclear framework or foundation of what constitutes an ergonomics approach to research and practice. I met a Minister of Labor in a large developing country when we attended a local ergonomics conference together. Her comment afterwards reflected her lack of clarity in how she would employ and use ergonomists in her government department. She was provided with such a wide range of ergonomics applications in the conference presentations she had difficulty having a clear picture of when and what an ergonomist would do. This remains as an ongoing challenge when we want to describe ergonomics to others in a simple description that is meaningful.

The Development Committee under Jan Dul conducted surveys with all Societies to understand the maturity of ergonomics in their country. Workshops were conducted at IEA Council meetings to better understand the needs of the Societies, and how the IEA family could work together to support each other. These programs formed the foundation for the important Future of Ergonomics project led by Jan Dul under the next executive with Andy Imada. This was one of the most important documents to be produced through the IEA. It forms the basis for understanding the future opportunities and challenges in ergonomics research and practice.

As an international body that celebrated the 50th Council meeting in Reykjavik, Iceland in 2008 we are relatively young compared to many of our fellow scientific societies. However, I left my term as IEA President with a great sense of confidence and hope that together the IEA family will continue to grow and prosper.

## Andrew S. Imada

2009 – 2012

Serving as the 17th President of the IEA was a richly rewarding and humbling experience. This provided a unique opportunity to see the discipline of human factors and ergonomics from a different scale. It is awe-inspiring to know how much we contribute to this world through our science and practice. The earthquake in Christchurch, New Zealand and the tsunami and subsequent nuclear events at the Fukushima facility in Japan served as good examples for the needs we can fulfil and the work that has to be done. At the same time, it was encouraging to see the kind of work that people are doing and the progress that we are making in improving our world and contributing to a better human condition. This position provided a good vantage point to see the massive needs and impressive progress. Having the luxury of visiting federated societies, participating in numerous conferences and meeting many great people gave me a different appreciation of who and what our field is about.



### The team

What has been most striking is the quality of people in our field and their dedication to their national ergonomics societies and the IEA. The Executive Committee members included: Eric Ming Min-yang Wang, Vice President and Secretary General; Klaus Zink, Vice President and Treasurer; Ralph Bruder, Chair of Development and Promotions; Yushi Fujita, Chair of Professional Standards and Education; Karen Jacobs, Chair of Science Technology and Practice; Barbara Silverstein, Chair of International Development; David Caple, Immediate Past President and Chair of Awards Committee; and Marcelo Soares, Chair of the 2012 IEA Congress. This team was a great role model of skilled and generous professionals working together to accomplish a common goal. Their responsiveness to tasks and hard work was inspiring. I particularly appreciated David Caple's sage and reliable advice. His calm experienced hand had positive effects on our team. I also benefited from many of the past presidents who shared their wisdom about matters both general and specific. I am particularly grateful for the current leadership's contributions of their talent, time and treasure. The generosity of these leaders, their employers and their families becomes clearer when you realize that the officers and several subcommittee chairs took care of their own travel expenses during the entire term. This allows the lion's share of expenditures to be spent by the Standing Committees where most of the IEA's work is done.

### Accomplishments

The Executive Committee, the IEA Council of member societies and individual societies contributed mightily during this time. However, I was particularly proud of six accomplishments during our executive term.

1. *The Future of Ergonomics White Paper* represented a landmark step for IEA to take a strategic stance in addressing our field moving forward. We are deeply indebted to Jan Dul for his role in leading a talented team that included: Ralph Bruder, Peter Buckle, Pascale Carayon, Pierre Falzon, William Marras, John Wilson and Bas van der Doelen. Jan led this wide range of professionals through a participatory process that gave us a unique perspective of our future. This became a priority after our first Council meeting in Bruges, Belgium. Soon afterward, I asked Jan Dul to take on this challenge. I knew that he had the unique skill set and perspective to take on this herculean task. We budgeted for this project and he and the team came through with a work product that was eventually published in the *Ergonomics Journal* and later highlighted at a keynote session at the IEA Congress in Brazil. Having a strategic vision for our profession was a bold, but necessary, venture into our future if we hope to be relevant to the rest of the world. Without it, we would be bound to work at a tactical level without any overarching vision of who we are as a profession and how that vision interacts with the world around us. Subsequent executive teams followed up with actions to flesh out this vision of our future at IEA executive council meetings and through national society activities.

2. *Reach out to IDC's*. One of the focal points of this executive was to reach out to IDCs, where we believe ergonomics can have the biggest impact for people who can benefit the most from our discipline. We began a lighthouse project with coffee bean harvesters and coffee bean growers, this demonstrated the value of ergonomics, particularly in Industrially Developing Countries (IDCs). IEA's collaboration with industry and university partners, Nicaraguan farmers and workers provides a framework for moving forward to create greater visibility and to practice our discipline. Klaus Zink was instrumental in securing funding and creating a communication network for this project. With his understanding of research, ergonomics and external organizations, he was able to fund this project. A team of researchers, led by Barbara Silverstein, made several trips to Nicaragua to engage coffee bean harvesters in a participatory project to redesign the work and equipment of the workers there and conduct physiological and perceptual measurements of the results of their redesign. Through the efforts of Klaus Zink, we were also able to support the work of Suman Singh, the Liberty Mutual Award winner, in using ergonomics to improve the lives of women working in rural India. This funding through the John Deere Foundation helped to sustain follow-up work for several years.

3. *IEA's legal Registration*. Our registration in Zurich has proven to be challenging in several respects. One requirement was to re-write our IEA Rules to conform to Swiss standards for not-for-profit tax status. A diligent review committee, led by David Caple, did a complete update of our rules. This was a time-consuming task that required skill, cooperation and patience from several key leaders. We are indebted to them for their great service.

The IEA managed to gain visibility around the world. Thanks to the work of dedicated professionals over many years, the IEA sponsored and/or released the following publications:

- Ergonomic Checkpoints (ILO/IEA, 2010)
- Ergonomic Guidelines (IEA/ICOH, 2010)
- Ergonomic Checkpoints in Agriculture (ILO/IEA, 2nd Edition 2011)
- Handbook of Ergonomic Quality in Design (IEA, 2012)

The IEA also began its work on Human Health Care. I was first approached about this opportunity by Professor Tachi from the Human Ergology Society (HES) when I was first elected in 2009 in Beijing. The HES and Kazutaka Kogi's team worked on a checkpoints document to address the work of caring for people, not only in hospitals, but in many other venues that take into consideration the full range of human needs. This was a prescient position given what we have since we learned about human well-being and health care. This document continues the strong IEA tradition of checkpoint publications, which when taken together, form a family of tangible products that have a distinct IEA brand. The IEA is deeply indebted to Kazutaka Kogi for championing this format for many years and bringing it to the IEA.

We also increased our visibility online through our Good Practices Database. Yushi Fujita, who chaired the Professional Standards and Education Standing committee, reinvigorated this subcommittee to disseminate good ergonomic practices for educational purposes. There were several databases around the world at universities and different websites. Integrating these databases and making them available online was an important contribution.

The IEA was also more visible through its participation with member societies. IEA Executive Committee members and representatives made 36 visits or virtual video greetings to federated societies and partners over the 27 months of this term.

5. *IEA's visibility*. We began working with the Japan Ergonomics Society (JES) to upgrade our information technology infrastructure. In 2011, we experienced a breakdown of the IEA website security on two separate occasions and lost our domain name temporarily. This was partly the result of a fragmented IT infrastructure. JES's proposal consolidated website functions, communications and archiving IEA information and was an important first step for creating a professional and scalable information system. We were extremely grateful to the Japan Ergonomics Society's generous offer for a long-term nine-year commitment to this effort.

6. *South America*. This executive term culminated with the first IEA Congress held in the South American continent. Together with our partners in ABERGO and ULAERGO, we held our world congress in Recife, Brazil in February 2012. The Congress Organizer, Marcelo Soares, and our Science Technology and Practice Chair, Karen Jacobs, put together an excellent program that showcased ergonomics to the rest of the world.

The organizers overcame unusual challenges when the venue was changed by the local authorities and adjustments had to be made to accommodate this dramatic shift. We appreciated the efforts that Marcelo Soares and his team implemented to overcome these local challenges. In addition to being the first meeting in Latin America, the congress introduced changes and innovation that were fitting for an international body such as ours. For example, being in the southern hemisphere, holding the congress in February as opposed to the typical summer dates in the northern hemisphere was a change. Having meetings start in the late morning or early afternoon and extending well into the evening was a good exposure to a different work rhythm for many of us who were accustomed to starting early in the morning. Delegates took advantage of this opportunity to have more leisurely mornings together over extended breakfasts and discussions over coffee. In retrospect, it was a great international experience. The Brazilians were outstanding hosts and showed us how their congresses and parties differed from the rest of the world. We were treated to experiencing Carnival in Brazil!

The Congress also gave us a chance to honor the recipients of the IEA Triennial Awards:

- Pascale Carayon, IEA Distinguished Service Award
- Hal Hendrick, IEA Ergonomics Development Award
- Raja Parasuraman, IEA Outstanding Educators Award
- Kamiel vanWonterghem, IEA Award for Promotion of Ergonomics in Industrially Developing Countries
- Ernst Koningsveld, IEA President's Award
- Baiduri Widanarko and Riley Splittstoesser, K.U. Smith Student Award

We recognized the individuals who were awarded Fellowship Awards at the World Congress: Jörgen Eklund, Frida Fischer, Valerie Gawron, Roger Haslam, Wendy Macdonald, Clas-Håkan Nygård, Eric Min-Yang Wang.

### Challenges

Internally, we faced challenges on increasing partnerships through sustaining memberships. Aside from the financial benefits, sustaining memberships represent a value proposition that has yet to be fully realized. We did not make the progress that I hoped for with the IEA office and banking infrastructure. The office function remained dependent on individuals and is difficult to administer sustainably. Finally, our Swiss registration brought unforeseen challenges that we were able to overcome. However, this would have been difficult without help from our German society (GfA) and our German-speaking officer, who had the time and resources to deal with the requirements from Zurich.

Externally, the IEA and our profession faced several opportunities and threats that are common to the rest of the modern world. First, as many federated societies noticed, our memberships are maturing and recruiting new members will be key to maintaining our vitality. Recruiting new members and societies is necessary to move forward in the future. Second, specialization has led to a fracturing of the discipline and loss of

focus on our systems perspective. Our multidisciplinary heritage makes it a challenge to maintain an identity; specialization can further erode this identity. Finally, the rate of change makes it imperative for us to continue to adapt and find new ways of solving human and system problems quickly and effectively.

### Our future

Our identity as a discipline and ability to contribute meaningfully to the world are aptly summarized in the Future of Ergonomics White Paper. The systems perspective is a unique feature to our profession. Another unique feature is that ergonomists change the environment to fit the human through design. Finally, there is a focus on improving human well-being and overall performance.

Hal Hendrick, who was a great mentor and leader to many of us, argued tirelessly that no one is better equipped than we are to simultaneously improve the human condition (e.g. health and safety, satisfaction, pleasure, learning, personal development) and system performance (productivity, efficiency, quality, innovation, flexibility, (systems) safety, reliability, sustainability). While many others do similar kinds of work; these features make our work unique.

Just as our organization is in mid-life, so too it appears are many of us in the field. If demography is our destiny, we may be a declining professional organization. Attracting younger, more diverse professionals into our field, applying our science to new arenas, creating new paths, reducing resistance, and mentoring are ways we can increase ergonomics' appeal and breadth. Our nominations to council, the awards we give, the students we accept, or the protégés we mentor should be chosen with the future in mind. This may not be the best researcher, or most traditional model, and may not even fit our current conception. To meet future demand, our ideas must meet the future's requirements. As strategic leaders, our sights need to be set on a future that is better than the one we are already destined to have.

This is a broad international perspective of the field, its historical record, official positions and current developments, particularly during the 17th executive term from 2009-2012. Compared to more traditional disciplines, we are a relatively new multidisciplinary field. But it is a field populated by talented, good people with whom I am proud to share my professional identity.

## Eric Min-yang Wang

2012 – 2015

### **Keep Our Youngest Brother and Sister Growing**

In this article, I am going to briefly share with you the messages I received from IEA federated societies that I have contacted during the past nine years, particularly the societies from the industrially developing countries (IDCs). I will also highlight some needs from those societies. Hopefully, more efforts and resources could be used to help our younger brothers and sisters grow and all the IEA federated societies could become ergonomics developed societies. I'll begin with my first encounter with IEA then talk about the messages from IDCs.



### **My First Encounter with IEA**

My very first encounter with International Ergonomics Association was in the IEA Triennial Congress of 1991 in Paris. I went to Paris from Sweden as a doctorate student with my family.

To me, a naïve PhD student, the IEA Triennial Congress in Paris was a huge event. I attended the Congress everyday throughout the program until the closing ceremony. My impression was: "Wow! So many participants! So many sessions! The proceedings is so thick and heavy! How do the organizers manage to organize such a complex congress? This IEA Congress is different from other smaller conferences I've attended, ..., etc." That was my first encounter with IEA and I was probably the only participant originally from Taiwan.

Not surprisingly, at that time, I had very little understanding about IEA and knew only a very few colleagues in this important international ergonomics organization! Since then, along with my academic career, through attending and hosting international ergonomics conferences, as well as interactions with international academia, I became more and more acquainted with IEA and the IEA family members.

In addition, my colleagues in Taiwan realized that we needed a local ergonomics society to play the very important role of promoting ergonomics locally. Early in 1993, Ergonomics Society of Taiwan (EST) was founded and, as a founding member, I was elected council member, and later, executive council member, president, and I am now the supervisory board member.

EST joined IEA as a Federated Society in 1995. In 1996, I attended my first IEA Council meeting as the council member for EST in Breckenridge, Colorado, USA. This opened my increasing involvement with IEA activities.

### **Support Ergonomics Development in IDCs is Important**

Serving as IEA Vice President and Secretary General from 2009 to 2012 as well as the President from 2012 to 2015 has given me an excellent opportunity to look at and think about the global ergonomics community and its development. This is certainly linked with the ergonomics needs and the accompanying issues in various countries and regions.

As noted in the IEA history, the foundation of early ergonomics societies and the IEA was from European countries, US, and Japan. It was not surprising that there wasn't any ergonomics society from IDCs in the early days when IEA was founded. For years, promoting IEA membership is always one of the important policies for the presidents and it has been carried out quite well. As more ergonomics societies from the IDCs are joining the IEA, the IEA family keeps growing stronger.

In the past nine years, IEA has approved six new federated societies as members, i.e., Malaysia, Nigeria, Peru, Thailand, Uruguay, and Venezuela. During this period of time, I have travelled to many countries, visiting IEA federated societies, attending their annual conferences and related activities, giving them strength and support as much as possible. Through interactions with local ergonomics societies and researchers, professionals, practitioners, and participants of the events, I found that, in addition to some of the common ergonomics needs and issues, those of different countries and regions are quite different and needed us to pay more attention to providing support. In reality, taking care of all the needs by the IEA is not easy, if not impossible, but creating a supportive condition that gives encouragement to and sharing experiences with those who need it is the least we can do.

I am extremely happy that one of the old friends from our new federated societies told me that our efforts have given great help to the development of ergonomics in his country. This is exactly what we expected and is encouraging.

### **The Primary Ergonomics Needs and Issues in IDCs**

I considered each visit to a federated society a good opportunity to meet delegates from the host society as well as from the neighboring countries. Therefore, I held formal meetings wherever possible to find out their ergonomics needs and issues. Sometimes, instead of a formal meeting, informal talks would take place. From those talks, some of the primary ergonomics needs and issues are revealed as below.

#### *The Ergonomics Needs:*

1. *Formal and full educational or training programs in ergonomics.* This is a long-term infrastructure development work for a country and would be a key for opening the gate to the ergonomics world for people in IDCs. The ULAERGO's ergonomics educational program and the education collaboration in BRICSplus are good models.
2. *Ergonomics expertise from international community.* This could be done in short period of time and would provide quick solutions to IDCs.

3. *Build network with other ergonomics societies.* Many colleagues showed high interests in doing research and practice with other colleagues across the borders. This includes sharing anthropometric data, ergonomics design and evaluation guidelines, and other relevant resources among federated societies. A trend of regional networking has initiated in recent years and several networks such as ErgoAfrica, BRICSplus, CAES (Chinese Association of Ergonomics Societies) and ACED (Asian Conference on Ergonomics and Design) among others are in operation.
4. *Ergonomics journals for IDCs.* This was urged by many colleagues particularly by those young faculty members and researchers from IDCs. The publication of research papers in scientific journals is encouraged and commonly considered as one's work performance. Many universities or institutes look at one's publication list to determine if one can be promoted. However, because of the different life styles or cultures or other unique factors, the research topics in IDCs might not fit well to the interests of current journals thus restricting suitable platforms for publication. Providing such an infrastructure could support the development of ergonomics in IDCs and is worth discussing among the stakeholders.

*The Ergonomics Issues:*

1. *Funding.* In many IDCs, although ergonomics has been considered an important research area, the funding for research and activities in the area is yet to be enhanced.
2. *Ergonomics is not yet known by the public.* Although ergonomics has been naturally practiced everyday, the public has little knowledge of it. It is necessary to let the general public know the basic ergonomics concept and its importance. This would lead to much easier promotion of ergonomics in our surroundings and more resources would be allocated to ergonomics research.
3. *Ergonomics society is usually small.* For ergonomics societies in IDCs, the number of members is usually small and mostly from a few specific groups, e.g., university faculty members, occupational safety and health professionals, physical therapists, etc. If the ergonomics concept is not spread out well, the growth of the society would be slow and difficult.

The needs and issues in ergonomics, like the unique dialect, differ from a country to another. No matter where you live, most of us are familiar with those needs and issues in our surroundings but may not know much of those in other places.

**Honor and Support Local Ergonomics Research and Practice**

One of the unique characteristics for ergonomics is it must satisfy local needs, regardless whether it is for IDCs or DCs. Therefore, in addition to the basic ergonomics research that is applicable to the general population across borders, ergonomics research and practice for local needs is also important and valuable.

Among the local ergonomics research that many countries have been doing are interesting topics relate to the improvement of traditional ways of working and living, in agriculture, industry, housekeeping, cultural performance, etc. The outcomes of this research are significantly important and valuable for the local people and their society and would certainly benefit them. However, it may not be so easy for a non-local researcher to do such research if the local factors are inaccessible. Therefore, it becomes clear that ergonomics supports such as the infrastructure of training and education for IDCs are necessary.

The ultimate goal of the support is to help all IEA family members become capable in providing the ergonomics solutions for their needs. In other words, creating ergonomics capabilities for all IEA federated societies is essential. We can never be relaxed if any of our youngest brothers and sisters does not grow up.

**Conclusion: Toward Ergonomically Developed Countries**

Ergonomics and human factors are so complicated, we only know a very little part of the whole knowledge in this field. No matter whether we are IDCs or DCs, in terms of ergonomics development, there are only “ergonomically developing countries (EDCs)” in the world! The only difference between each of the EDCs is their experience of ergonomics research and practice. Some countries have more experience and some others have less but all countries need to work harder to be adaptive to the quick changes of the new technologies.

It is for sure that new technologies will bring to us new ergonomics issues to be resolved. The endless ergonomics needs and issues are not only our challenges but also the opportunities. It is the IEA history and the good models set by our founding executives and pioneers that keep us working together and encourage us to keep going. We have to keep in mind that all these efforts must fulfill our goal to benefit local people and industries as well as maximize human wellbeing. I truly believe that “Ergonomics is a promising discipline!” I do hope that, with our efforts together, we can be “Ergonomically DEVELOPED countries” in the near future!

**Acknowledgements**

Firstly, I would like to thank the late Professor R. Dale Huchingson who brought me into the world of human factors and ergonomics when I consulted him about this discipline. Later I found the discipline an important and interesting field that worth to dedicate to as my lifetime career.

Secondary, I would like to thank to my PhD supervisor Professor Houshang Shahnavaz for the humanity he taught me and for his guidance on my human factors and ergonomics career. I would never forget the first assignment given by him. He wanted all his students to read the book of “Small is Beautiful”, written by E.F. Schumacher, as the first thing to be admitted. It was a little tedious to read the book at the beginning but later I found it a book of wisdom that could sustain across the generations. Those

words in the book inspired me to use wisdom instead of cleverness in thinking. Thirdly, I appreciate very much all the friends who I am unable to list, as there are too many names on limited pages. Those individuals are members of IEA federated member societies, of affiliated societies, of the networks, or are sustaining members, in and outside the IEA community, for their continuous support of my work. Lastly, but not least, a great team worked together for IEA during my presidency. From the bottom of my heart, I sincerely thank the following executive committee members from 2012 to 2015 for their dedications and contributions. Without their voluntary efforts and sacrifices, the continuous development of IEA would not be possible.

- Margo Fraser, Vice President and Secretary General
- Yushi Fujita, Vice President and Treasurer
- Andrew S. Imada, Past President, Awards Committee Chair
- Barbara Silverstein, Chair of International Development Standing Committee
- Jose Orlando Gomes, Chair of Professional Standards and Education
- Wei Zhang, Chair of Science, Technology and Practice
- Christine Marks, IEA2015 Congress Chair
- Ernst Koningsveld, IEA Historian.

## Yushi Fujita

2015 – 2018

In the closing ceremony of IEA2015, I ran up to the stage when I was invited to give a brief inauguration speech as the 19<sup>th</sup> President of IEA. Even though it was a spontaneous action, it symbolized the subsequent activities of the whole executive committee. We ran around all over the world. We tried to visit as many as possible member societies. We made more than seventy international trips, many of which were attended by more than one executive. Like our predecessors, we were highly motivated to fulfill the responsibilities of IEA executives. We had good reasons to do so. We wanted to interact directly with individual members of member societies to feel how they speak, how they smile,..., and we wanted them to see how we speak and how we smile,... Regarding the scientific aspect, we were aware that we were beginning to experience a huge technological surge such as robotics coupled with Artificial Intelligence (AI). There was a belief that the emerging technologies would change the work and home environments tremendously for good or bad. It was considered that the considerable changes would take place rather quickly - not within a few decades, but within a decade or an even shorter time.



Including these two important elements that drove us, we were aware of what we wanted to pursue, and we had some working policies that would realize our desires. After having completed our term, I felt that we were embraced by something unexplainable. I was so grateful for the opportunity to contribute to the promotion of human factors and ergonomics (HFE) with such a good team. Perhaps, most of the former IEA Presidents might have felt similarly, but I think it deserves mentioning this once in lifetime experience.

### Goals and achievements

In my candidate statement for the election of the 19<sup>th</sup> President of the IEA, I identified seven priorities that I thought were important for an incoming Executive Committee (EC). Four of these were internal to the IEA: (1) activating interactions among members; (2) making the IEA bigger by welcoming new members; (3) regaining an impetus of scientific activities, which are an essential foundation of the IEA; and (4) improving the IEA infrastructure. Three other priorities were external to the IEA: (1) reinforcing the relationships with long term partners (e.g., UN, WHO, ILO, ISO, ICOH, IOHA); (2) establishing relationships with new partners especially those which are industry-oriented; and (3) promoting projects for external stakeholders in industrially developing countries. Most of them may look more less similar to strategies set forth

by many of the former IEA Presidents. In our term, I also believed that the work done by Jan Dul and other members of the Future of Ergonomics committee (“A strategy for Human Factors/Ergonomics: Developing the discipline and profession,” Jan Dul and others, 2012) would be a foundational piece to these priorities.

During this Executive, we developed seven policies to reflect these considerations as well as the insight of EC members gained through interactions with member societies. These seven policies are as follows:

1. Engage stakeholders
2. Collaborate with IEA networks
3. Reinforce IEA networks
4. Contribute to science and technology
5. Identify the roles of IEA in promoting certification and related matters
6. Reinforce relationship with external organizations (existing and new)
7. Reinforce the infrastructure of IEA

Each EC member developed and implemented a plan consistent with these seven policies. I was grateful for EC members who made every effort to ensure that these policies would enable the IEA to open a new avenue for serving its members and other stakeholders. During our term, we identified several cases in industrially developing countries (IDCs) that showed a new way of promoting systemic HFE projects engaging a wide range of stakeholders. This demonstrated that the IEA should be able to facilitate a multiple-win situation in which many engaged stakeholders could benefit. It was recommended that this new approach be explored further in the coming years.

We believed that this should allow HFE to be more widely recognized in the global community. A then ongoing effort by the Future of Work Task Force for identifying the roles of HFE in changing work environments was an ideal platform for applying this new approach. It is also worthwhile mentioning that the infrastructure of IEA was improved significantly. In particular, a new registration in Geneva enables the IEA to minimize the sacrifice of individual officers. It was an important step forward for the IEA to become a full-fledged international organization. It was also monumental achievement for IEA to establish a permanent secretariat. Together with a new financial system, we were looking forward to a more stable administration.

#### Recommendations for the future

At the end of our term, several recommendations were made for the future. How they are implemented or how they are modified to meet rapidly changing conditions will be found in the future.

*Recommendation:* The policy of engaging stakeholders was well accepted, especially in IDCs (i.e., Latin America, Eastern Europe, and Africa). Several cases were successfully promoted in which influential stakeholders such as local governments and universities

were involved and played critical roles in promoting high-quality HFE projects. These projects were unprecedented at least in the regions. For IEA, they exemplified the unique approach in which the IEA helped local societies as a facilitator. This new approach would be expected to reinforce local societies in their power to promote stakeholder-engaged systemic projects. The IEA Networks (i.e., ULAERGO, FEES, and ErgoAfrica) also played important roles in realizing the cases. Through these concrete examples, it was exemplified that the policy would be implementable in the future by member societies in collaboration with IEA Networks and IEA.

*Recommendation:* The policy of collaborating with and reinforcing IEA Networks appeared to be well implemented. The BRICS-plus Network, covering five major emerging national economies: Brazil, Russia, India, China and South Africa, and the Asian Council on Ergonomics Design (ACED) are expected to join the IEA Network status anytime soon. Once they become IEA Networks, there will be six IEA Networks (i.e., FEES, ULAERGO, ErgoAfrica, SEANES, BRICS-Plus, and ACED). They will create a good coverage across the globe. There are some preliminary ideas of affiliating small non-IEA affiliated societies and academic/industrial groups of relevant disciplines. It is fair to say that the policy initiated a good movement with which IEA and their member societies work together to promote HFE on the global scale. It is also hoped that this movement will enable HFE to acquire an ability to play more roles in systemic projects, thereby improving the recognition of HFE in the society.

*Recommendation:* Four new technical committees were established in our term. It is hoped that together with existing technical committees, they would promote state of art HFE technologies and produce guidance, guidelines, recommendations for standards, or any other concrete outputs that can benefit themselves, the IEA and external professional communities. It is also hoped that more new technical committees would be established.

*Recommendation:* Even though a priority was given to establish an ad hoc committee on disruptive technologies, it was not realized in our term. The reason why the ad hoc committee was not realized somehow explained how HFE was recognized by non-HFE specialists who were requested to join the committee. We need to face this reality and explore different approaches to understand how HFE can play more roles in the future. It will contribute to promoting HFE. Technologies will advance without interruption.

Emerging technologies will continue to change people’s life significantly. There will be some other fundamental changes stemming from such critical trends as globalization. Traditional value systems have been changed significantly over the decades. They will continue to change in the future. It is essential that HFE evolves to meet new challenges. One challenge (it is the one we have always had) is to get stakeholders to recognize the critical role of HFE. The socio-technical approach gives us guidance for moving ahead (e.g., Davis M.C. and others, “Advancing socio-technical systems thinking: a call for bravery,” *Applied Ergonomics*, 45(2):171-80, 2014.)



**Recommendation:** The IEA should further improve the certification endorsement system so that it becomes useful for certifying bodies which are not yet endorsed by IEA. In this term two certification bodies were endorsed by IEA: CREE in Europe and sisCEB in Brazil. Member societies are recommended to communicate closely with IEA so that the IEA can better help certification mechanisms in their countries. In addition, the IEA should initiate projects addressing issues of HFE education. Relationship between education and certification should be discussed in greater detail. The Professional Standard and Education Standing Committee and the International Development Standing Committee need to work in a collaborative manner. The involvement of IEA Networks is also important. Here, the General Framework Model (GFM) can provide a good platform.

**Recommendation:** The relationships with longtime partners (i.e., UN, WHO, ILO, ICOH, IOHA, and ISO) were further reinforced in our term. ISQUA, the International Society for Quality in Health Care, was welcomed as a new partner. ErgoAfrica began working with ISQUA for organizing their conference. This kind of substantial collaborations are important for maintaining and developing the relationships with external organizations. It is hoped that new relationships will be established especially with external organizations of relevant disciplines such as industrial engineering. It will enable HFE to find new roles.

**Recommendation:** It is recommended to establish more relationships with external organizations and promote collaborative projects. This can be done in collaboration with IEA Networks. The IEA can affiliate international organizations, whereas the IEA Networks can affiliate regional organizations. This kind of concerted approach can create globally coordinated tight collaborations because some international organizations have regional branches (e.g., WHO, ILO).

**Recommendation:** The new registration in Geneva brought us lots of benefits in reinforcing the financial and accounting infrastructure. The permanent secretariat is expected to make the administration of IEA more resilient in coming years. The IEA website was improved significantly, and it greatly facilitated the communications between IEA and their members. The digital archive fulfilled one of important conditions for the IEA to become a full-fledged international organization. The second history book of IEA was nearly completed for publication in 2019. It will help us in considering how the IEA should fulfill their missions in the future. Together with other efforts made to improve the infrastructure of IEA, these accomplishments will contribute to more stable and sustainable operation of IEA.

**Recommendation:** No doubt, efforts of improving the infrastructure will continue as indispensable background activities. Among many other things to be addressed, how to stabilize the financial basis of IEA will need to be understood better and specific measures should be devised as soon as possible. How to better ensure the administrative continuity will also be an urgent topic.

**Recommendation:** The Future of Human Factors and Ergonomics Task Force (FoHFE) and the Future of Work Task Force (FoW) were highlights. The FoHFE Task Force identified issues, priorities, and activities for the future of HFE that can be tackled by the next EC. The FoW Task Force had made a steady progress. It is expected that a white paper will be drafted and used as our guidelines as well as a promotion tool for ILO.

### The Executive Committee

Serving as the 19<sup>th</sup> President of the IEA was a unique and rewarding experience in three ways. Firstly, I was lucky to have such great members in the EC. I was grateful to work with:

- Kathleen Mosier, VP Secretary General
- Jose Orlando Gomes, VP Treasurer
- Eric Min-Yang Wang, Past President and Awards Committee
- Michelle Robertson, Communication and Public Relations Committee
- Andrew Todd, International Development Committee
- Frederic Tey, Professional Standard and Education Committee
- Thomas Alexander, Science, Technology and Practice Committee
- Margaret Graf, Swiss Resident Director
- Riccardo Tartaglia and Sara Albolino, IEA2018
- Ernst Koningsveld, IEA Historian
- Takashi Kawai, ICT
- Sarah Sharples, Future of HFE Task Force
- Juan Carlos Hiba, Future of Work Task Force
- Lynn Strother, Administrator

All of them worked professionally and helped each other as team members. I was also grateful for Christina Jonson and Christopher Schlick. Unfortunately, Christina Jonson had to step down in the middle of her service as the chair of Development and Promotion Committee. We were very sorry for the loss of Christopher Schlick, who passed away in the middle of serving his term as the chair of Science, Technology and Practice Committee. I mention their names as a tribute to their devotion to IEA. Secondly, it was such a wonderful experience to meet with individuals of our member societies. In particular, I enjoyed communicating with young researchers and students who were full of hope for the future. They are a treasure in our community. We must ensure that they are a top priority and we must think over how we should train them. Finally, our new policies brought me to meet with a lot of stakeholders in different communities in many countries. It was an exciting experience. The roles that future IEA Presidents will play must change over time. I was lucky to have experienced this important transitional period.

# Growth of the IEA

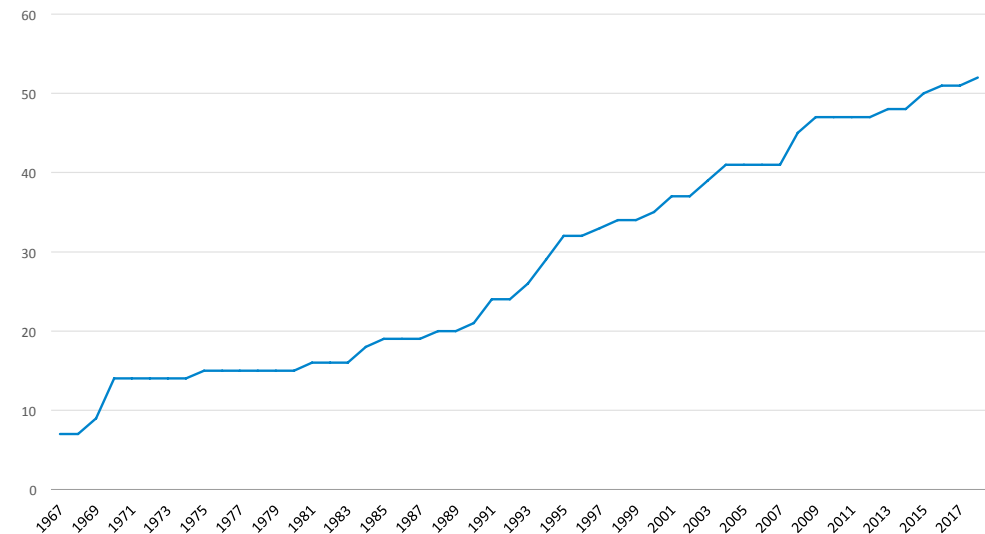
The International Ergonomics Association initially only had individual members. In 1967 the membership structure changed with the introduction of *Federated Societies*<sup>4</sup>. For several years individuals could be corresponding members, but that option was dropped when the Association grew. The list below shows the year of admission for all the Federated Societies. Where changes occurred (e.g. in country names) this is briefly explained in the footnotes. For ease of understanding the country names are provided, instead of the names of the Societies.

2004	Argentina	<1967	Netherlands
1970	Australia *	1970	New Zealand *
1985	Austria	2018	Nigeria
1988	Belgium	1970	Nordic Countries
1984	Brazil	2018	Nigeria
1970	Canada	2015	Peru
2003	Chile	2004	Philippines ****
1991	China	1970	Poland
1998	Colombia	1994	Portugal
1993	Croatia **	1991	Russia
1969	Czech Republic ***	1975	Serbia ***
2008	Ecuador	2009	Singapore ****
<1967	French Language Ergonomics Society	1969	Slovakia
<1967	Germany	1994	South Africa
1994	Greece	1990	South Korea
2001	Hong Kong ****	1991	Spain
1984	Hungary	2000	Switzerland
1993	India	1995	Taiwan
2008	Indonesia ****	2009	Thailand ****
2003	Iran	2008	Tunisia
1995	Ireland	1997	Turkey
1981	Israel	1995	Ukraine
<1967	Italy	<1967	United Kingdom
<1967	Japan	2016	Uruguay
2008	Latvia	<1967	USA
2013	Malaysia ****	2015	Venezuela
2001	Mexico		

\* Until 1991 Australia and New Zealand had one society. In 1991 the NZ Ergonomics Society became Federated Society.  
 \*\* In 1975 Yugoslav Society for Ergonomics became a Federated Society. In 1992 the Federal Republic of Yugoslavia split into several countries. The Serbian Society acted as the successor of the Yugoslav Society, where the Croatian Society applied for an own membership in 1993.  
 \*\*\* In 1969 The Ergonomics Section of the Czecho-Slovak Committee for Scientific Management became a Federated Society. Since the republic split in 1993 the Czech Republic and Slovakia have individual Federated Societies.  
 \*\*\*\* From 1986-2009 SEAES, the South East Asian Ergonomics Society, was a Federated Society for these countries.

<sup>4</sup> Unfortunately the first book on the history of the IEA indicates on page 5 incorrectly that this change was in 1976, instead of 1967.

Number of Federated Societies that are member of IEA



## Affiliated Societies

IEA has two Affiliated Societies: the Human Ergology Society (1984), and the Colombian Association of Research Ergonomics (2018). Affiliated Societies are other national or international professional societies that are ineligible for federated member status or have an interest in ergonomics but have their main aim in an associated area.

## IEA Networks

IEA Networks are geographically bound groupings of IEA federated societies, or its affiliates, formed to address specific needs. The Council approves the formation of an IEA Network based on a formal proposal stating the purpose, organizational structure and mode of operation and which is endorsed by participating societies. Autumn 2018, the following IEA networks exist:

- Federation of European Ergonomics Societies (FEES)
- La Unión Latinoamericana de Ergonomía (ULAERGO)
- The South East Asian Network of Ergonomics Societies (SEANES)
- ErgoAfrica

Two more networks are likely to join IEA soon after 2018: the BRICS-Plus Network, covering five major emerging national economies: Brazil, Russia, India, China and South Africa, and the Asian Council on Ergonomics Design (ACED). Below each of these networks that joined IEA per August 2018 present their history and actual status in headlines.

## Federation of European Ergonomics Societies (FEES)

*Pascal Etienne, Secretary General FEES, & Pieter Rookmaaker, Past President FEES*

After a preparation period of more than 5 years, finally on 7th May 2003, FEES could celebrate its inauguration in Munich, Germany. By then twelve Federated Societies became a member of FEES. Early 2018 FEES counts twenty member societies (actual membership and useful information on FEES can be found at <http://www.ergonomics-fees.eu/node/4>). The first Board of FEES was composed as follows: the initiator of FEES, Pieter Rookmaaker (NL) was elected as President, Dave O'Neill (UK), Secretary, Dirk Delaruelle (B), Treasurer. The board got support by individuals with specific portfolios: Dietmar Gude (D) for the website, Martin Schütte (D), standards, and Clas Hakan Nygård (SF), meetings.

The major objective for FEES is to enhance the recognition of ergonomics, contributing to economic development, to quality of life, to health and safety at work and to social progress in Europe. More specifically to support -under the umbrella of the International Ergonomics (IEA) - the development of ergonomics within the European region by enhanced mutual communication between various European Ergonomics societies, and by encouraging and facilitating contact and exchanges between ergonomists (educators, researchers and/or practitioners). One of the means to achieve these goals is the organization of European conferences about evolving ergonomics/human factors.

Of course FEES special attention is focused on the relevant policy and programs of the European Union (EU), for instance by assisting in the access to EU resources and facilities for ergonomists and their employers.

FEES is a network of the ergonomics societies in the geographical area called the Council of Europe. The governing body of FEES is the FEES Council consisting of representatives of its member societies. All major decisions are taken by the FEES Council, which meets at least once a year. The FEES Executive Committee executes the day-to-day administration.

The various activities of FEES cover for instance a website meant to facilitate cooperation and information exchange between members and to communicate externally. For the latter goal promotional materials have been developed. A significant achievement is the inventory and publication of ergonomics activity-centers throughout Europe in order to know "who is doing what and where".

The establishment of the Brussels Task Force in 2005 aimed to promote Ergonomics/Human Factors at EU-organizations and their related bodies, and to offer outstanding ad hoc expertise concerning research, project evaluation, standardization and



legislation. This Task Force was chaired by Kamiel Vanwonderghem from Belgium. For this, the first step was to get acquainted with the various EU-facilities, programs and initiatives, and to disseminate EU-information to the FEES-members. The taskforce acted as a working group of about ten people from different countries, having different capacities. Although these tasks had to be performed with volunteers, several good results were achieved. By acting in Expert-groups in Brussels, FEES promoted and actively participated in the implementation of EU Framework Programs. FEES has a liaison status in the European Committee for Standardization TC 122 'Ergonomics', and contributes to the creation and further development of the European Machine Directive and the Directive in the field of Personal Protective Equipment. FEES is also closely involved as Official Campaign Partner for Healthy Workplaces at the European Agency for Safety and Health at Work in Bilbao, Spain.

FEES supported the founding of new Ergonomics societies in Europe, for instance in Latvia, and to further development of existing societies by active exchange of information and experiences between the member societies.

Over the years workshops and symposia with a European character were organized, for instance in Brussels, San Gimignano, Stockholm, Budapest. In 2010 a very successful larger symposium was held in Bruges, Belgium under the title "Ergonomics in and for Europe". Soon after this symposium the Brussels Taskforce stopped its activities. Kamiel Vanwonderghem retired, and the amount of work made it impossible to find a new one. Inspired by the US Human Factors and Ergonomics Society FEES decided in 2005 to organize every October the European month of Ergonomics. The goal was to trigger the knowledge, information and insight of ergonomics in the member countries. The good contacts between FEES and EU-OSHA (the European agency for safety and health at work) made a fruitful collaboration possible. Where FEES had ambitions but few financial resources, and OSHA had a budget but limited staff, the collaboration worked fine, despite the difference that OSHA is more focused on treatment, where ergonomics basically is a preventive discipline. Through very motivated individuals like Martti Launis, the Month of Ergonomics has become a success, despite the fact that it is not taken up in all FEES member countries.

In 2012, at the Council held in Stockholm, a new board took the lead, with Sylvain Leduc as President, Pascal Etienne as Secretary General and Reinier Hoftijzer as Treasurer, the FEES website being reorganized and fed by Gyula Szabo, chair of the Communication and Promotion task group.

During these years, FEES organized several conferences or similar events, related to initiatives taken by member societies. For instance in 2013 in Munich, for the tenth anniversary of FEES. In addition several symposia were held: one on the issue of FEES foundation and development, cooperation between FEES and CREE, the future of FEES; another on the challenges of ergonomics in Europe; and one on the issue of the cooperation between ergonomists and other stakeholders with presentations on ergonomics and Personal Protective Equipment, on standardization, and on the activity of the European OSH Agency. In 2015, two symposia took place in Lisbon and in Paris on “ergonomics and creativity”, with the aim to give food for thought in order to prepare the IEA 20<sup>th</sup> Congress in Florence. And in November 2016 in Amersfoort, the Netherlands, a round table on “Ergonomics in design for all” and a symposium on “Ergonomics and creativity” were held, jointly with the Human Factors NL, the Dutch society for ergonomics.

At the June 2017 FEES Council, the rules of FEES were updated; the main change being the creation of the status of associated member, giving the opportunity to the Ergonomics society in United Kingdom (CIEHF) to become again part of FEES, as associated member. A new treasurer was elected: Pedro Ferreira.

During the year 2017, FEES was strongly involved in the preparation of the conference on “workers and creativity”, held in Brussels in June 2017, showing a cooperative process between the European Trade Union Institute (ETUI), the Belgium Ergonomic Society (BES), CREE and FEES with the support of IEA. Such a support is a first evidence of the mutual support decided by IEA and FEES, following the signature of a Memorandum Of Understanding between both associations in Florence at the end of March 2017.

The IEA and FEES Memorandum (see details on the FEES website) reflects the scope of both organizations: to raise awareness of the importance and benefits of HFE in organizations and societies, to develop and share common understanding of ergonomics. In the memorandum FEES and IEA agree to foster the development of ergonomics and ergonomic societies in Europe where it is necessary and expected by the local HFE professionals. FEES welcomes the IEA mandate to support the development of HFE in the periphery of Europe, (e.g. the Mediterranean border countries, the Middle East countries) in co-operation and agreement with the regional concerned bodies (e.g., ERGOAFRICA), according to the needs expressed by the national societies (or individuals, if any), and/or the regional networks mentioned above, and in close co-operation with these networks. FEES is ready to contribute, at the request of the IEA executive, to the development of ergonomics in other countries or regions, where it is required.

The practical collaboration may take the form of the organization of joint meetings and seminars, promotion of outreach activities of Human Factors and Ergonomics, collaboration in the field of development, training/education and professional standards in Europe, publication of joint guidelines, position papers and related documents, collection of case studies published in cooperation with CREE.

Several initiatives have been taken by FEES-representatives showing the implementation of this Memorandum Of Understanding in order to develop ergonomics in various East European countries, such as the Baltic countries (Latvia and Lithuania), Slovenia, Croatia, Serbia, Romania. This illustrates the role of FEES in the support of initiatives from local/regional ergonomics communities, particularly in Central and Eastern European countries. FEES is committed and finds itself in a unique position to foster the growing European diversity in the field of ergonomics and human factors.

FEES promoted European-wide activities related with education, certification and accreditation in close cooperation with the Centre for Registration of European Ergonomists (CREE). Both bodies participate jointly in the development of the ergonomics profession in Europe: this includes the establishing of quality criteria for publishing case studies, providing information about ergonomics education and training in Europe and providing more support for newer societies in the form of experience exchanges.

In the future FEES will continue to co-operate with IEA in order to enhance ergonomics in Europe, especially in the Eastern European countries, and with the other regional branches of IEA.

In summer 2018 a new board was elected, with Bernard Michez as President, Pascal Etienne as secretary-general, Pedro Ferreira as treasurer and Szabó Gyula as communication and promotion committee chair.

## ULAERGO

*Paulina Hernandez, Presidente ULAERGO*

La Unión Latinoamericana de Ergonomía / The Latin American Union of Ergonomic Societies (ULAERGO) is a voluntary and non-profit organization that ties together the Associations and Societies of ergonomics in the Latin American countries. Its objective is to enhance cooperation between societies and provide support for the scientific development of the discipline, the enhancement of competent and ethical professional practice, based on professional obligations (deontological), and the promotion of public policies that contribute to the integrated and coordinated development of labor productivity and welfare. ULAERGO was founded on September 3, 2002 in Santiago, Chile, at the end of the IEA Symposium “Advances in Ergonomics in a Developing World”, within the process of the incorporation of the Chilean Ergonomics Society as a federated member of the IEA. Founding members of ULAERGO are the Associations of Argentina and Brazil and the Societies of Colombia, Chile and Mexico. The first presidency of ULAERGO was held by the President of the Chilean society (SOCHERGO), María Eugenia Figueroa.

The first Latin American Ergonomics Congress “ERGOLATINOMÍA”, was held in Chile in November 2004, and was achieved through the sustained hard work of a few Chileans, along with the voluntary participation of a number of well-known professionals, such as the then IEA President Pierre Falzon, Rosalío Achurra (Mexico), Mario Cesar Vidal and Ana María de Moraes (Brazil), Francois Daniellou (France) and others. It realised the dream of a few and enabled the beginning of collaborative scientific work. At the 2004 congress Nelcy Arévalo of Colombia was elected to be the new president of ULAERGO. In 2007 during the second Congress of ULAERGO, also in Colombia and organized by Nelcy Arévalo and his team, the presidency of ULAERGO was passed to the Brazilian professor, Mario Cesar Vidal.

In October 2009, the Valparaíso Act was signed at a multinational meeting with significant discussion and substantial Latin American presence. It marked a milestone for ULAERGO and modified decisions previously taken in Bogota, Colombia, such that the former president would become the vice president. An executive presidency and a superior council were formed from the former presidents. It was decided that the priority goals should be to strengthen the relationship between ULAERGO and the associations of each country and to promote the institutions of the association. It was also decided to establish a ULAERGO budget with expenses shared among the societies. A mediating role for ULAERGO has been noted, where ULAERGO has assisted with the resolution of issues for national member countries, arising either from internal or external processes.

In August 2010, at the 3<sup>rd</sup> ULAERGO Congress in Rio de Janeiro, the statutes of ULAERGO were modified, creating a mixed executive board composed of representatives



from at least two countries. The Council should be formed by the presidents of the member societies. It should identify and support interest groups, members (organizations) that are not yet constituted as Societies or Associations, for lack of legal registration and statutes, or who face difficulties in holding elections. The Assembly elected José Orlando Gómez as President, Paulina Hernández as Secretary General and Paulo Antonio Barros Oliveira as Treasurer. Under their leadership ULAERGO was strengthened and showed an increasing membership: Bolivia, Peru, Ecuador, Venezuela, Cuba and Uruguay joined. Scientific activities were carried out every year in the Latin American countries. ABERGO supported ULAERGO by promoting and sponsoring the attendance of Latin American professionals at their meetings, which gave a further boost to the organization.

In 2013, ULAERGO was recognized by the International Ergonomics Association as an official network of that organization.

The 4<sup>th</sup> Congress of ULAERGO was held in September 2013 in Quito, Ecuador. This was attended by the president of the IEA, Eric Wang, as an illustration of the IEA support for ULAERGO. The 2013 - 2016 Board consisted of Paulina Hernández (President), Paulo Oliveira (Vice President-Secretary General) and Francisco Cáceres (Vice President-Treasurer).

The 2015 IEA Council Meeting in Melbourne, Australia, brought two further important achievements; the approval of the entry of Peru and Venezuela as federated members of the IEA, and the decision that the next IEA Council Meeting would be held in Medellín, Colombia (2016).

In 2016 ULAERGO faced a complex situation, perceived as a threat to the quality of the discipline in Latin America and especially in Argentina. A consultant from that country, associated with a private university, began offering professional training in ergonomics that is absolutely insufficient for accepted professional quality standards. In addition, that institution offered professional certification by falsely indicating that they were aligned with ULAERGO. As an organization, and with the signature of all the presidents, a rejection letter was formulated and published on the websites of all the member societies and associations. This marked a milestone for the acceptance of collective responsibility to defend objectives. Although the conflict still persists between this consultant and the Asociación de Ergonomía Argentina (ADEA), at least we managed to spread the view that not all “offers” of ergonomic training meet our combined quality standards.

The 5<sup>th</sup> Latin American Congress of Ergonomics was held in Lima, Peru, in September 2016. The theme was “Developing Ergonomics in Latin America”. It was attended by the president of the IEA, Yushi Fujita, the president of the International Development Standing Committee of the IEA, Andrew Todd and the IEA Treasurer and Vice-President, José Orlando Gómez. A Certification Forum was held, where the Latin American countries that have established certification processes (Mexico, Brazil and Chile) shared their experiences. Shinichi Fukuzumi, chairman of the Ergonomics Certification Committee of Japan, also attended the Forum. ULAERGO renewed its Board of Directors and its bylaws. Paulina Hernández was reelected as president, Rafael González (Venezuela) became Vice President-Secretary General and Federico Ferreira (Uruguay) the Vice President-Treasurer.

In Medellín in 2016 and in the context of the IEA Council Meeting, the “Manifesto of Medellín on the Challenges to Workers’ Health” and a memorandum of understanding (MOU) between the IEA and ULAERGO were signed. The MOU strengthens the collaborative relationship between ULAERGO and the IEA in the promotion and development of human factors and ergonomics (HFE) in Latin America and the promotion of high quality professional standards and education in HFE within the scope of their missions, strategies, competences and resources.

#### **A Panorama of Latin American, March 2018**

Latin America and the Caribbean comprise together 42 countries and some 700 million inhabitants. There are three main official languages, Portuguese, Spanish and French, and 420 languages of indigenous peoples. There is substantial economic inequality: the average GINI index is 0.50 ) and poverty levels are high in many countries of the region. In 25 years the fertility rate decreased from 6 to 3 children per woman and the current average is 2.1 children per woman.

Generally 80% of household income comes from work, so it is the main engine for overcoming poverty and access to social protection (source: Economic Commission for Latin America and the Caribbean, ECLAC), although there are about 130 million people working in informal conditions (47.7% source: ILO).

There are great differences in social protection, for example, in Mexico, Colombia and Peru only 35% of the workers have access to social protection, while in Argentina, Brazil, Chile and Uruguay, it is 70%.

In terms of professional training, only 1 worker in 9 receives some type of training each year (education or on-the-job training). Companies in the region report manifest difficulties filling vacancies and locating personnel with adequate technical and socio-emotional skills, showing serious imbalances between demand and supply (source: the Inter-American Centre for Knowledge Development in Vocational Training (ILO/ Cinterfor).

#### **ULAERGO 2018**

ULAERGO covers 10 countries: Cuba, Mexico, Colombia, Venezuela, Ecuador, Uruguay, Brazil, Argentina, Peru and Chile, with approximately 800 adhered members.

In Latin America there are ergonomics training programs in Mexico, Cuba, Venezuela, Colombia, Peru, Brazil, Chile and Argentina, in the following levels: 8 Diploma programs, 10 Specialization programs, 8 Masters programs. In addition, there are 2 Master Degrees in Peru and Panama and a recent important advance in a Doctoral program for Latin America.

Regarding certification systems; Mexico has 35 certified professionals, Brazil 170 professionals and 5 certified training programs, and Chile has 23 certified professionals. Argentina is starting the process of certification.

The work of ULAERGO currently focuses on:

1. Strengthening demand, by:
  - a. generating collaborative relationships with the ILO:
  - b. developing tripartite meetings in the context of country events:
  - c. initiating a project of hospital ergonomics in Latin America, resulting from the MoU CRS (signed in Porto Alegre in 2017) :
  - d. strengthening relationships and work with government agencies, especially in regulations and legislation.
2. Application of HFE of high quality, through:
  - a. development and support to training programs (masters and doctorates):
  - b. strengthening and stimulating the processes of certification:
  - c. support for and presence at local scientific events.
3. On the internal front: working on the empowerment of local societies, opening spaces for related groups to integrate them and preparing the 6<sup>th</sup> Congress of ULAERGO in 2019.
4. Relationship with the IEA; aligned and collaborative work; promoting the assistance of the IEA executive in Latin American events, stimulating participation in IEA2018.

## SEANES

*Halimahtun M. Khalid, Past President SEANES*

The South East Asian Network of Ergonomics Societies (SEANES) is a coalition of human factors and ergonomics societies in South East Asia (SEA). It is a voluntary and nonprofit entity; to date with five societies as members. SEANES replaced the former South East Asian Ergonomics Society (SEAES) that was established in 1984 by four eminent ergonomists led by the late Prof. Alain Wisner (France). The founding team comprised Prof. Adnyana Manuaba (Indonesia), Prof. Kitti Nantranont (Thailand) and Dr. Kazutaka Kogi (Japan). The prime goal of SEAES was to develop and promote ergonomics in the Southeast Asian region comprising 10 countries. These countries make up the Association of Southeast Asian Nations or ASEAN.

SEAES was a federated member of the International Ergonomics Association (IEA). However, SEAES membership fluctuated over the years, from 1984 to 1994. It became apparent that SEAES had problems in leadership and its future may be somewhat bleak. This led to the mushrooming of national ergonomics societies in ASEAN, with the establishment of the *Perhimpunan Ergonomie Indonesia* (PEI) and the Ergonomics Society of Singapore (ERGOSS). Newly formed societies included the Ergonomics Society of Thailand (EST) and the Ergonomics Society of the Philippines (ESP). Following global trends in society renaming, two societies changed their names by 2016 – ERGOSS to the Human Factors and Ergonomics Society of Singapore (HFESS) and ESP to the Human Factors and Ergonomics Society of Philippines (HFESPhil).

SEAES held its triennial meeting-cum-conference on a rotational basis at various locations: 1991 Bali-Denpasar (Indonesia), 1994 Bangkok (Thailand), 1997 Kuala Lumpur (Malaysia), 2000 Singapore, 2003 Kuching (Malaysia), 2005 Bali-Denpasar (Indonesia), 2008 Bangkok (Thailand), 2010 Cebu (Philippines) and finally in 2012 Langkawi (Malaysia). The early history of SEAES prior to 1994 was not documented, therefore little is known about its past decade of activities.

In 1994, Prof. Halimahtun M. Khalid from Malaysia was appointed as the first female SEAES President. She served as SEAES representative in the IEA Council until 2012. Due to a change in the IEA policy in the 21<sup>st</sup> Century, national ergonomics societies could become federated members of the IEA. This paved the way for Indonesia, Thailand and Singapore to be represented autonomously in the IEA. To exist alongside with the established societies, SEAES was transformed into a network of ergonomics societies in SEA. This decision was made at the SEAES General Meeting on 23 May 2005 in Bali, Indonesia. A task committee comprising three senior members was formed, chaired by Prof. Halimahtun Khalid as SEAES-IEA Representative. The remaining members were Dr. Kazutaka Kogi (Japan) who was a founding member of SEAES, and Prof Martin Helander, a Past President of the IEA. The Committee reported to the outgoing SEAES President, Ms. Sudthida Krungkrai Wong (2005-2008) of Thailand. SEAES was dissolved on October 22, 2008. This led to the birth of SEANES two years later during the First



SEANES Conference in Cebu, Philippines on 13 December 2010. Dr. Andrew Imada, the IEA President, presided the inauguration of SEANES. A Second Conference and Bi-annual meeting was held July 9-12, 2012 on the island of Langkawi, Malaysia. It was jointly organized by SEANES and the newly formed, Human Factors and Ergonomics Society of Malaysia (HFEM). The SEANES logo and Awards were introduced at this significant meet.

SEANES Awards are given to Human Factors Professionals and Ergonomists who have contributed immensely to the promotion and development of the discipline in SEA. The following were recipients of the awards.

- SEANES 2012, Malaysia  
Education: Prof. Adnyana Manuaba, Indonesia  
Development: Dr. Kazutaka Kogi, Japan
- SEANES 2014, Singapore  
Education: Prof Martin Helander, Singapore
- SEANES 2016, Indonesia  
Development: Ms Sudthida Krungkrai Wong, Thailand

Despite active growth of ergonomics in Malaysia, HFEM was only founded on 5 June 2010 by Dr. Halimahtun Khalid, who later became its first President (2010-2012). HFEM became the 49<sup>th</sup> federated member of the IEA on 26 August 2013.

SEANES provides the executive power for ergonomic matters in ASEAN. SEANES has three goals: The first goal focuses on regional collaboration. Besides the national Ergonomic societies, SEANES offers other forms of Ergonomics representation such as Special Interest Groups in the remaining five SEA countries (Brunei, Cambodia, Laos, Myanmar, Vietnam). This group has yet to form a society.

The second goal involves engagement and professional development in four sectors: Public, Academia, Government and Industry. Through this goal, SEANES organizes various activities that involves the participation of national agencies. This includes awareness seminars and training workshops.

The third goal concerns global development through extended cooperation with ASEAN partners such as Japan and Australia. SEANES supports the Journal of Human Ergology produced by the Human Ergology Society of Japan, which is an affiliate of the IEA. Dr. Kazutaka Kogi, a former Treasurer of the IEA and Past President of The International Commission of Occupational Health (ICOH), is prominent in promoting ergonomics

in SEA and other developing countries. The Human Factors and Ergonomics Society of Australia (HFESA) is also a staunch partner of SEANES by setting up funds to support young ergonomists in SEA attend the IEA Congresses.

The SEANES Council has seven members: President, Secretary, Treasurer and four ordinary country members. The appointment of the President is based on a rotational basis by country. The President represents SEANES in the IEA Council meetings.

In addition, SEANES has 3 advisers: Dr. Halimahtun Khalid, Dr. Kazutaka Kogi and Prof. Martin Helander who guide in strategic planning. SEANES organizes the following activities in its member countries:

1. SEANES conference is to be held bi-annually in conjunction with the SEANES council meeting,
2. Development of SEANES Ergonomic Checkpoints for Indoor and Outdoor Workplaces,
3. Training and certification of SEANES ergonomists and human factors professionals in the region:
4. SEANES Ergonomics Month takes place annually between August to October in member countries.

The Symposium on “Future of Ergonomics in Southeast Asia” is a common feature at SEANES bi-annual conference, besides a special session on “ASEAN Ergonomics” at the triennial Congress of the IEA. The last session was held at the 19<sup>th</sup> Triennial Congress of the IEA in Melbourne, Australia from 9-14 August 2015 on the theme “SEANES Ergonomics Checkpoints.”

Beyond 2012, SEANES held two conferences, organized by the national ergonomics societies: 3<sup>rd</sup> Conference in Singapore, 1-4 December 2014, and the 4th Conference in Bandung, Indonesia, 28 November-1 December 2016. The 5<sup>th</sup> Conference will be held in Bangkok, Thailand, 12-14 December 2018. These events provided a platform for information exchange, knowledge sharing and networking among regional human factors professionals and ergonomists to further enhance the implementation and practice of the discipline in South East Asia.

## ErgoAfrica

*Andrew Todd*  
*Past president ErgoAfrica*

# Ergo Africa

In the May of 2014 the Tunisian Ergonomics Society hosted their Annual conference in the beautiful coastal city of Hammamet. This was an auspicious occasion for the society as not only did they host the International Ergonomics Association executive meeting at the same time, but their African colleagues from South Africa, Nigeria and Algeria were also in attendance. Part of the purpose of this gathering was to allow the various ergonomics societies from around the African continent to enter into dialogue around shared experiences on how to improve working conditions and productivity through the implementation of sound ergonomics principles.

These discussions were exceptionally fruitful and culminated in the societies agreeing to form an umbrella body to represent the needs of the African continent in the global ergonomics community. This led to the formation of ErgoAfrica (The African Federation of Ergonomics Societies) with three founding countries, Tunisia, South Africa and Nigeria. The main purpose of ErgoAfrica is cooperation and mutual support between the Associations and Societies of Africa for:

- a) The scientific development of Ergonomics in Africa:
- b) Ensuring a competent professional practice of Ergonomics in Africa:
- c) The application and practice of Ergonomics within ethical principles and ethical parameters in Africa:
- d) Promoting public policies that contribute to the development of integrated systems of occupational health and labor productivity in Africa:
- e) Be a representative of all Ergonomics activities of the IEA in Africa.

By the end of the three day meeting ErgoAfrica was able to present a comprehensive set of bylaws to its member societies to guide the activities of the network and the development of ergonomics on the African continent. Some of the key values that these bylaws ascribe to are outlined below:

- Sustainability in production activities, defined as the balance between current and future health of workers and their working environment:
- Respect for human rights including more socially responsible approaches, acknowledging the need for social redress and more globally equitable access to economic, social, technological, political, and natural capital:
- Ergonomic decision-making should be based on the “best” solution for the entire system bearing in mind ecological equity and the socially responsible distribution of resources:
- Value and respect diversity that embraces human variability as well as ethnic and geographic diversity, and the diversity of other species (i.e. cultural diversity, human variability, and ecological diversity). This means accepting that local and indigenous solutions often have precedence over solutions that attempt to enforce ‘global’ solutions:



- Respect for the work culture which is understood as respect for the habits and customs of workers that do not involve risk or danger to themselves, their environment or their co-workers.

At the closing of the conference Andrew Todd from South Africa was elected to be the first president of ErgoAfrica with Taoufik Khalfallah (from Tunisia) and Samson Adaramola (from Nigeria) joining him on the executive committee. Over the next year the network looked to critically engage with understanding the unique characteristics of the work environment and the people working in these environments to develop African solutions for African problems.

In 2016 there were several important events for ErgoAfrica. Firstly, the network was to be officially recognized as a network of the International Ergonomics Association, which was achieved in November at the council meeting in Medellin, Colombia. Another important outcome of this meeting was the signing of a memorandum of understanding between the IEA and ErgoAfrica to foster a closer working relationship. Secondly the network started collaborating with other African countries in an effort to foster growth in north Africa. Therefore, several delegates from the ErgoAfrica network attending the conference of the Moroccan Ergonomics society where the focus of presentations was on fostering collaboration in Africa. Subsequent to this, ErgoAfrica has continued to work with Morocco; it is hopefully that they will be able to join the IEA in the not too distance future.

Another landmark event was hosted in 2017 in Johannesburg, South Africa where the first conference of ErgoAfrica was held in conjunction with the Ergonomics Society of South Africa (ESSA) conference. ErgoAfrica and ESSA were proud to host delegates from across the African continent with representation from Tunisia, Algeria, Morocco, Botswana, Namibia and South Africa. During the conference there was an important session on unpacking the current situation within each of the African countries present at the conference, which was well attended and fostered some robust debate. A very important component of the conference was the workshop facilitated by Professor Tahar Hakim Benchekroun on the current state of education in human factors and ergonomics in Africa. The outcome of the workshop was a resolution to formulate an action plan and standard for education in Africa by the Triennial congress of the IEA in Florence 2018. At ErgoAfrica's executive committee meeting several important changes were made to the functioning of the network in line with the memorandum of understanding signed with the IEA. Firstly, Taoufiq Kalfallah took over as president of the network providing north Africa with an important opportunity to lead the association forward. Secondly, further technical committees were established; Andrew Thatcher was charged with leading the science, technology and practice committee, Tahar Hakim Benchekroun the professional standards and education committee and Andrew Todd the international development committee. These structures mirror those of the IEA and were an important developmental step for ErgoAfrica, allowing for better communication with the international body. It has been encouraging to see

that ErgoAfrica will be well represented at the triennial congress in Florence in 2018 with a special session being run by the network to further foster an understanding of ergonomics in Africa.

A key focus of the network is on building African capacity, through the development of high quality education programs. A significant step forward in this regard was achieved during 2017 when ErgoAfrica signed a memorandum of understanding with the World Health Organization collaborating centre in human factors and patient safety, the Centre for Clinical Risk Management and Patient Safety in Florence, ITALY. The focus of this relationship is on joint academic endeavors to support the development of patient safety programs in African hospitals whereby a local need is addressed while simultaneously building local capacity. To date collaborative projects have been initiated in South Africa, Tunisia and Morocco.

It is evident that ErgoAfrica has made good progress in the four short years of its existence and that it can play an important role in the development of human factors and ergonomics in Africa. Through the continued support and collaboration with the IEA we are confident that we can increase the membership of African societies within the IEA.

# IEA Triennial Congresses

*Ernst Koningsveld and Ian Noy*

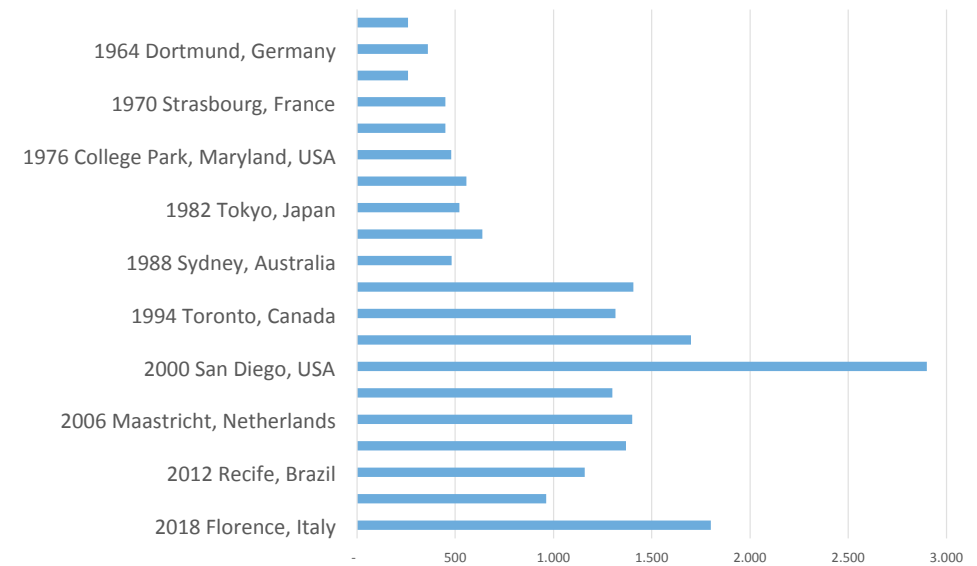
The Triennial IEA Congress is the most visible activity of the Association. Held for the first time in 1961, every three years one of the IEA federated societies<sup>5</sup> hosts the worldwide conference on behalf of the IEA, covering all aspects of human factors and ergonomics science and practice. IEA Triennial Congresses are typically 5 days long, the technical program comprising keynotes, parallel lectures and panel sessions, workshops and other meeting formats. The organizing committee (primarily from the host society) selects an inspiring theme, and creates a delegate experience that emphasizes local culture and perspectives. The Congresses play a key role in engaging the community in advancing the discipline and practice and helping members to form new collaborations, partnerships, and friendships. Borders are literally and figuratively crossed, helping to promote the discipline and deepening the knowledge and scientific bases for effective application. This chapter gives a brief overview, with special focus on the Congresses held between 1985 and 2015.

Year	Venue	Congress chairperson	Theme
1961	Stockholm, Sweden	Sven Forsman	-
1964	Dortmund, Germany	Gunther Lehmann	-
1967	Birmingham, UK	<sup>6</sup>	-
1970	Strasbourg, France	Bernard Metz	-
1973	Amsterdam, The Netherlands	Henri Boudri	-
1976	College Park, Maryland, USA	Harry Davis	-
1979	Warsaw, Poland	Jan Rosner	-
1982	Tokyo, Japan	Masamitsu Oshima	-
1985	Bournemouth, UK	Reginald Sell	Ergonomics International 85
1988	Sydney, Australia	Roger Hall	Designing a better world
1991	Paris, France	Alain Wisner	Designing for everyone
1994	Toronto, Canada	Ian Noy	-
1997	Tampere, Finland	Markku Mattila	From experience to innovation
2000	San Diego, USA	Hal Hendrick	Ergonomics for the new millennium
2003	Seoul, Korea	Min Chung	Ergonomics in the digital age
2006	Maastricht, The Netherlands	Ernst Koningsveld	Meeting diversity in ergonomics
2009	Beijing, China	Sheng Wang	-
2012	Recife, Brazil	Marcelo Soares	Designing a sustainable future
2015	Melbourne, Australia	Christine Marks	Reaching out
2018	Florence, Italy	Riccardo Tartaglia	Creativity in Practice

IEA Triennial Congresses, their venue and Congress theme if available.

<sup>5</sup> In some cases the organization was done by two federated Societies (e.g. 2015), and in several other cases organizational support from neighboring societies was provided.

<sup>6</sup> Congress chair's name could not be retrieved; may have been Hugh Patrick Russel Smith.



Number of participants at IEA Triennial Congresses.

## Venues and participation

The IEA Triennial Congresses usually attract ergonomists from 45-65 countries, all over the world. There is certainly a relation between venues and participation. For example, over the years 1991-2012 participation was usually between 1200 and 1400. However, the 2000 Congress attracted 2.900 participants, due to the fact that it was a combination of the IEA Congress and the annual meeting of the Human Factors and Ergonomics Society of the USA, the latter usually attracting around 1500 participants. At the 1997 Congress in Tampere, the large Scandinavian contingent accounted for relatively high registration numbers. In Seoul, Beijing and Recife, however, the participation of people from the nearby regions was good, but not enough to compensate the relatively lower attendance from Europeans and Northern Americans. Similarly, due to its geographical remoteness and the related costs for travelling, Melbourne unfortunately did not attract the expected number of participants. Due to the volatility of historical numbers, Congress organizers find it very difficult to predict the number of participants, making budget development a major challenge. It is similarly difficult to anticipate the magnitude of financial sponsorship until the planning is well underway. On the other hand, it appears that large international crises, like terroristic attacks, outbreaks of infection diseases, had little effects as far as can be seen.

Over the past decades IEA Triennial Congress organizers have put much effort in trying to include participants from Industrially developing countries (IDCs). In some cases, they raised funds for scholarships to support travel or registration fees for delegates from IDCs. Several societies that made a profit from the organization of their IEA Triennial Congress, created special funds earmarked for financial assistance to IDCs, either to support future participation in IEA Congresses or to promote local conferences.

### The role of Technical Committees

The IEA currently has 27 Technical Committees (TCs) that facilitate collaboration and the exchange of information on a given topic in ergonomics (the number of technical committees fluctuate over time, depending on topic currency and need). An important role of the TCs is active involvement in the development of the Congress technical program. Most of the TCs solicit, review abstracts and select papers in their area of interest. Several TCs take a more proactive role in organizing technical sessions, panels or even multi session symposia. These activities reduce the tremendous workload of the host society.

### Content

It is beyond the scope of this book to trace the evolution of the field of ergonomics and human factors over the past 35 years. However, a review of the technical content of past Congresses suggests that work-related musculoskeletal disorders (e.g. back injuries) and physical strains have been persistent topics of great interest. However, the research focus has broadened to include upper limb disorders. Moreover, while heavy physical work was an early concern, more recent focus has shifted to injuries from sedentary work and high repetitive movements. Since the early 1980's human computer interaction has become an important issue, though it is clear that much of the scientific exchange in this area takes place outside the IEA. For thirty years, topics related to Organizational Design and Management (ODAM) featured prominently at IEA Congresses, where typically several sessions are devoted to exploring sociotechnical issues and broader organizational influences and opportunities for intervention. Other topics that illustrate the diversity of application with the field of ergonomics include healthcare ergonomics, aging, affective design, ergonomics in design for all, ergonomics for children and educational environments, building and construction, agriculture and mining.

### Proceedings

There is no standard for the publication of the Congress proceedings. For a period there was a tradition that at least the keynotes were published in a special issue of one of the major journals in our discipline. The papers of all presentations used to be published in bound volumes; the 1997 Tampere Congress proceedings turned out to comprise 4,362 pages in 7 volumes, with a shelf width of no less than 20 centimeters. Finland Post did good business shipping many of these worldwide, since overweight was even more expensive for the participants. Though already considered in 1994, the first electronic version of the proceedings was only published on CD-ROM in 2003 by the Korean organizers. Since 2012 online publication of the proceedings is the primary means of disseminating the technical papers. It is evident that both costs of production and accessibility of proceedings benefit from these developments.

### Finances

Organizing an IEA Triennial Congress is a major undertaking, with a budget of US\$ 1 million or more. For the most part, income depends on the number of participants, which remains uncertain until a couple of months before the actual event. Costs are

largely fixed, with major items being meeting rooms, food and beverage, professional meeting planner, promotional material, onsite audiovisual and other equipment. Compared to annual national conferences, the Triennial IEA Congress is financially risky. In most cases, the local organizers tend to be relatively inexperienced in the organization of such a large and complex event; there is no traditional group of sponsors, and each federated society intends to make the Congress unique to a certain extent. Yet, many Congress organizers find the experience of welcoming the many, diverse delegates from so many countries incredibly rewarding and enriching, and it is an opportunity to enhance the local awareness of ergonomics and human factors. The Triennial Congresses are a major source of income for the IEA, since capitation fees are charged to the local organizers, which augments membership dues from federated and affiliated societies to help cover IEA operations. If the Congress does not realize a profit, the capitation fee is waived, which can strain IEA operations. Fortunately, this is a rare result.

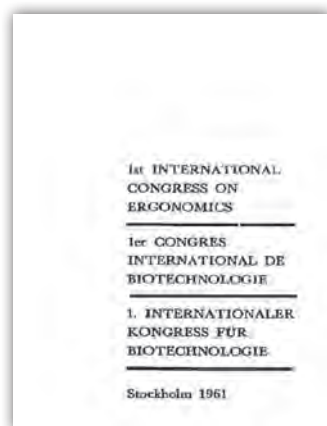
### The role of IEA

The Triennial Congress is the most visible activity of the IEA, and the only place where the international ergonomics community comes together to engage in knowledge sharing and networking. Yet, the IEA Executive Committee and the Council play a relatively minor role, delegating the responsibility for the organization to one of its federated member societies. Six years in advance of a Congress, Council selects the venue from among competing proposals by federated societies. Proposals are screened by a task force that checks if those meet the IEA criteria for the Congress location and organization, as specified in the Operational Procedures. While the proposals indicate intended city and site (hotel or convention center), in several instances the venue within the selected country was changed due to costs or other considerations. Since the local organizers are fully responsible for the budget, Council's interest in the financial aspects is very limited. Council's interest in the details of the technical program and administration increases as the event approaches, resulting in requests that are often difficult or too late to incorporate. Moreover, the term of IEA officers is 3 years; hence, that the Executive Committee that is in place during the first three years after selection is made, will be replaced by a new Executive Committee that will be in place when the Congress takes place. As a consequence, the Executive Committee focus is directed to the upcoming Congress that will be held during their term. This is not ideal since important decisions need to be taken in the first three years. Normal turnover of Council and TC members also affects IEA input or role continuity. In particular, lack of continuity reduces the potential benefit of lessons learned from previous Congresses.

### General Assembly of the IEA

For many years the IEA General Assembly was held at the Triennial Congresses. At this plenary session, the President reported on the activities and achievements of his/her term, the newly elected Officers are presented, as well as the IEA Triennial awards. However, since attendance decreased, early in the 21st century this tradition stopped. The president and the other members of the Executive Committee report in the IEA Council and in written triennial reports. IEA Triennial Forum

According to the IEA by-laws, at the Triennial Congresses a Forum is held, intended essentially for presidents of Federated and Affiliated Societies, Sustaining members and representatives of International organizations with which the IEA has formal relations. All the Council members are welcome to attend. During the Forum, the outgoing President delivers an address on the State of the IEA. The Forum provides an opportunity to exchange views about the current and future needs for developing ergonomics worldwide, the role of the IEA in relations to the member societies and the development of interactions with international organizations. The IEA Triennial Forum is not a decision making body.



# Certification and Professional Standards

Maggie Graf and Thomas J. Smith

## Aims of the IEA for the profession – a history of the developments

Certification of professional ergonomists has long been an aim of the IEA with many executive committees dedicating energy to this task. There are a number of reasons for a professional society to be concerned with certification. The most commonly cited reason is that it protects the profession from unqualified practitioners, who not only reduce the job opportunities for qualified people, but can also result in reputation loss for the profession as a whole. Certification also serves to unify a profession and to crystalize a sense of professional identity and pride. The definition of minimum levels of knowledge and experience required for certification serve to provide employers and government authorities with information about what they can expect from the services of professional practitioners. For educational institutions they are a guideline for the development of programs. Certification systems are also used to encourage ongoing professional development. In a relatively young and changing profession, this is essential. At an international level, certification systems can be used to facilitate the exchange of professionals between countries and ensure a set of common values, knowledge and practices. As the IEA is the only worldwide international organization of ergonomics and human factors specialists, the expectation of the members is for the IEA to oversee and coordinate such activities. It is also clearly in line with the mission of the IEA to elaborate and advance ergonomics science and practice.

In the early 1990s the IEA had concerns that in at least one country, specifically the USA, more than one certifying body had been established and problems were foreseen if the standards applied by one or more bodies were not consistent with the IEA's quality aspirations. Furthermore, a private training school was offering certification that was clearly tied to its own training program. The IEA saw a need to take protective action. However, there was no formal system for IEA checking of certification systems, no internationally agreed minimum educational standards and some diverse views between countries as to the practice of ergonomics.

Under the presidency of Hal W. Hendrick (1991-1993), a "Professional Practice and Education Committee"<sup>7</sup> was established and first chaired by Margaret Bullock. It was tasked with producing draft guidelines for Federated Societies to use in developing

their own codes of professional practice. Work on these documents continued during the Presidency of Martin Helander (1994-1997) and in 1997 Margaret Bullock completed the first draft of the IEA Ergonomics Core Competencies Document to assist

the Federated Societies in developing professional certification criteria and education programs and drafted the criteria for IEA endorsement of national and regional professional certification agencies. The drafts of the documents were discussed at a special workshop on Certification during the IEA Congress in Tampere in 1997, circulated to all Federated Societies for information and comment, and again revised accordingly. Delegates at the IEA Council Meeting of 1998, remarked that there were no great advantages of endorsement for large established certification systems (notably the Ergonomics Society of the United Kingdom), but smaller societies emphasized that they were very valuable (notably The Netherlands). It was emphasized by the President that the documents were living documents and should be reviewed regularly. The guidelines were officially published in 1999.

The principal document, *Core Competencies for Practitioners in Ergonomics*, elaborated the scope of practice in ergonomics and defined the requisite skill set for professional ergonomists. The document *Minimum Criteria for the Certification of Ergonomists* provided guidance to Federated Societies contemplating the development of a system for certification for ergonomists. A third document, *Criteria for IEA Endorsement of Certifying Bodies*, formed the basis of a system for the IEA to check the quality and endorse certifying bodies.

With the acceptance of the documents by Council, an IEA Certification Endorsement (Review) Sub-Committee (ERC) was established to review and, if appropriate, endorse certifying bodies and their individual systems of certification. The Sub-Committee had the following Terms of Reference<sup>8</sup>:

- to determine whether the certification process designed and submitted for review by an individual Federated Society, or any group of societies, meets the minimum criteria defined by the IEA for the certification of an ergonomist.
- to make recommendations to the IEA Executive Committee that the process under consideration be endorsed / not endorsed by the IEA.
- to periodically review the criteria for endorsing the certification process and the certifying body.
- to ensure the approval of the relevant Federated Society on all applications for IEA endorsement of a certifying process or of a certifying body.

<sup>7</sup> The authors assume that this refers to the same IEA function as Professional Standards and Education (Standing) Committee in later references. The name of the Professional Standards and Education Committee and the abbreviation for it (PSE, PS&E, PSESC) has varied slightly over the years. For simplicity, the name used in 2018 has been adopted in this document, when it is clear that the role of the IEA delegated person was the essentially the same. Generally only one person is appointed by the IEA executive to chair this "committee" and the composition is at the discretion of this person.

<sup>8</sup> At the Council Meeting of 1998 it was agreed that the IEA charge the greater of \$US 1 for each certified person or US\$100 for the consideration of each application for endorsement of a certifying body and its system of certification, and that the IEA charge 50% of the application fee for annual renewal of endorsement. No refund would be given if the application was not successful. The IEA endorsement was to have a life of five (5) years. Where applications are not successful, the IEA Endorsement committee would list the deficiencies identified and resubmissions would be invited.

Some administrative Guidelines to be followed by the Sub-Committee were also developed. From 1999 it was instructed to give detailed consideration to the manner in which the process and standards satisfy:

- i) IEA criteria for endorsement of certifying bodies
- ii) IEA minimum criteria for certification of an ergonomist
- iii) IEA competency standards or a sub-set of them.

The newly established ERC received approval from the IEA Executive Committee to proceed with an initial certification endorsement in 2000, under the presidency of Waldemar Karwowski and with John Wilson as chair of the Professional Standards and Education Committee. Hal Hendricks was appointed chair of the ERC. The IEA had already been contacted by the Board of Certification of Professional Ergonomists (BCPE) in the United States and the New Zealand Ergonomics Society to indicate their interest in applying for endorsement as soon as the IEA was ready. The Japanese Ergonomics Society reported that they were working on the development of their own system of Professional Certification and would also be interested. Korea and Taiwan stated that they were also working in this direction.

To complement these efforts, an Accreditation of Educational Programs in Ergonomics Sub-Committee was established (see section on this theme below). It produced a set of guidelines for the accreditation of ergonomics educational programs and plans were made to produce a specimen Code of Conduct and guidance on ethical practice for ergonomics and ergonomists.

The BCPE received the first IEA endorsement for its certification system in October 2001 and it was given a plaque to attest to the endorsement. A document on the lessons learned during this case was produced, and the document "Minimum Criteria for the Process of Certification of an Ergonomist" was revised again (Version 4) in 2001 on the basis of this first experience<sup>9</sup>. The criteria for IEA endorsement of certification bodies was also revised at this time. John Wilson stressed that the IEA documents are guidelines, not prescriptions, and are intended as a resource by IEA Federated Societies. From 2003 to 2005 the chair of the Professional Standards and Education Committee (PS&E) was Carol Slappendel, whose goal was to actively promote the endorsement option to existing certification schemes and provide advice and guidance to Federated Societies in developing certification schemes<sup>10</sup>.

<sup>9</sup> It is believed by the authors that Versions 1-3 were produced by Margaret Bullock and John Wilson, however no records of these documents could be found which indicate authorship or dates of origin.

<sup>10</sup> In the (IEA) discussions at this time on the Minimum Specifications for a Master's Degree (Version 2, Sept 2005), concerns were expressed that the syllabus required was too large to be fitted into a one-year course of study. This was resolved by agreement that universities would be allowed some "specialisation", thereby enabling them to omit some "less important" topics from the full syllabus and so to "individualise" their own Master Degree courses. This agreement had implications for certification practices, which, as a consequence, could also be regionally individualised.

However, no applications for endorsement were received during her term. The Endorsement Review Subcommittee Members at that time were Stephen Legg, Francois Daniellou, Jerry Duncan, Harvey Cohen, and Neil Mansfield. They revised the IEA website information and made further minor changes to the IEA Certification Endorsement Application Form (revision of January 2004). They also conducted a questionnaire survey of the Federated Societies and other groups, to determine the existence and/or stage of development of their certification schemes. Brazil, Korea, Hong Kong, Nordic Countries, BCPE (USA), South Africa, New Zealand, China, Germany, Italy and South East Asia replied.

In 2006 Stephen Legg became Chair of the Professional Standards and Education (PS&E) Committee. He summarized the goals of the committee as follows: It maintains, develops and disseminates the IEA Directory of Ergonomics Educational Programs, endorses certification schemes (and provides advice and guidance about their development) and provides guidance on professional conduct, ethics and standards for ergonomics education. At this time the PS&E had three subcommittees: Directory of Ergonomics Educational Programs (DEEP), Professional Standards (PS), and Ergonomics Education (EE). During 2007, there was extensive consultation on the definition of a certified ergonomist. This debate highlighted the various types of ergonomists that can be defined depending on their interest in education, research or practice.

The definitions adopted in relation to these were:

- an ergonomist is an individual whose knowledge and skills concern the analysis of human/system interaction and the design of the system in order to optimise human well-being and overall system performance.
- an IEA recognised Certified Ergonomist is a professional ergonomist whose practice and training have met the quality criteria set by an IEA endorsed certifying body.

Subsequently, David Caple (President of the IEA from 2007 to 2009) and Tom Smith, then Chair of PS&E, agreed that, as a high priority task for the PS&E, the certifying bodies should be contacted to seek feedback as to their thoughts on certification. Tom Smith had been given this position following a submission to the IEA regarding how and why the endorsement approach might be improved. The Certification subcommittee included Kazuo Aoki, Chair of the Japanese Certification Program, Peter Budnik, Director of the Board of Certification in Professional Ergonomics (BCPE) and later Robert Bridger. They asked the known ergonomics certification boards what the proper role of the IEA should be as an endorsing body in the light of their experiences. Specifically they asked whether the IEA should assume any responsibility as regards professional endorsement or certification and, if so, what should this responsibility be?

The options were:

- a) Endorsing the professional acceptability of bodies that certify professional ergonomists (the only formal responsibility assumed by the IEA at that time)
- b) Endorsing the professional acceptability of educational programs that train ergonomists
- c) Certifying the professional qualifications of ergonomists themselves.

The letter further stated that the IEA was considering placing greater emphasis on the performance of the certifying body in the assessment process. It was stated that this would mean that the certifying body would be asked to provide information not only about the number of certifications that are processed (an input performance measure) but also about whether there are positive professional benefits for those who achieve certification (an outcome performance measure).

In 2007, Tom Smith produced a draft compliance checklist to formalize the procedure for assessing compliance with the IEA defined accreditation criteria.

In the IEA Triennial Report of 2009 (Presidency of David Caple) it was stated that the certifying bodies that have been accredited by the IEA include:

- Australia
- Europe (Centre for Registration of European Ergonomists – CREE)
- Japan
- New Zealand
- United Kingdom
- United States (BCPE)

At the end of his period as Chair of the Professional Standards and Education Committee Tom Smith suggested that the IEA apply for accreditation from the US National Commission for Certifying Agencies to provide a third party audit of the quality of the IEA accreditation services. However, the following officers concerned themselves primarily with the question of mutual recognition between the certification bodies. Peter Budnick, as Chair of the Endorsement Review Sub-Committee (now called Certification Sub-Committee) organized a special session on this topic at the IEA Congress in 2012 in Brazil (see sub-section on this topic).

Representatives from some of the ergonomics certifying bodies also met at the 5<sup>th</sup> International Conference on Applied Human Factors (AHFE) in 2014 in Poland. The meeting was organized by the IEA (PS&E) and the Japanese certification body to discuss certification and education in ergonomics. Participants were BCPE, Japan, Brazil, South Africa, and China and two Usability Certification Bodies (from Germany & Japan, both outside the IEA family).

A further session was organised by the Chair of the Professional Standards and Education Committee from 2012-2015, José Orlando Gomes, at the 2015 Congress in Australia. It included representatives of those Federated Societies with IEA endorsement, several who were expected to apply in the near future and one from a certification process for usability professionals. The aims were to strengthen and

expand the exchange of experiences on certification as promoted by the IEA and to rethink the certification goals to deal with new issues such as new areas of ergonomics (e.g. usability). Following this meeting the Sub-Committee for Certification was re-established with Maggie Graf as Chair.

During 2016 the IEA documents on the certification process were again revised, primarily with the aim of simplifying the language, and subsidiary documents containing flow-charts were produced. The impetus for this revision was feedback from newer Federated Societies that they were too complex and hard to understand. The revisions were accepted at the 2017 IEA Council meeting, where the decision was made to also revise the Core Competencies document to bring the competencies in line with modern teaching and certification practice, reflect the IEA strategy for the development of ergonomics and permit more flexibility for specialization.

Today there are certification systems for ergonomists in Europe, North and South America, Asia and Africa, although not all of them have applied for IEA endorsement. The following section describes the established systems known to the IEA. This is followed by a section on the development plans of several countries and regions in regard to certification.

### Currently established certification systems<sup>11</sup>

The Board of Certification in Professional Ergonomics (BCPE), established in the **United States of America**, was first incorporated as an independent non-profit organization in July 1990. It received the first IEA endorsement for its certification system in October 2001. It is governed by an elected board of leading professionals and is managed by an Executive Director and Executive Administrator. Applicants choose the designation that reflects their own preference: Certified Professional Ergonomist, Certified Human Factors Professional or Certified User Experience Professional. An Associate Professional designation is offered to professionals who have demonstrated their competency in education and are working towards the full professional certification, which requires three years of experience. In 2013, the base educational requirement was changed from a Master's degree to a Bachelor's degree, but the educational coverage of the core competencies in credit units remained equivalent to a Master's degree. Additionally, an examination is conducted. The exam consists of 125 multiple-choice questions in English and takes approximately 3 hours to complete. It is administered electronically within a two-month window, twice a year at proctored sites across the country as well as internationally. It is not necessary to live or work in the USA to become certified with the BCPE. Currently there are 905 people with professional level certification and 194 associate professionals.

In **Europe** certification for all countries within the Council of Europe (not restricted to European Union members) is undertaken by the Centre for Registration of European Ergonomists (CREE). CREE was established in February 1993 by eight ergonomics societies in Europe: The Netherlands, France, Portugal, United Kingdom, Belgium,

<sup>11</sup> Listed in order of number of certified professional level ergonomists, Figures accurate as of January, 2018.

Germany, Ireland and Sweden. It is governed by a Council composed of representatives from each of the member countries, although some countries have combined to have a single representative. The CREE Council now has representatives from 19 member Societies. The President, Secretary General and Treasurer are elected from the Council. CREE offers only one professional title: “European Ergonomist” (Eur.Erg). Candidates are primarily assessed at local society level according to rules established by CREE and formally endorsed at the biannual Council meetings where decisions are made, and unusual or complicated cases are discussed. A Code of Conduct must be signed as part of the application process. The title requires at least three years of university level education of which one must be in ergonomics and include minimum educational content in a list of ten areas of knowledge. Additionally, the candidates must demonstrate at least three years of professional work, preferably including a year of supervised practice by another certified ergonomist. A detailed assessment is made of the quality of professional work from project reports. Certified ergonomists must apply for renewal of the certification every five years and the quality of continuing professional development is a major criterion in the assessment. As at January 2018 just over 500 ergonomists were currently certified. The CREE system is endorsed by the IEA. Two countries in Europe (who are also part of CREE) offer other levels of professional accreditation internally (Italy and United Kingdom). The United Kingdom is particularly noteworthy, as the (currently named) Chartered Institute of Ergonomics and Human Factors has had its own membership selection system since its foundation in 1949, as the Ergonomics Research Society. In 1977 its name was changed to the Ergonomics Society and various categories of membership were introduced. The members are currently assigned to six membership categories: Associate members, Student members, Technical Members, Graduate members, Registered Members, and Fellows. In 2014 the CIEHF was granted “Chartership”, which is an official government recognition in the United Kingdom for professional societies and is associated with high professional status. Both Registered Members and Fellows may be eligible to call themselves Chartered Members, depending on confirmation of at least three years of university education, including a list of competencies, at least three years of professional experience and proof of ongoing professional development. The Fellows category is granted to very experienced members with a high level of professional success. Currently there are just over 420 ergonomists with the chartered level of membership. The CIEHF accepts applications from all over the world.

The Certification Program for Professional Ergonomists of **Japan** was established in August 2003 and endorsed by the IEA in May 2007. The governing body of the Committee consists of the chair, vice chair and other executive members selected from CPE members who operate the examination, general meeting, seminar and other events. After June 2007, two new certification programs targeting young practitioners were established. The system is quite flexible, offering options for assessment (exam, essay and interview or portfolio examination). Generally, a Certified Professional Ergonomist must have a college or university degree and at least two years of professional practice. Other levels of certification include Certified Associate

Ergonomics Professional (CAEP), and the Certified Ergonomics Assistant (CEA) designations. More than 330 people have been certified in these programs, of which 207 are at the highest level.

The **Brazilian** Ergonomics Society has a well-established certification system, called sisCEB, and it was endorsed by the IEA in 2018. The certification system took almost 10 years to build and was implemented in 2004 with two tracks: professional ergonomist certification and accreditation of training programs in Ergonomics (MBA-type). The sisCEB also certifies groups and enterprises offering services in the ergonomics field. It is supported by the Brazilian Ministry of Education. At the IEA conference in 2015 the representative from Brazil reported that local industry is looking more to those with certification. Currently the Society has 221 certified ergonomists and six university accredited training programs, with a further two in the evaluation process.

The **Canadian** College for the Certification of Professional Ergonomists (CCCPE), which is responsible for Canadian Certified Professional, was formed in 1998 and is governed by a Board comprising of seven members chosen by the Association of Canadian Ergonomists with respect to geography, language and the physical and cognitive areas of the discipline as well as ensuring that both language groups in the country are served. It now has 171 Certified Canadian Professional Ergonomists CCPE and 11 Associate Ergonomists (AE). CCCPE is working on an application to become endorsed by the IEA. It recently revised its list of educational requirements and core competencies; this has reduced the minimum number of hours in focused ergonomics education and formal work-term periods in the course of their core training. These changes provide more flexibility, recognising the Canadian educational system. A university level degree of at least three years covering five areas of ergonomics competence (at least 700 lecture hours and 8 weeks of field work) is required, and the quality of professional work is assessed.

The Human Factors and Ergonomics Society of **Australia** established a certification system in 1990, awarding professional status to 21 members of the Society. At first, university level training in a related discipline, at least three years of experience and recommendations by colleagues were required as the minimum certification criteria, but in 1998 the Society defined a set of core competencies which need to be demonstrated before certification would be granted. A Code of Conduct has always been required. An external firm was employed to prepare and submit the application for IEA endorsement and a celebration was held when it was granted. Today the Society has 83 certified members.

In December 2007 the Board for Certification of **New Zealand** Ergonomists (BCNZE) was endorsed by the IEA. At that time, the BCNZE operated as a separate body associated with the New Zealand Ergonomics Society. Consequent modification to the Society (now Human Factors and Ergonomics Society of New Zealand - HFESNZ) resulted in the professional membership categories and certification processes being included in the general membership structure. The HFESNZ currently offers five membership categories, with three of these being different levels of Professional (Certified) Membership. Professional Members must abide by a Code of Conduct. Applicants with at least 3 years of academic level education, at least one year of which was in Human Factors/Ergonomics, and one full time year of supervised practice in



Human Factors/Ergonomics may become Associate Professional Members. With a further two years of professional practice (at least one of which has been in New Zealand) the applicants qualify for full professional status. Technical Professional Members must carry out Human Factors/Ergonomics as a significant part of their work (though they may not call it that), and must have done a number of significant HFE projects over recent years. They must have detailed knowledge of at least one topic, and some knowledge of anatomy and physiology, the work environment, people and systems, psychology, methods and tools, and they should be working with a 'systems' approach. Certification to practise in the health and safety sector in New Zealand has become increasingly important in recent years as a result of Government regulation and this has supported the activities of the Society.

The **Mexican** Ergonomics Society established a certification body called the National Institute of Ergonomics in 2004. It has two certification categories: Certified Associate Ergonomist and Certified Professional Ergonomists. Currently there are 31 in the first category and 18 in the second one. In **Chile** a certification body was established in 2013 and it currently has 23 certified professional ergonomists. Neither of these bodies has yet applied for IEA endorsement.

Professional certification in **South Africa** is currently under development. It has now reached a stage where the Ergonomics Society of South Africa (ESSA) can perform certifications internally, as there are more than three ergonomists, who have been approved by an IEA recognised certification system and are prepared to form a certification board. This was done for the first applicants by CREE, who provided the necessary support to get the certification system off the ground. It is intended that when sufficient applications have been processed, an application for IEA endorsement will be filed.

### Local and regional initiatives

Since 2005 the certification endorsement officers of the IEA have actively promoted the establishment of certification systems in Latin American and Asian countries. In regard to Latin America, moves have been made, or discussions had, in Mexico, Peru, Argentina and Colombia. A significant issue in the region is that there are few professors qualified in ergonomics in the universities, which means that there is little scientific competence to train people. The IEA, particularly the International Development Committee Chair 2015-2018, Andrew Todd, and José Orlando Gomes, PS&E Chair from 2012-2015 and IEA Treasurer from 2015 have made it a priority to help support the development of training courses in the region.

In Asia, there is a great deal of variability between the countries. At the 2015 IEA Conference in Melbourne a representative from the Indian Ergonomics Association reported that they were considering the development of a certification system. At the Asian Conference of Ergonomics & Design 2017, which took place in Japan, there was also a symposium on certification. It was reported that some societies have or are developing a system of certification, but others do not intend to do so. The Chinese

Ergonomic Society has 400 members and to be a member you need to be at least an associate professor in an ergonomics field. The Taiwan Society has indicated that they welcome a relationship with the other Chinese speaking countries to assist with the development of certification. Both the Societies from Indonesia and Malaysia are establishing certification bodies, but the Singapore Society has decided that it is not economical to develop its own certification and would encourage the local human factors and ergonomics professionals to apply for certification from the BCPE or CIEHF (both of which accept applications from other countries).

Several Asian societies have reported that they would prefer to have a limited scope of certification (not the full spectrum of competencies) or multiple levels of certification, however they would like formal IEA recognition for these systems. An important issue which needs to be addressed is the large variety of disciplines to which ergonomics practitioners belong and the consequent difference in their educational backgrounds. The certification system proposed by the Human Factors and Ergonomics Society of Malaysia offers three stages in order to cater for the diversity of educational and experience backgrounds of the ergonomics practitioners in Malaysia. It ranged from a very basic level, called the ergonomics trained person (ETP), to an ergonomics assessor (EA) for the intermediate level and then to a full professional ergonomist (CPHFE). Both ETP and EA are recognised by the department of Occupational Safety and Health in Malaysia. The professional ergonomist has a comprehensive combination of knowledge from physical, cognitive and organisational ergonomics and this certification is administered by a separate accreditation body (Myhfe services LLC). In order to safeguard the standards of ergonomics practice, endorsement of the IEA will only be sought for the professional ergonomist level.

The Indian Ergonomics Society has also expressed the need to have multiple levels of certification rather than a single high level, e.g. a high level equivalent to the BCPE and one or two lower levels. They feel that a strong business case exists within industry for a large number of certified ergonomics consultants or service providers at the lower level but very few at the higher levels. The people certified at lower levels of skill and knowledge should still demonstrate some competency across the main application areas, e.g. physical and cognitive ergonomics.

An effort to form a collaborative Asian certification system, similar to CREE in Europe, was discussed during 2016 and 2017 but this has not been pursued due to substantial differences between development levels of ergonomics in the Asian countries. Both the Ergonomics Societies of Russia and Israel have also put energy into the development of certification programs. The Russian Society has considered joining CREE but is currently waiting to see what develops as a consequence of the establishment of the BRICS network in the IEA (Brazil, Russia, India, China and South Africa), which is considering the development of a common ergonomics certification system. Israel approached CREE to request membership in 2009, but this was not accepted on the grounds of the CREE Statutes which limit membership to the members of the Council of Europe. They are currently developing a national system.

### Accreditation of educational programs in ergonomics

Encouraging the harmonisation of the content of ergonomics training has been of interest to members of the IEA since the early 1990s when the first documents on this theme were published. Margaret Bullock, the first PS&E Chair from 1997-2000, proposed an IEA accreditation system for ergonomics training courses, however this required an agreement on the contents of such courses.

John Wilson, as PS&E Chair 2001-2003, and Stephen Legg, his successor in 2004 to 2006, tried to get international consensus on the content of a standard for a one-year post-university graduate level course. In some countries this is called a Master Degree course, but this term is not used in all countries and differs in meaning, even where it is used. They aimed to collate the contents of ergonomics training programs to identify the common content. Several international “consensus meetings” were held and a detailed and prescriptive document relating to Masters level education was produced. Perhaps the most significant issue in gaining international agreement, as mentioned above, relates to disagreement about the “depth” of ergonomics training. Today there is a large amount of consensus across the world in regard to the level of ergonomics training for professional ergonomists, with most member societies accepting the IEA recommendation of one year of university level ergonomics training as the standard for professional practice.

The “width” of the training is a more contentious issue, as many university courses are specialised in specific areas of ergonomics practice. Identifying principles that are applicable to the whole field has not proved easy. The IEA has traditionally maintained that some knowledge of physical, cognitive and organisational ergonomics should be included in all courses aiming at training professional ergonomists. The argument is that the systems approach of the profession could be compromised if these aspects are not included in the training.

Initiatives by the BCPE are relevant to this discussion: They have conducted a series of job analyses. The first was led by a committee made up of representatives from the professional society, along with other stakeholders and scientific bodies. It performed reviews of job/task analyses to identify the knowledge, skills, and abilities required of human factors/ergonomics practitioners. The results were passed to the Human Factors Society to use for course accreditation. Interestingly task analysis would be considered the core business of ergonomists in many countries e.g. France, demonstrating the wide diversity in application domains across the world.

Along with the IEA, the BCPE, CREE and sisCEB have addressed the topic of accrediting educational programs, with varying degrees of success. The sisCEB seems to be successful but the IEA, BCPE/HFES and CREE have moved away from direct course accreditation. Significant issues relate to the continually changing courses and the resources needed for the accreditation.

Thomas Smith, PS&E chair from 2007-2010, submitted a document “Development and Promulgation of Guidelines Regarding Graduate Education in Ergonomics. The Role of the International Ergonomics Association: A Perspective” to the IEA executive

in 2007. This document pointed out a number of deficiencies in the IEA guidelines and questioned the usefulness of the IEA approach for its members, particularly in developing countries. He supported the development of guidance standards for the accreditation of university programs but argued against providing prescriptive guidance on course content, arguing that there was already a large amount of overlap between the requirements of the certification bodies and that this was sufficient. He produced a comparison table which included the requirements for the BCPE, CREE and Japanese Ergonomics Society to demonstrate his point.

Since that time there have been no further efforts to develop IEA course content standards and the IEA has not accredited any educational programs.

### Current issues for certification

The question as to who should regulate professional certification, particularly if it should be by the regional government or by the (regional or international) professional societies, is important to the IEA for its strategic development. In most countries, professional certification is left to professional societies, but governments may endorse particular societies, giving them sole right to certify a particular profession, such as is the case today with ergonomists in the United Kingdom. However, in the European Union context, the trend is toward a more open profession with less government regulation. It is not always the case that more government regulation is better. Government regulations create both opportunities, e.g. potential enormous growth in the need for ergonomics skills, and threats, e.g. when the regulated scope of ergonomics includes only one or two of the core competencies (see below), the risk of devaluing the profession increases and the professional societies can become flooded with low qualified people (“Technical Members”). This has been shown to block further development and carries the risk that the reputation of the profession becomes severely damaged. On the other hand, in many countries there is an increasing need at government level for quality standards in the occupational health and safety professions and this can be seen as positive for the development of ergonomics, although it may lead to one-sided development of the profession. However, governments do not generally wish to be responsible for professional certification themselves, and leave it to respected national professional organisations. This frees the government from administrative responsibilities. The advantage for the professional societies of administering the certification themselves, is that the system has more flexibility and can respond to changes in society and evolution in both the discipline and the profession more quickly. The challenge here is for national societies to gain sufficient respect to be accepted by the government authorities as a professional organisation. Establishing a certification system that conforms to international standards and that is endorsed by an international organisation (e.g. IEA) is generally sufficient evidence of a mature professional society.

A continuing issue in most countries has been the lack of infrastructure devoted to training and education in ergonomics. Most ergonomics training was (and still is) embedded within diverse academic departments such as psychology, engineering,

medicine, anthropology, kinesiology and others. There is only a relatively small number of university departments or faculties that provide degrees in ergonomics as a unique discipline or profession. Consequently, many ergonomists view themselves first and foremost as something else (e.g. psychologists, engineers, physicians, industrial designers, etc.). Programs dedicated specifically to the science of ergonomics, and centres of scholarship in ergonomics help the discipline grow. The Societies in several countries and regions have overcome this matter by providing information to their members about how they could obtain the education necessary to become certified, by attending courses at diverse institutions. The development of distance learning programs has also assisted in overcoming this problem and it is expected that this type of program will expand in the future.

One of the requirements for IEA endorsement of a certification system is that it is independent of any commercial interests. In some areas the IEA Federated Society runs quite separately to the Certification Board, for example the Human Factors and Ergonomics Society is the federated member of the IEA in the USA and the BCPE conducts certification. IEA checks that certification bodies are mandated by the local society as part of the endorsement process. This separation of functions maintains stability on the certification boards. On the other hand, it may mean that in time the organisations become too separate to offer much support to each other. This happened in Europe, where the mandating societies almost forgot about CREE for a while around the turn of this century. When the FEES was formed (the Federated umbrella organisation of the European Ergonomics Societies), there was a lot of confusion in several national societies about the roles of CREE and FEES, where it was felt that there was a duplication of functions, but it has actually helped CREE to have FEES. FEES is able to “remind” the national societies about certification and promote certification much more directly than CREE can do, as the Society representatives may not be board members of the member societies. FEES is better constituted to represent the profession to external agencies. On the other hand, Japan had a lot of issues with the requirement to separate their certification board from the society, as they were worried about losing influence, and this is a possible downside. Some form of formalized information exchange is strongly advised.

Perhaps the most challenging issue for the IEA is to meet the needs of the profession, both in the well-established Societies and in the newer ones, in terms of flexibility of the educational requirements. It is the view of the IEA that lowering the level of professional certification is not an option: University level training of at least three years, which covers most of the areas included in the Core Competencies recommendations will remain mandatory for IEA endorsement of a certification system. However, the certification system may contain lower levels (e.g. associate members) or include technical members who are highly specialized. The open question for the IEA is, how much specialization can be allowed for professional members? With the rise of usability specialists the BCPE, the CIEHF and CREE have all revised their requirements to permit lower levels of competence across all fields of ergonomics

where a higher level of competence in a specialty has been acquired. In many developing countries the wish to have high level training in physical ergonomics but less knowledge in other areas, reflects the needs in the workplaces of their countries.

### Mutual recognition between certification bodies

The recognition by the IEA endorsed certification systems of the professional certification offered by the other endorsed systems (mutual recognition) has long been discussed. There are several mentions in the IEA meeting notes during the 1990s of an agreement between the BCPE and CREE regarding mutual recognition. Before CREE was formally established, five Societies in Europe agreed in a document entitled “Harmonised Ergonomics Training for Professional Ergonomics Practitioners (HETPEP, 1992) on the educational and experience requirements for certification<sup>12</sup>. The educational requirements of this document were taken over by the BCPE as it was formed. In 1994 it was agreed between the BCPE and CREE that CREE would confine its activities to certification of practitioners within Europe and the BCPE would offer certification to people from all other countries. This was not a mutual recognition agreement, but rather an agreement to restrict competition between certification bodies. However, Nigel Corlett, the first President of CREE, proposed to the BCPE in 1995 that “if (an ergonomist is) seeking (certification) within a specific country or region for a temporary term, not to exceed 3 years, (there) shall be issued a letter of recognition by the appropriate BCPE or CREE office”. It is not known whether anyone ever applied for such a letter. With the accreditation of the BCPE by the Institute for Credentialing Excellence (ICE) such an agreement would have needed to be reconsidered and reviewed, as the requirements of ICE pose administrative complications for such mutual recognition.

At the Council Meeting of 1998, when the original IEA endorsement process was being established, it was noted that the IEA does not require reciprocity agreements as part of the process of endorsement of certifying bodies. The question was raised in IEA Council discussions again in 2007 and in 2008 it was proposed that the IEA facilitate mutual recognition by different certifying bodies. It was decided that the IEA could provide information comparing the requirements of the different certification bodies and that the PS & E committee would facilitate a discussion between existing certifying bodies for mutual recognition of professional ergonomists. At the 2009 IEA Triennial Congress a panel session was organised on the advocacy of mutual recognition. There was participation from Kazuo Aoki (Japan), Peter Budnick (BCPE), Ernst Koningsveld (CREE) and Marcelo Soares (Brazil). CREE recommended support for the idea, BCPE supported partial recognition of credentials from another jurisdiction and the Japanese Board supported mutual recognition among bodies endorsed by the IEA.

<sup>12</sup> The working group was composed of Pieter Rookmaaker (Chair, The Netherlands), Yvonne Queinnec (Society of French Speaking Ergonomists SELF), Nigel Corlett (Ergonomics Society, UK), Willy Swier (Society for Work Sciences GfA, Germany) and Karel Hurts (Association of Nordic Ergonomics Societies).

From 2010 Peter Budnick (HFES) became Chair of the Certification Sub-Committee and in 2011 he was requested by the IEA executive to make recommendations regarding mutual recognition among various certification bodies, and to launch a review of the IEA certification accreditation process for compatibility with mutual recognition findings. At the 2012 Council Meeting Yushi Fujita commented on the PS & E accomplishments of the year: The idea of mutual recognition is generally supported

and most certifying bodies agree that the IEA endorsement should be the basis of the mutual recognition. However, it remains difficult for BCPE to accept the IEA-based mutual recognition due to the ICE accreditation and the CIEHF now has similar constraints due to their national “chartership”. CREE has made the decision that people who have been certified for at least five years at the professional level by

an IEA endorsed system, and who have moved permanently to a country within the geographical area of Europe, may be granted CREE certification using the renewal procedure. This does not require a complete re-examination of the educational requirements. The work history of the last five years will be assessed for ergonomic quality and continuing professional development.

#### **A final remark**

Over the past decades significant steps have been made over much of the world to establish systems for the acknowledgement of professionalism in ergonomics and human factors. These steps were possible through local initiatives and by the stimulation of the IEA. The discipline can be proud!

## Ergonomic Quality in Design (EQUID)

*Ralph Bruder*

### **Development of EQUID**

The initiative for the development of the IEA Ergonomic Quality in Design Program (EQUID) started during the presidency of Waldemar Karwowski (2000-2003) (see also History of IEA 2000-2003). The rationale behind this initiative was the “*ever growing proliferation of claims (often not validated) for ‘ergonomically designed’ products and systems that appeared in a variety of magazines, trade journals, and websites.*” (Waldemar Karwowski, *IEA Triennial report 2000-2003*).

One aim of the IEA EQUID Program is to support the public to make more informed decisions about ergonomic quality of products. Furthermore, it was and still is the intention of the EQUID initiative to promote the integration of ergonomics into the design process for products and services. And last but not least the EQUID program could be a field of application for specialists in Human Factors and Ergonomics. The initial idea was to assess the ergonomic quality of a design process (for products but also for work systems and services) and to have an EQUID certification program. Consequently, in 2001 two subcommittees were established: one for the criteria for assessment of the design process and one for the criteria for accrediting the Quality of Ergonomic Design certification body. Later on these two subcommittees were combined into an EQUID working committee chaired by Waldemar Karwowski. As a result of the IEA Council meeting in Seoul 2003 the status of the EQUID working committee was changed to an IEA Standing Committee and as an implication of this decision the chair of the EQUID Standing Committee became a member of the IEA Executive Committee.

During the presidencies of Pierre Falzon (2003-2006) and David Caple (2006-2009) the EQUID Standing Committee continued its work focusing on the development of a document to define the process requirements for product design. Pascale Carayon, Lina Bonapace, Michel Naël and Klaus Zink actively supported the development of EQUID within the IEA bodies. I took over the position of chair for the EQUID Standing Committee in 2008.

Under the presidencies of Andrew Imada (2009-2012), Eric Min-Yang Wang (2012-2015) and Yushi Fujita (2015-2018) the further development of EQUID and especially the distribution of EQUID was and still is an important part of the working agenda. The status of the EQUID Standing Committee changed in 2009 and the development of EQUID became a part of the IEA Standing Committee Development and Promotion which I chaired from 2009 to 2012.

The development of EQUID was a topic on numerous IEA Council meetings. The discussions during the Council meetings focused e.g. on the following topics:

- Not getting involved in the certification of product design processes
- Intensification of the contact with stakeholder institutions like ISO or professional bodies in Design
- Include case studies to better understand the benefits of the EQUID process
- Consideration of the relation between EQUID and other Human Related Design Processes (e.g. ISO 9241 series)

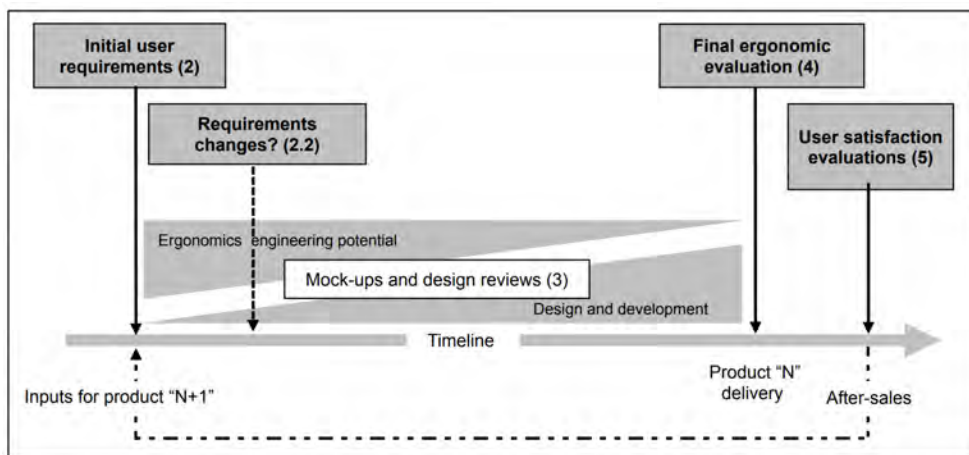
### EQUID document

Starting in 2003 a document to describe EQUID and to define EQUID Design Process Guidelines was produced in different versions.

Several experts had been involved in the discussions about EQUID and in the development of the EQUID document on process requirements for product design: Vassilis Agouridas, Steven Belz, Olle Bobjer, Pierre-Henri Dejean, Wolfgang Friesdorf, Sebastian Glende, Jiyoung Kwahk, Hugh McLoone, Bernard Meegan, Yvonne Toft, Sung Han, Daniel Podgorski, Thomas Berns. And especially Michel Naël, played an important role in coordinating the work on the latest versions of the document.

There had been two inquiries with experts from industry, academia and consultancy on different versions of the document (Nael, 2011). The main feedback was positive and there had been comments on the necessity to improve the readability of the document as well as the implementation of the EQUID design process in practice.

An essential part of the IEA document is the EQUID design process (figure 1)



EQUID Design Process (IEA, 2008)

The EQUID Design process starts with the definition of user requirements that are stated in a user requirements document (see (2) in Figure 1). If there are changes to these user requirements the document has to be changed accordingly (see (2.2) in Figure 1). During the design phase ergonomic reviews have to be considered (see (3) in Figure 1). The results and consequences of these ergonomic reviews have to be documented as well. A final ergonomic evaluation in reference to the user requirements shall be performed and a final ergonomic evaluation report shall be created (see (4) in Figure 1). After-sales information of user satisfaction shall be collected and analyzed. This information should be used for continuous improvement of the product (see (5) in Figure 1).

The document EQUID Design Process Guidelines, Requirements for ergonomic quality management in the design process for products and services Version 2.0 is published by IEA press and available on the IEA website (IEA 2008).

Since 2011 Karen Lange-Morales from Universidad Nacional de Colombia has been intensively involved in the further development of EQUID. She and Gabriel Garcia-Acosta, from Universidad Nacional de Colombia as well, combined the EQUID approach with the stages of a whole product life cycle and came up with a matrix where the requirements for ensuring ergonomics quality in design are related to the different phases of a product life cycle (Lange-Morales et al., 2014).

The practical usefulness of the EQUID approach had been studied by several case studies.

### Distribution of EQUID

The EQUID initiative and the EQUID Design process had been presented at several international conferences, e.g. IEA Triennial Congress Beijing 2009, Conference of the German Ergonomics Society Chemnitz 2011, International Symposium on Human Factors in Organizational Design and Management Grahamstown 2011, IEA Triennial Congress Recife 2012. The extended version of EQUID being integrated within a whole product life cycle has been presented e.g. at the Human Factors in Organizational Design and Management Conference Copenhagen 2014.

A handbook on Ergonomic Quality in Design (EQUID) published by IEA press is under development. This handbook will describe the EQUID approach in the context of a product life cycle in an easy to understand way and it will contain several case studies on how to use the EQUID approach.

In 2008 an official contact between IEA and ISO took place concerning the integration of the EQUID document into the standard series of the Technical Committee (TC) 159 "Ergonomics" of ISO. The decision was taken not to implement the EQUID approach directly into an ISO standard. Instead the intention of the EQUID approach to make the management of an organization more aware of ergonomic processes was used as a starting point for new ergonomic standards at ISO. Not at least because of the contact between IEA and ISO an initiative for a standard series on the human-centered organization was started. In 2016 the ISO standard 27500 "The human-centred organization – Rationale and general principles" was published. Since 2017 a draft

version of ISO 27501 “The human-centred organization – Guidance for managers” has been available.

## References

IEA (2008): EQUID Design Process Guidelines, Requirements for ergonomic quality management in the design process for products and services, Version 2.0, IEA Press, ISBN978-0-9976041-0-8

Lange-Morales, K.; Garcia-Acosta, G.; Bruder, R. (2014): The EQUID approach: improving ergonomics quality in product-life-cycle. In: Broberg, N. Fallentin, P. Hasle, P.L. Jensen, A. Kabel, M.E. Larsen, T.Weller (Ed.): Human Factors in Organizational Design and Management – XI Nordic Ergonomics Society Annual Conference

Nael, M. (2011). The IEA EQUID Template for Cooperation between Product Designers and Ergonomists. In Karwowski, W., Soares, M. and Stanton, N. (Eds.), Handbook of Human Factors and Ergonomics in Consumer Product Design: Methods and Techniques. (Chap. 18, pp. 261-272). Boca Raton: CRC Press Taylor & Francis.

## IEA Awards

Over the years IEA introduced several awards to recognize people who made outstanding contributions to the discipline or to the Association. The history of the awards is described below under ‘Past Awards’. Today there are two major categories: yearly awards, and triennial awards. First the two yearly awards are described.

### The IEA Fellowship

At the end of the century the IEA Fellowship was introduced. The IEA Fellowship is given to recognize extraordinary or sustained, superior accomplishments of an individual. To be considered for a fellowship two eligibility criteria must be satisfied. The candidate must have been a Full Member in good standing of a Federated or Affiliated ergonomics Society for at least the preceding 10 years, and the candidate must have served the ergonomics community at an international level. International service means activities including service to the IEA, and an extensive publication record in international journals or international consulting or service to the United Nations organizations, or similar. The nominee’s service to the society, the IEA, and the ergonomics profession has to be described. In addition, the candidate’s distinction as ergonomics professional must be demonstrated.

Nominations for the IEA Fellowship award can be made annually by any Federated Society, and not exclusively for their own members. Certificates are presented in the awards ceremony at the next IEA Triennial congress. In the first years nominees were assessed by an Awards Committee, chaired by the President (since 1995 by the Past President). As from 2006 the Past President invites all actual IEA Fellows to assess the nominees. In October 2018 127 individuals had received the honor of the IEA Fellowship. A full list, including those who passed away, can be found at the IEA website: <https://www.iea.cc/award/recipient.html>

### The IEA/Liberty Mutual Medal

The yearly IEA/Liberty Mutual Medal was instituted in 1998 and consists of a plaque (certificate), medal, and monetary award (US\$ 10,000). This medal recognizes outstanding original research leading to the reduction or mitigation of work-related injuries and/or to the advancement of theory, understanding, and development of occupational safety research. The IEA/Liberty Mutual Medal winners are selected by an international review committee established by the IEA. All recipients of the IEA/Liberty Mutual Medal are invited and expected to present their research at the next IEA Triennial Congress, using part of the monetary award for travel to the Congress.

### Triennial awards

For the first four awards described below, recipients are selected by the Awards Committee based upon nominations from federated societies.

#### *The IEA Distinguished Service Award*

This was the first IEA Award, introduced in 1981 and presented for the first time in 1982. The IEA Distinguished Service Award is presented triennially to individuals for outstanding contributions to the promotion, development and advancement of the

IEA. Recipients are selected by the Awards Committee based upon nominations from federated societies.

#### *The IEA Outstanding Educators Award*

Then in 1991 the IEA Triennial Outstanding Educators Award was introduced, this is presented triennially to persons 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
- Graduated persons who have become outstanding ergonomists.

#### *The IEA Award for Promotion of Ergonomics in Industrially Developing Countries*

Also introduced in 1991, the IEA Award for Promotion of Ergonomics in Industrially Developing Countries (originally The IEA Ergonomics of Technology Transfer Award) is given triennially to a person(s) who has made significant and outstanding contributions to the Development of Infrastructure of Ergonomics in an industrially developing country. This may be manifested through development of teaching/training programs, implementation of ergonomics design in industry, development of R&D programs, organization of ergonomics professionals, and extensive collaboration with international bodies such as United Nations.

#### *The IEA Ergonomics Development Award*

The IEA Ergonomics Development Award is presented triennially to persons who have had an international impact on ergonomics in terms of making a contribution or development which:

- Significantly advances the state of the art of existing ergonomics sub-specialty
- Opens up a new area of ergonomics research and/or application.

The award was first presented in 1991.

#### *The IEA President's Award*

Starting in 1997 the IEA President's Award is presented triennially to persons who have made outstanding contributions to ergonomics or the furthering of ergonomics, and whose contribution does not clearly fall into one of the other award categories. Persons qualifying for this award do not necessarily have to be ergonomists. Nominations may come from the IEA Council or the IEA Executive Committee. Final approval of this award rests with the IEA President.

#### *The K.U. Smith Student Award*

The IEA K.U. Smith Student Award was launched in 1997 through an agreement with the St. Paul Foundation, which provides overall management of the Fund. The award provides a tangible means by which the IEA can encourage the development of the discipline, foster scholarship and recognize worthy achievements. The purpose of the award is to honor a deserving student responsible for an application of or contribution to ergonomics. The award consists of a cash amount of US \$3,000. Any student enrolled in an accredited

post-secondary institution (college, university, technical or vocational school) is eligible to apply for the award. All areas of ergonomics are eligible for consideration. Examples of applicable projects include an applied ergonomics project, a human performance study or analysis, a design project or product, a research project undertaken in the laboratory or field, or a theoretical/conceptual contribution to ergonomics. This study endeavor should be documented in a paper submitted to the IEA Congress.

#### *The IEA/Elsevier John Wilson Award for Applied Ergonomics*

This award is presented in honor of John Wilson (1951-2013), Professor of Human Factors at the University of Nottingham, where he was Director of the Institute of Occupational Ergonomics until his death, and Head of the Human Factors Group (until 2006). The IEA/Elsevier John Wilson Award recognizes major contributions in the field of applied ergonomics. As Editor of the journal, Professor Wilson demonstrated tremendous leadership and transformed the journal into one of the best human factors and ergonomics journals. The award was introduced in 2015.

#### *The IEA Human Factors and Ergonomics Prize*

This award is presented to a group, institution or organization that has made significant contributions to research and development, and/or application of knowledge generally in the field of human factors and ergonomics. The first award was granted in 2015.

#### **Past awards**

After having appointed three individuals as honorary members of the IEA in 1967, in 1976 a discussion on awards started. In 1978 an ad hoc committee of Council concluded that, since the IEA has no individual members, the Honorary Membership would be removed from the rules. The committee advised to introduce awards. Nominees from any member of IEA would be assessed by an Honours Committee, soon called Awards Committee, which was chaired by the President.

*Honorary members.* In 1967 three individuals were nominated as Honorary Members of the Association: Prof. Gunther Lehmann (D), Prof. Erich A. Müller (D), Frederick Bartlett (UK).

*IEA Founders Award.* This in 1988 proposed award was presented to individuals who were active in the foundation of the IEA, or who performed as teachers or researchers in the early years of ergonomics and human factors. In 1991 Jean Scherrer (F) received this award, followed in 1994 by Karl U. Smith (USA), who passed away that same year. In 1997 the award was granted to William F. Floyd (UK), and in 2000 Wesley E. Woodson (USA). Soon after, IEA decided that the group of living people became too small to let this Award make sense; as a consequence the award was no longer granted.

*IEA/JOSE Best Paper Award* In the years from 2003 – 2009 this sponsored award was granted to authors of best paper published in the journal JOSE, International Journal of Occupational Safety and Ergonomics.

#### **Awardees**

All awardees, except for the Founders Award, can be found at the IEA website: <https://www.iea.cc/award/recipient.html>

# Remembrances of a long strategy process (1975–2012)

Jan Dul

## Introduction

On February 4, 2012 forty-one council members of the International Ergonomics Association, representing their federated societies from all over the world, gathered in Recife, Brazil to decide about the future of ergonomics. An ad hoc committee that I chaired had prepared a position paper with proposals for major changes of the content and the positioning of the ergonomics discipline and profession. After the document was discussed, the council members had to vote on the following motion: “the IEA Council adopts the white paper *A strategy for human factors/ ergonomics: developing the discipline and profession as a guide in the development of a strategic and action plan*”. The motion was accepted unanimously, and a new path for ergonomics was paved. Just after the meeting in Recife the white paper was published as an article in the journal *Ergonomics*. The article is one of the most cited articles of this journal.

It took a long time to get to this point of having a strategy for ergonomics. And it will take a long time until we all walk this way. Ergonomists and ergonomics societies share many values, but have also major differences. In some parts of the world the focus of ergonomics is on engineering and performance, in other parts on medicine and health and safety. Some ergonomists focus on products, others on production. In some regions the general public understands what ergonomics is but not what human factors is, in other regions it is the other way around.

Why was it needed to define a new future for ergonomics? How was it possible to find a common path in a very diverse field? How was the ergonomics community involved in formulating its future? In this chapter I will discuss these questions from a personal perspective. I will not only describe the last year of the process, when the committee that I chaired produced the white paper. I will also describe its prelude when successful guideline-based classical ergonomics, started to show some cracks, followed by a variety of early signals of decline, but also opportunities for revitalization. I do not claim to present an objective history of the development of ergonomics. I describe these developments from a very personal perspective.

My perspective on ergonomics has emerged over a long time. In 1975 I walked in the university library of Twente University of Technology, the Netherlands, looking for a topic for my Master thesis in Mechanical Engineering. By browsing (literally!) through books and journals, I was looking for a topic that links technology to human needs. I found copies of the journals *Applied Ergonomics* and *Ergonomics*, and read articles about this unknown field to me. Immediately I knew: this is my field. Today I am still working on ergonomics, now as professor of ‘Technology of Human factors’ at the Rotterdam School of Management, a research-based business school that is part of the Erasmus University in the Netherlands.

I divide this chapter in four time periods. The first period is 1975–1997 when ergonomics was booming and ‘classical ergonomics’ was a respected field. The second period is 1997–2003 when the cracks appeared, and ergonomics had difficulties to link itself with decision makers and major societal and technological developments. The third period is 2003–2009 when I explored ideas for reconnecting ergonomics to major societal trends and to decision makers in business, and when I was a member of the executive committee of the IEA responsible for ‘Development’. The fourth period is 2009–2012. In that period preparations for establishing the IEA ad hoc committee on the future of ergonomics were made, and the committee started its work. The goal of this committee was to produce a position paper (‘white paper’) on a strategy for the ergonomics discipline and profession. The final part of this chapter is a short reflection on ‘what next?’

## Classical ergonomics (1975–1997)

The first period that I describe starts with my discovery of ergonomics in 1975. Ergonomics was upcoming and I wanted to be part of it. Although hardly any ergonomics courses were offered at my university, I integrated ergonomics in my mechanical engineering study by following classes that were given at other schools about anatomy, physiology, and psychology. One major ergonomics activity was my study of an ergonomics project at the Philips company in Eindhoven, the Netherlands. Philips is the cradle of Dutch ergonomics, and also partly of international ergonomics. In the 1950’s and 1960’s a visionary multidisciplinary group of Philips professionals, including medical doctors Georg Burger and Paul van Wely, engineer Tom Kellerman, and psychologist Paul Willems, invented ergonomics in practice. Burger was internationally active in the establishment of the ergonomics discipline. In 1957 he chaired the steering committee that was linked to the European Productivity Agency, which committee advised ‘to establish an international body’ about ‘fitting the job to the worker’. This body became the International Ergonomics Association (IEA). In 1957 the technical seminar ‘Fitting the Job to the worker’, of the European Productivity Agency was held in my current hometown Leiden, the Netherlands, where the following objectives for the discipline were formulated:

1. “Acquire knowledge in the various disciplines (e.g. time and motion studies, occupational medicine, psychology, industrial hygiene) to understand and improve physical and mental working conditions”
2. “To create a true interest on the part of industries in a better adaptation of workplaces to the workers’ capabilities, to improve the workers well-being and industrial productivity”

Note that these original ideas for the new discipline already contain the three core elements of ergonomics that have been appreciated by ergonomists and have characterized ergonomics throughout the years: systems approach, design driven, dual objectives (well-being and performance). After the establishment of the IEA in 1959, Burger also chaired an IEA working group that produced the ‘IEA checklist’ for job analysis (Burger and De Jong, 1962). This ‘guideline approach to ergonomics’ became very successful. In 1963 Philips published the book ‘Vademecum Ergonomie’ by Kellerman, van Wely and Willems. Together with Etienne Grandjean’s classic ‘Fitting the task to the



man' (1969) this was one of the first broadly accessible resources of ergonomics. The Vademecum was translated into 11 languages and became an international bestseller. In this book general ergonomics principles were explained, and more importantly, were translated into practical guidelines for designers of work systems.

More than ten years later I visited the Philips group to study the Philips ergonomics approach. In particular I studied the process of designing an 'ergonomic lathe' that 'tilts the work towards the eyes' for better visibility, working posture and performance. One of the lessons was that only design principles that were formulated specifically, rather than generally were ultimately integrated in the final product. Another lesson was that successful design not only improves well-being but also performance. By tilting the work to the worker, both the worker's well-being and the worker's performance are improved. Later, during my master thesis project in 1979, I applied the same ergonomics principle of tilting the work to the eyes, and the same implementation principle of having concrete guidelines to the design of an office desk. This office desk had a slanted working surface for reading and writing: the main tasks of an office worker in a time that personal computers did not exist yet. A prototype of the design was produced by a large office furniture company but the final design was not produced because of an upcoming new technology: the Visual Display Unit on a worker's office desk.

The 'guideline approach' of ergonomics developed by early ergonomists --concrete practical guidelines, combined with linking ergonomics to performance-- made it possible that ergonomics principles became part of the design process. This approach was also adopted by the IEA. In 1973, during a symposium in the United Kingdom, the IEA made the recommendation to the International Standardization Organization, to start formal standardization in the field of ergonomics. One year later the ISO established a Technical Committee, TC 159 Ergonomics, to develop such standards. The first ergonomics standard was published in 1981, as general guideline on ergonomic principles in the design of work systems (ISO 6385). Between 1981 and 1997 the number of International ISO standards on ergonomics increased rapidly. In 1995 18 standards were published and 31 standards were in preparation. The topics ranged from general standards about workplace and equipment design (including for Visual Display Units) and for specific aspects of the environment (e.g., noise, climate).

A further boost to the ergonomics 'guideline approach' was when governments started to appreciate the guideline approach of ergonomics. In many parts of the world general ergonomics principles became part of legislation for healthy and safe working environments and healthy and safe use of machines. Ergonomics guidelines could be readily used for this purpose. For example, in Europe the first 'Machinery directive' came into effect in 1989 to harmonize the minimum safety requirements of machinery. This directive mentioned the general ergonomics principle as one of the 'principles of safety integration' as follows: "Under the intended conditions of use, the discomfort, fatigue and psychological stress faced by the operator must be reduced to the minimum possible taking ergonomic principles into account." To make these principles concrete, the European standardization organization CEN established Technical Committee TC 122 to develop ergonomic standards. In contrast to ISO standards, which are voluntary, some 'mandated' ergonomics CEN standards have a legislative status: they must be integrated

in the legislation of European member states. Between 1989 and 1995 CEN published 18 standards and 31 were in preparation. I was actively involved in several subgroups of ISO TC 159 and CEN TC 122 to develop ergonomics standard for physical work load. One of my remarkable experiences was that, although usually ISO and CEN standards are developed by parties that have a direct interest in the standard (e.g., standardizing of product or processes for competitive advantage), ergonomics standardization seems primarily done by enthusiastic ergonomists who want to contribute to their profession, and to base the standard on the best available scientific knowledge.

Many countries started having Occupational Health and Safety regulations that included requirements for ergonomics, sometimes referring to available ISO or CEN standards and other ergonomics guidelines. This development was not only visible in Europe. Also in the USA attempts were made to include ergonomics/human factors in legislation. The Occupational Safety and Health Administration (OSHA) of the United States Department of Labor published in 1990 the "Ergonomics Program Management Guidelines for Meatpacking Plants", and created the 'Office of Ergonomics Support' (Department of Labor, 2000). The purpose was to enhance the development of an ergonomics program and to conduct ergonomically related enforcement activities at the workplace. The USA National Institute for Occupational Safety and Health (NIOSH) released in 1991 the influential 'revised lifting equation' which states that an object of more than 23 kg should not be lifted manually by a single person. For example, many airlines followed this guideline by setting a maximum weight of 23 kg of a single piece of checked baggage, which still is currently often used. Ergonomists were heavily involved in health-related research in the field of physical ergonomics. The first International Scientific Conference on Prevention of Work-Related Musculoskeletal Disorders (PREMUS) took place as an initiative of the scientific committee on musculoskeletal disorders of the International Committee on Occupational Health (ICOH) and included physical ergonomists worldwide. At that time I was leading the multidisciplinary group on musculoskeletal research of the TNO Institute of Preventive Health Care in Leiden, Netherlands. In one of the projects, we studied the effects of psychosocial factors on musculoskeletal disorders. The results were presented at the first PREMUS conference and won the PREMUS award. Its publication is now a classic in psychosocial determinants of musculoskeletal disorders (Bongers, de Winter, Kompier, and Hildebrandt, 1993). The contributions to PREMUS of the ergonomics discipline including ergonomics standards and guidelines were respected by this specialized research community.

The success of 'guideline based ergonomics' had many advantages for the ergonomics discipline and profession. A main advantage was that designers of work systems and products could incorporate ergonomics in their designs. The complexity of ergonomics guidelines and standards increased the demand for ergonomics professionals who were able to translate these guidelines into design requirements for specific systems. Ergonomics professionals not only have helped standardization bodies to formulate design requirements, but also helped to implement those in practice. The complexity of ergonomics guidelines, and their embeddedness in legislation was a golden combination for ergonomics professionals and created a booming market for ergonomics consulting. It is therefore not surprising that the number of ergonomics consultants rapidly increased.

In the period 1985–1988, during which I was board member of the Dutch Ergonomics Society (Nederlandse Vereniging voor Ergonomie, NVvE, currently Human Factors NL), the membership of the society was at its maximum ever: 600 members, primarily consulting ergonomists, serving a population of 16 million Dutch. The NVvE was one of the largest ergonomics societies in the world in terms of the number of ergonomists per capita, and certainly the largest in terms of number of ergonomists per square meter. Also other ‘old’ ergonomics societies experienced membership growth during these years, as did the number of new ergonomics societies in the world. In 1993 when I became a member of the IEA council representing the NVvE together with Ernst Koningsveld (we had two seats because of the size of our society) I started understanding more about the similarities and differences of ergonomics worldwide. At my first IEA council meeting (in Warsaw, Poland, 1993), chaired by IEA president Hall Hendrick, I noticed the optimism about the growth of the IEA. Not without reason. Whereas in 1976, when the IEA became a society of societies rather than of individual members, about 15 ergonomics societies (from Europe, North America, Australia and Japan) were members of the IEA. In 1997 the IEA consisted of 33 societies including from South-East Asia, Russia, and South America. Whereas in 1976 the 6<sup>th</sup> IEA triennial congress in Maryland, USA was attended by some 500 ergonomists, in 1997 the 13<sup>th</sup> IEA triennial congress in a sunny Tampere, Finland was attended by some 1800 ergonomists, and the presentations were summarized in a seven-volume conference proceedings!

To guarantee the quality of ergonomics applications, and to maintain the growing consultancy market for ‘real’ ergonomists only, initiatives were taken by local ergonomics societies and supported by the IEA to certify ergonomics consultants. In 1990, the first 21 Australian professional ergonomists were certified by the Ergonomics Society of Australia (currently Human Factors and Ergonomics Society of Australia, HFESA). Their ‘Certified Professional Ergonomists (CPE’s) “have demonstrated that they have the skills and experience to provide high quality and consistent advice and support in the area of Ergonomics and Human Factors”. Also in 1990, the Board of Certification in Professional Ergonomics (BCPE) was established in the USA, which “provides professional certification for practitioners of human factors/ergonomics (HFE) who demonstrate expertise and comprehensive understanding of the discipline. Employers and consumers know they are working with a professional who has met a rigorous standard.” Some years later in Europe the Center for Registration of European Ergonomists (CREE) was created to set “the necessary standard of knowledge and practical experience required to become a European Ergonomist”, which standards were based on the Harmonized European Training Programmes for the Ergonomics Profession (HETPEP).

In parallel with the growth of ergonomics standards, ergonomists, and ergonomics societies, also the number of ergonomics books rapidly increased. After the passing away of Kellerman and Willems, and the retirement of Paul van Wely, the latter approached Bernard Weerdmeester and me with a request to revise and update the publication *Vademecum Ergonomie*. We gratefully accepted this offer and challenge. The new book was published in 1991. It had maintained the guidelines-approach of the original version but focused on a broader audience. The English version was called ‘Ergonomics for Beginners’ to indicate that we wanted to reach the broader audience, and to distinguish the book from the many professional ergonomics books that had become available. The ergonomics bookshelf

included now not only general ergonomics books, but also books for specific aspects of ergonomics (e.g., working postures, working with visual display units), and books on specific fields of application (e.g., building and construction). Also the number of academic journals on general ergonomics has extended from the classical three journals (Applied Ergonomics, Ergonomics, Human Factors) to a list that more than doubled in the period between 1986 and 1997 (International Journal of Industrial Ergonomics started in 1986, Human Factors and Ergonomics in Manufacturing in 1991, International Journal of Occupational Safety and Ergonomics in 1994, and the International Journal of Cognitive Ergonomics in 1997). In all, ergonomics was flourishing in these years! For me this was the reason to leave classical ergonomics and to explore how the value of ergonomics was perceived by, and could be integrated in, the business and management environment where the decisions are made about products and work systems. I moved to the business school of the Erasmus University to explore these questions. In my first activity I made a link between business and management research and practice. I was able to better understand business and management thinking and behavior. Later I became a professor in Ergonomics Management, doing research on ergonomics in management and teaching business students about ergonomics.

### Signals of decline (1997-2003)

In the business and management environment I quickly noticed that the successful guideline approach of ergonomics had also some major disadvantages. First, linking ergonomics to occupational health and safety resulted in a narrowing of the field of ergonomics. The attention of ergonomics for health and safety, in particular musculo-skeletal disorders obscured the performance goal of ergonomics. As a narrow field, ergonomics was not much appreciated in the business and management environment. Many ergonomics professionals indeed just focused on physical ergonomics, which confirmed the perception of the business and management community of narrow ergonomics. For example, physical therapists (e.g. in Nordic countries or Australia) became ergonomists and focused on improving the physical workplace for prevention of musculoskeletal disorders and on providing workplace training on lifting and sitting. Such focus of ergonomics on health and safety without attention for performance narrowed also the view about the meaning and importance of ergonomics of those who received the services. Furthermore, the physical ergonomics community had connected to other professionals who are solely working on occupational health and safety. For example, the focus of PREMUS was only on one aspect of human-system interaction, was not on design, and was not on performance outcomes. PREMUS focused on occupational medicine and epidemiology. Although the specialized ergonomics contributions were valued by these PREMUS professionals, the business and management community could not see that ergonomics also contributes to performance.

An additional disadvantage of ergonomics as perceived by the business and management community was the linking of ergonomics to legislation. For the business world, ergonomics became a ‘duty’ rather than a desire. Businesses prefer to operate based on their own strategic goals, and health and safety is usually not a primary organizational goal but just a hygiene factor. Thus, ergonomics professionals were not considered a primary

partner of an organization's senior management, who are the strategic decision makers. The negative attitude of the business and management community towards 'obligatory' ergonomics became most apparent in the USA. There was a fierce opposition against ergonomics, and some even questioned the scientific backgrounds of the field. The term 'ergonomic problems' became equivalent to 'musculoskeletal disorders'. The opposition was primarily against the OSHA ruling on ergonomics. After a long road of implementation of this ergonomic guidelines into legislation, the latest version (Ergonomics Program Standard) was implemented in 2000, but was rapidly repealed three months after its implementation by George W. Bush jr, his first act after becoming president. Also in Europe there was a tendency towards de-regulation. With less legislative backing, health and safety related ergonomics professionals lost a part of their market.

The original success of guideline-based ergonomics and providing 'obligatory' services, also inhibited the attention within ergonomics for the development of new services and for innovation of the ergonomics field. The world was changing due to globalization and the IT revolution. At the 13<sup>th</sup> IEA triennial congress in Tampere, Martin Helander, outgoing president of the IEA, expressed his appreciation for what ergonomics had achieved in the first forty years of its existence. But he also expressed a concern by finishing his address: "Clearly the profession is driven by design requirements from users, markets, industries, organizations and governments. Ergonomics must be able to quickly respond to the changing needs of society."

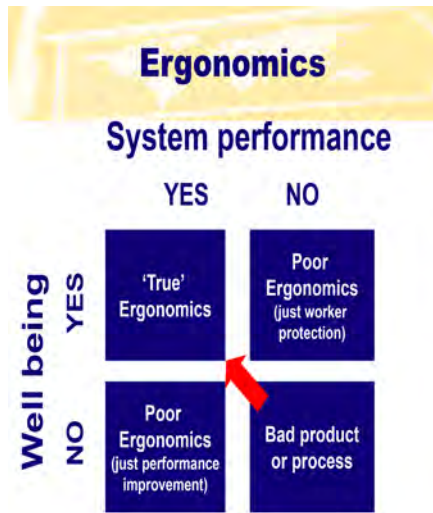
One of the major challenges for ergonomics was to response to the ICT-revolution. The ergonomics specialization, called 'cognitive ergonomics' was particularly dealing with the interaction between humans and computers. However, professional societies and initiatives outside the ergonomics arena were better able to integrate this new topic as a special field of interest into their fields. For example, In 2001 the Special Interest Group on Human Computer Interaction (SIGHCI) of the Association for Information Systems was founded and within a couple of years attracted hundreds of members. Although the conference called 'HCI International' was established in 1984 by an ergonomist (Gavriel Salvendy), was rapidly growing, and became the major international event on human computer interaction, cognitive ergonomics became only a small part of it. The HCI discipline and profession emerged, with its own societies, meetings and journals separate from ergonomics. Cognitive ergonomics (with core values of systems approach, design-orientation and delivering dual outcomes: performance and well-being) became a small part of mainstream HCI (focusing on a limited aspect of human system interaction: computers and performance). Instead of HCI being a field under the umbrella of (cognitive) ergonomics, cognitive ergonomics became a minor field under the umbrella of HCI. In 2002 the International Journal of Cognitive Ergonomics stopped being published. In summary, I noticed five signals of decline: narrowing ergonomics to health and safety in particular musculoskeletal disorders and physical ergonomics, linking ergonomics to legislation, perception by the business and management community and the general public that ergonomics is a narrow discipline and profession, perception of the business and management community of ergonomics as a duty rather than a desire, and the lack of innovation and anticipation for new societal developments). These signals alerted me that for survival of the ergonomics discipline and profession something had to be done. But what?

### Exploring revitalization (2003-2009)

During my first years at the business school, I was reflecting on the answers to this question. At the 15<sup>th</sup> Triennial Congress of the International Ergonomics Association in Seoul, Korea in 2003 I gave a presentation on the topic *Ergonomics in management*. I wanted to alert the ergonomics community that our field is not appreciated by the business and management community. I presented data on how many times the word 'ergonomics' is used in academic and practitioner management journals. The results were devastating. In 97 journals during a 10 year period (1992-2001) the word 'ergonomics' was only found 10 times and only in a narrow (physical) meaning. At the same time many topics were discussed in these journals to which ergonomics could have been linked. It is clear that readers of these journals are not to be blamed for having a limited view on ergonomics. The business and management community seldom reads about ergonomics, and if they read about ergonomics it confirms the narrow interpretation of the field. If we want to change this situation, we must first change ourselves by linking our activities to business and management problems, showing the value of ergonomics, and reporting this value towards the business and management community.

With this lesson in mind I accepted an invitation by the new IEA president, Pierre Falzon, elected at this IEA congress in South Korea, to become the successor of Klaus Zink in the IEA Executive Committee, responsible for 'Development'. In this role and as part of my university activities, I travelled to many ergonomics conferences and meetings worldwide (USA, Australia, UK, Germany, France, Switzerland, Nordic Countries, Portugal, Poland, Turkey, etc.), and even more to business and management conferences where, without exception, I was the only ergonomist. At these management conferences I was astonished to see how many researchers and practitioners were discussing topics that could easily be called 'ergonomics'. For example, the theory and practice of Person-Environment Fit is well established in the 'organizational behaviour' subfield of management and business. In the subfield 'operations management', Behavioural Operations was rapidly growing and very respected, and in the subfields Marketing and Innovation Management, Eric von Hippel's views and approaches on user involvement in product innovation is a classic in the business and management field. It was surprising to see how broad (rather than narrow) ergonomics approaches could be easily rephrased to get a connection to these subfields of business and management research and practice, but that ergonomics was completely isolated from these related fields. At the ergonomics meetings I expressed my concerns about this disconnection. I presented my ideas about how ergonomics could change to regain value (broad ergonomics) that is appreciated by the business and management community (proper language)

One of the most memorable meetings was on July 15, 2004 when I delivered my keynote address during the fifth PREMUS conference at ETH in Zurich, Switzerland, one of the founding places of ergonomics. Etienne Grandjean was an ergonomics professor here; he was succeeded by Helmut Krueger, but after his retirement in 2005 the position of professor in ergonomics disappeared. In my talk to this health and safety/musculoskeletal disorders focused community, I emphasized (using the slide below) how ergonomics through technical and organizational design can contribute to prevention of musculoskeletal disorders and at the same time have a positive effect on business



performance. I reiterated that the impact of ergonomics is limited if ergonomics focuses on well-being only (just like it is not enough to focus on performance only). I claimed that we must search and can find ergonomics actions that can combine both. This corresponds to the definition of ergonomics stating that the field contributes to two outcomes: system performance and human well-being. There was much support for this idea and a vivid discussion emerged on how to realize this. I got invitations to share my ideas at other places.

Figure 1. Moving towards 'true' ergonomics. From: presentation at the fifth PREMUS conference at ETH in Zurich, Switzerland, 2004

In the mean time I focused my research and teaching on integrating ergonomics into business. For example I collaborated with Patrick Neumann to explore the combined performance and well-being effect of changes of business processes. We found that the vast majority of changes resulted not only in increased economic performance (many times the trigger of the change) but also in increased social-performance (well-being). We expressed our findings at international management and business, and engineering networks and conferences and also at ergonomics conferences. We wrote two articles both well-cited: one in an ergonomics journal about how to get more management and business thinking in ergonomics ('Ergonomics contributions to company strategies', Dul and Neumann (2009) and one in a business journal on how to get more ergonomics thinking in management and business ('Human factors: spanning the gap between OM & HRM, Neumann and Dul, 2010). Note that in the second article the name Human Factors was used instead of ergonomics. Although according to the definition ergonomics and human factors are synonyms, the business community interprets ergonomics as more narrow and human factors as broader. This was also one of the reasons that a few years after my inauguration as ergonomics professor at the business school, I changed the name of my chair from 'Ergonomics Management' to 'Technology and Human Factors'. It is surprising that business students and scholars are much more open to our discipline and profession when it carries the broader name. Similar experiences have triggered several ergonomics societies (including UK, the Nordic countries and the Netherlands) to add human factors to their name, or even carry just the name 'Human Factors'.

In another research project with my master student Petra Breedveld we explored how certified ergonomists performed their work in organizations (Breedveld and Dul, 2005). It turned out that physical ergonomics and health and safety were most common, but also that there was attention (to a lesser extent) for cognitive ergonomics and organizational ergonomics and for economic goals.

Given the broad definition of ergonomics, the actual practices of certified ergonomists, and the support at ergonomics conferences it seems possible that the ergonomics discipline and profession focuses on the combination of well-being AND performance as *modus operandi*. During my service as chair of the IEA Development Committee I had exchanges with local ergonomics societies about their plans for the future. Also discussion sessions were held at IEA Council meetings about the future of ergonomics. With a broader audience of ergonomists several sessions were held at the 2009 17<sup>th</sup> IEA Triennial Congress in Beijing. Additionally, over a period of six years I collected more than 100 documents that describe expectations and plans for the future of ergonomics, mostly for specific aspects of ergonomics or for specific regions. However, no plans were formulated about the worldwide development of ergonomics as a discipline and profession, nor about better linking ergonomics to business and management communities. After 6 years I ended my service in the Executive Committee at the congress in Beijing with the conclusion that for a sustainable future of ergonomics/human factors, fundamental re-thinking and changes were needed and feasible.

#### Formulating a strategy for ergonomics (2009-2012)

At the IEA congress in Beijing new officers of the IEA were elected: president Andy Imada (USA), and vice-presidents Klaus Zink (Germany) and Eric Min-yang Wang (Taiwan). Ralf Bruder became my successor as chair of the Development committee, which was renamed as the Promotion and Development committee. After the new Executive team was one year in office, I was approached to setup an ad hoc IEA committee on the future of ergonomics (FOE). In December 2010, this committee was formed and received the following task: "The goal of FOE is to formulate a proposed strategy (or some alternative strategies) for the ergonomics discipline in general and for the IEA in particular to safeguard the success of ergonomics in the future". More specifically, it was intended to have a position paper to be presented at the IEA Triennial congress of 2012 in Brazil. The committee consisted of the following members: Ralph Bruder (Germany), Peter Buckle (UK), Pascale Carayon (USA), Pierre Falzon (France), Bill Marras (USA), John Wilson (UK), and Bas van der Doelen (Secretary, Netherlands). I had the honour to chair the committee. In little more than one year, the committee had to come up with a position paper about the future of ergonomics that was broadly supported by the international ergonomics community. In this complex process I describe 13 steps that influenced the outcome.

#### Starting document (December 2010)

As the chair I started the work by writing a short starting document for the committee members, reflecting on the current status of ergonomics and on the uncertainty about its future, as depicted in Figure 2. Just like products and technologies (and humans), also a discipline has a life cycle with a rise phase, a maturity phase and a decline phase. The ergonomics discipline is relatively young and still in its first life cycle (Wave 1). It did not have experiences of re-inventing itself. Of course, not all regions in the world are in the same phase of that cycle. In some regions (e.g., in economically developing countries) ergonomics is in the rise phase of the first wave, whereas in other regions (e.g. in the economically developed world) ergonomics is mature and is growing older, reaching

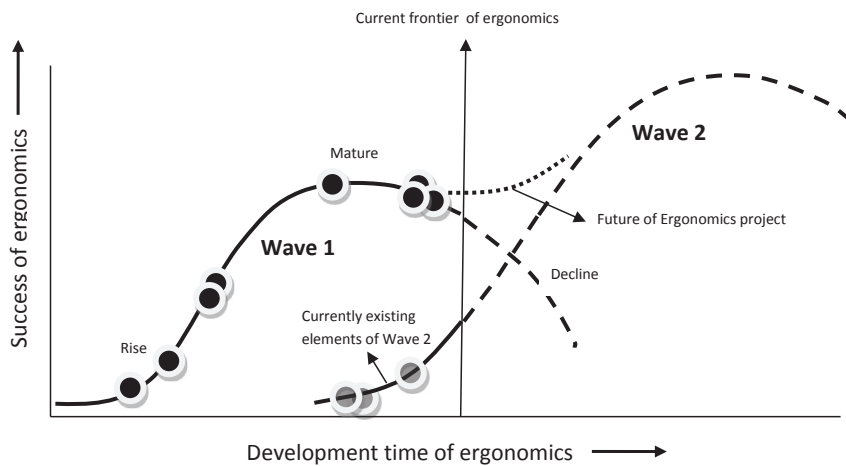


Figure 2. A two-wave life cycle model of the ergonomics disciplines. The dots represent ergonomics initiatives of individuals, groups or professional societies. The dotted line represents the goal of the Future of Ergonomics (FOE) project. From: Starting document of the IEA Ad Hoc committee on Future of Ergonomics (FOE).

the eve of the first wave, and thus having a need for a new wave to prevent decline and survive in an unknown future.

In certain mature ergonomics regions there were serious signals of decline, as discussed above (e.g. reduced number of membership, other disciplines taking over ergonomics initiatives, identity problems, and image problems). With highly respected committee members that represent mature ergonomics regions, the committee was well-equipped to define the characteristics of the second wave of ergonomics and to suggest a roadmap moving from Wave 1 to Wave 2 (the dotted line). Currently, elements of the future must already exist somewhere, but are not yet identified and recognized as such. Most of the required information for a strategy formulation is already available, in particular as tacit knowledge in the minds of the members of the committee and other ergonomists, and partly as explicit knowledge in the more than 100 collected 'future of ergonomics' documents.

### Interviews committee members (January 2011)

The starting document was distributed amongst the committee members and their opinions were gathered by interviews. Bas van der Doelen and I interviewed each member individually through a 1 hour Skype meeting that was recorded. The goal was to hear the committee member's personal views on the following topics: what are 'competing' disciplines and professional fields of ergonomics, what are the core competences of ergonomics, what are the stakeholders of ergonomics, and what is the added value of ergonomics for these stakeholders? The interviews resulted in a broad overview of the views that existed within the committee. Many views were similar, but there were also substantial differences about each of the discussed topics.

### Discussion document (March 2011)

The results of the interviews were summarized and integrated in a discussion document. The integration consisted of a classical SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) that is commonly used for strategy building by linking the strengths to the opportunities. From the SWOT analysis it became clear that there are, in principle, four distinctive strategic alternatives for the ergonomics discipline, each having considerable and different tactical and operational consequences:

1. **No ergonomics.** Combine the strength of 'collaboration on overlap with other disciplines' with the opportunity 'external demand for specialized (ergonomics) knowledge'. Fully integrate ergonomics in other disciplines (no separate discipline), and profit from existing market demand for these disciplines.
2. **Specialized ergonomics.** Combine the strength 'specialized knowledge in certain fields' with the opportunity 'external demand for specialized ergonomics knowledge'. Focus on specialized ergonomics (several specialized ergonomics sub-disciplines) and compete with other specialized disciplines for providing specific knowledge to existing market demands ('Inverted T approach')
3. **Broad ergonomics.** Combine the strength 'systems approach' with the opportunity 'awareness in society that systems become more complex and humans play a critical role'. Focus on the broadness of ergonomics (systems approach) as a core competence and develop the discipline (combining knowledge for a market demand application rather than specific knowledge delivery) and develop the market demand for it ('T approach').
4. **Make no choice.** No focus, allow a 'natural development'.

The discussion document suggested, based on the interviews, that the core of ergonomics is its 'systems approach' (holistic view on people and system), such in comparison to large traditional disciplines and small specialized (new) disciplines. Nevertheless many ergonomists in academia and practice focus on specialized knowledge rather than on the systems approach of ergonomics. Although the systems approach core of ergonomics is valuable (with proven successes), and its potential is extremely high, there is not enough demand for it from other professionals and from decision makers. There is more demand for specialized ergonomics knowledge which can be delivered both by a specialized ergonomist, as well as by a specialist from related disciplines. The interviews suggested that nevertheless, the strategy of the discipline should focus on this core, in order to survive as a separate discipline. The discussion document was the input for the face-to-face meeting of the committee members.

### First committee meeting Amsterdam (March 2011)

The discussion document was discussed during the first physical committee meeting which was held on 3 and 4 March 2011 in Amsterdam. The meeting started with a plenary discussion about the discussion document to identify specific topics for further discussion. These topics were subsequently discussed in smaller groups and in creative sessions to stimulate divergent thinking and convergent thinking on the topics. One main conclusion was the confirmation that the broad 'systems approach' is the core

value of ergonomics and the main justification of having a separate ergonomics field, in addition to the specialised fields outside ergonomics. At the same time we recognized that a large part of the ergonomics community are specialized ergonomists (cognitive ergonomics, physical ergonomics) who do not primarily base their work on a systems approach and who have a large overlap with similar specialized fields. We decided not to make a choice for generalist or specialist but to accept the challenge to embrace both the generalists and the specialists in our discipline. We also quickly agreed on two other core values of ergonomics: design driven and dual outcomes (system performance and human well-being). These have traditionally been part of the ergonomics discipline and are part of the IEA definition of ergonomics, developed over three years and presented in 2000 under the leadership of IEA president Ian Noy.

During the meeting we agreed that for the future of ergonomics the discipline must focus on broad integrative systems. But it is also essential that there is explicit demand (from stakeholders) for such approach, which is currently still limited. Therefore, as part of strategy, the ergonomics community must develop demand for a broad integrative system approach. There are potentially many possible ways to achieve this through education, partnerships, advertising, influencing opinion leaders etc. Input is needed from stakeholders outside the ergonomics communities to achieve this.

After the meeting we produced a one-page note summarizing the discussions about the core value of ergonomics and the main strategic goal. There were many topics left for further discussion such as the name of the field, and how to combine ergonomics generalist and specialist approaches. In particular about the name of the field the opinions of individual committee members were strong and different, ranging from keeping the name 'ergonomics' (fits our identity and history), changing it to 'human factors' (better for our image) and changing it to 'human-system integration' (good experiences in the USA).

### **Progress report IEA council (April 2011)**

After we formulated the main strategic directions for the future of ergonomics we produced a status report which was presented at the IEA Council held in Grahamstown, South Africa on April 4, 2011. In this report we indicated that we intended to get input and broad support from the ergonomics community using a 'circle approach': in the core is the input from the committee members, in the inner circle around this core is the input from Council members and other senior ergonomists (via special sessions and interviews), and the outer circle is the input from other ergonomists (via email). The council supported the directions that we had chosen.

### **First input from the inner circle (April-May 2011)**

During the Council meeting in Grahamstown we organized a 90 minute session (with group work) with Council members about the main strategic goals and how to implement these. Afterwards, interviews were held with individual council members to better understand their views and ideas. We also interviewed participants at the ODAM conference, which was held immediately after the Council meeting. It turned out that there is support for the main strategic direction, but that a variety of views exist on how to implement this strategy. Further, it was noted that the supply side of 'systems

approach' is not well developed within the ergonomics community. Many ergonomists are specialists who do not consider the broader context as suggested by the systems approach. Hence, the strategic goal should not only be the development of demand, but also the development of supply. During the subsequent months the one-page note was adapted and extended to become the first draft of a position paper, which was used as input for the second physical committee meeting.

### **Second committee meeting Paris (June 2011)**

The goal of the second physical committee meeting in Paris on June 15, 2011 was to discuss and integrate the input that was received from the inner circle of senior ergonomists. We adopted the idea that the IEA strategy is not only about 'growing demand' of good system ergonomics, but also about 'growing supply'. Further, it was decided which topics should be presented in the draft position paper for distribution for receiving comments from the outer circle of ergonomists. We added a description of major societal developments to which ergonomics could be linked to increase demand. In the Paris meeting we also drafted the first version of a visual representation of the key driving forces for positioning the ergonomics field. Finally, we discussed the name of the ergonomics field and we acknowledged that humans are part of the system and that the goal of ergonomics can be described as 'better (or good) integration of humans in the system'. We concluded that there was no need for a new term to describe this goal. Two remaining major challenges were: how to improve supply, how to connect generalist approaches and specialist approaches of ergonomics, when a systems approach is the core of ergonomics. During the next months the position paper for distribution was further developed by the committee along the lines discussed in Paris and based on the inputs from the inner circle of ergonomists. This resulted in a first draft position paper to be distributed for further input from a wide variety of ergonomists.

### **First draft position paper (October 2011)**

The first draft position paper was distributed to the outer circle of ergonomists. In the draft we defined 'good ergonomics' as consisting of systems approach, design driven, and dual goals. We made suggestions *how* to develop supply and demand for the core values of ergonomics. The strategy was visually presented as shown in Figure 3. (pag. 140) Further, we had developed ideas for combining the generalist and specialist approach of ergonomics by introducing the concept of 'contextualization' as follows: "When defining problems and formulating solutions, the focus of ergonomics can be on specific aspects of people (e.g. only physical), on specific aspects of the environment (e.g. only workplace), or on a specific level (e.g. micro), but always the broader context of the human within the environment is taken into consideration ('contextualization'). This broad perspective of ergonomics can be referred to as a 'systems approach' or a 'holistic approach'." We proposed to develop supply of good ergonomics by labelling it as strengthening the identity of ergonomics (what we are) as follows:

- Focus ergonomics research, education, and consultancy (and related publications, certification, communication, etc.) on good ergonomics that always include the key elements: systems approach, design driven, dual goal:

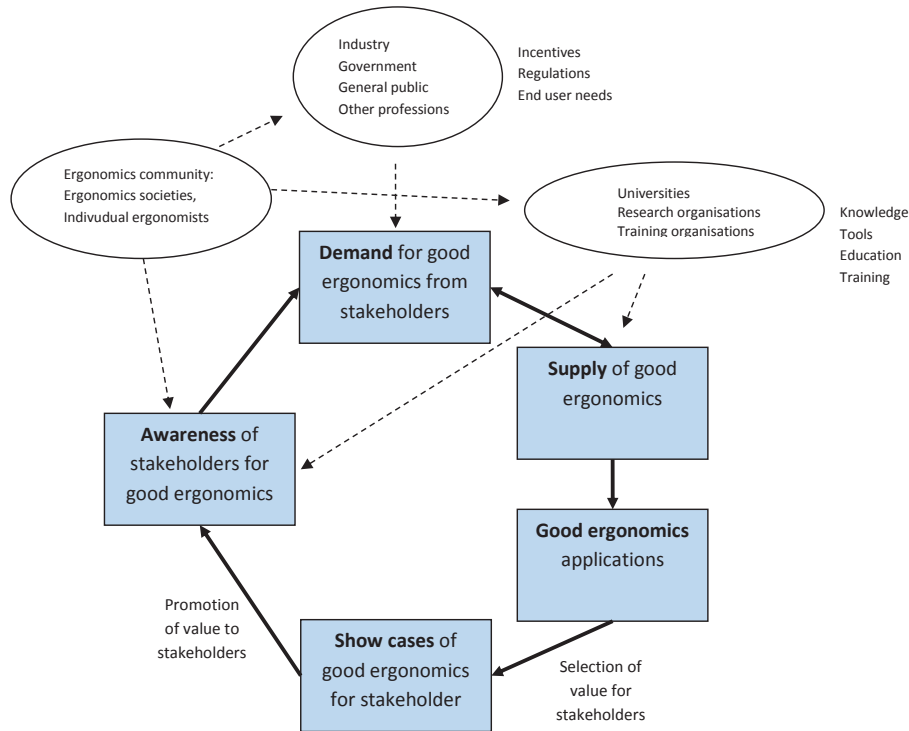


Figure 3. Development of supply and demand of good ergonomics. From: First draft of the position paper on the future of ergonomics, IEA Ad Hoc committee on Future of Ergonomics (FOE), October

goal and the other key values of ergonomics in their language, to increase the stakeholders' awareness and understanding of what is good ergonomics, rather than focusing on stakeholders with 'well-being' interest.

- Strategic partnerships: focus partnerships, networks, projects, etc. on key stakeholders of designing human environments (industry, government (politics), general public (media), and other professions (engineers, psychology, architecture) ,decision makers/managers:
- Educate (future) main stakeholders in their education by showing the value of ergonomics in all educational levels and settings, from education in primary schools to education of professionals from disciplines other than our field (in particular the (future) designers/developers and deciders of human-made environments and artifacts).

So, the document was ready for input from the outer circle ergonomists. We distributed the document to 54 ergonomists with different backgrounds and positions and from different geographic regions.

### Second input from key persons - outer circle (October 2011- November 2011)

We received many valuable comments on the first draft position paper. The majority of the comments could be integrated in the document. Some remaining discussion points (with different views within the ergonomics community and within the committee were:

- Is the third key element of ergonomics (its goal) 'system performance AND well-being' (as currently stated) or is it 'system performance' (including well-being):
- Is it fair to say that in current practice ergonomics in general is more focusing on the well-being than on performance?
- Is the main strategy: develop demand, develop supply and develop demand, or a mixture of supply and demand?

### Third committee meeting (November 2011)

The third physical committee meeting was held November 11-12, 2011 in Amsterdam and addressed these and other questions. For example, the proposal of the Paris committee meeting about the name was adopted: the human is part of the system. Hence system performance includes human performance. However, because this is not necessarily understood outside ergonomics (for example in engineering a system may be understood as technical system), we decided that when we refer to a systems approach we include reference to the human and that the output of an ergonomics system design is performance *and* well-being. We also stressed that performance and well-being are related. Performance can produce well-being, and well-being can produce performance, hence a relationship with two directions.

We finalized the discussion about the name of our field by selecting the name human factors/ergonomics. 'Human factors' is used first to indicate primarily the demand side of ergonomics and that ergonomics is broad. 'Ergonomics' is used second to refer to the tradition of our field. These names also correspond to the official IEA definition of ergonomics (and human factors): the two names are synonyms. The combination of two

- If the focus is on specific aspects of people (e.g. physical), on specific aspects of the environment (e.g. technical), or on a specific goals (well-being, health and safety), attention should be paid to the broader context when defining specific problems and formulating specific solutions ('contextualization'); limitations of the specific approach and how to tackle these should be addressed (e.g. collaboration with others):
- Attracting students from a wide range of specific disciplines to become good ergonomists (with three key elements), rather than only specialist on aspects:
- Education and certification of ergonomists. Life-long education of ergonomist to guarantee the quality and quantity of ergonomists for delivering good ergonomics that are desired by the stakeholders, and to provide cases of good ergonomics practice, which can be helpful for increasing stakeholders' awareness and understanding of good ergonomics.

We proposed to develop the demand of good ergonomics labelled as strengthening the image of ergonomics (how others see us) is as follows:

- Communication with opinion leaders of major stakeholders (system designers, system deciders, system influencer), by emphasizing the system performance

names also reflect that in some regions ergonomics is the preferred name and in other regions human factors is preferred. Based on comments from the outer circle we also had a discussion about the role of training of people, which is an activity of many ergonomists. We maintained that design is a core value of ergonomics, but adopted that ergonomics “typically takes a hierarchical approach where environmental design to fit the human is seen as the priority, and selecting people to fit the environment or training people to fit the system is only considered when the former is not possible.”

**Second draft position paper (December 2011)**

Based on the committee discussions we produced the second draft of the position paper. We defined High-quality Human Factors/Ergonomics as ergonomics with the key elements: systems approach, design driven, and performance and well-being outcomes. We emphasized that specialized ergonomics approaches should also pay attention to the broader context when defining specific problems and formulating specific solutions (‘contextualization’) and that the limitations of the specific approach and how to tackle these should be addressed (e.g. collaboration with others). The name of the field was abbreviated as HFE, and the model to develop demand and supply of good ergonomics was restyled as a ‘HFE development cycle’ (Figure 4). The draft also included a detailed action plan. Furthermore, we discussed how we could disseminate our ideas, apart from presenting the final document to the IEA for further decision making. We agreed with the IEA executive committee that the position paper would also be 1:1 published in one of the main ergonomics journals, preferably *Ergonomics*, and that the position paper would be presented as a keynote address at the 18<sup>th</sup> IEA Triennial conference in Recife, Brazil, 2012.

**Third input from key persons (inner + outer circle) (December 2011-January 2012)**

We organized the final input from the ergonomics community by approaching both the inner and outer circle to comment on the second draft of the position paper. For reasons of time a parallel process was required for approaching the editor of *Ergonomics* (Roger Haslam) for publication of the paper before the IEA congress. Regarding the latter, an agreement was made that the paper would be blind-reviewed in an extremely short time, that the authors would respond promptly to reviewers’ suggestions, and would also include the comments received from the inner and outer circle ergonomists, that the paper would be finalized before the Recife meeting and shipped to Brazil for providing a physical copy to each participant of the IEA 2012 conference, and that the paper would have open access for at least one year. With remarkable efforts from all involved we realized this challenging plan. Besides the committee members, the editor of *Ergonomics* and the three anonymous reviewers, 71 ergonomists from the inner and outer circle provided input to the position paper: F. Javier Llana Alvarez, Alexey Anokhin, Tomas Berns, Verna Blewett, Guy André Boy, Bob Bridger, Ole Broberg, Alexander Burov, David C. Caple, Alan Chan, Wen-Ruey Chang, Pierre-Henri Dejean, Mica Endsley, Patricia Ferrara, Margo Fraser, Yushi Fujita, Somnath Gangopadhyay, Sylva Gilbertova, Matthias Göbel, José Orlando Gomes, Richard Goossens, Alan Hedge, Martin Helander, Magne Helland, Veerle Hermans, François Hubault, Sheue-Ling Hwang, Andrew S. Imada, Christina Jonsson, Halimahtun Khalid, Jung-Yong

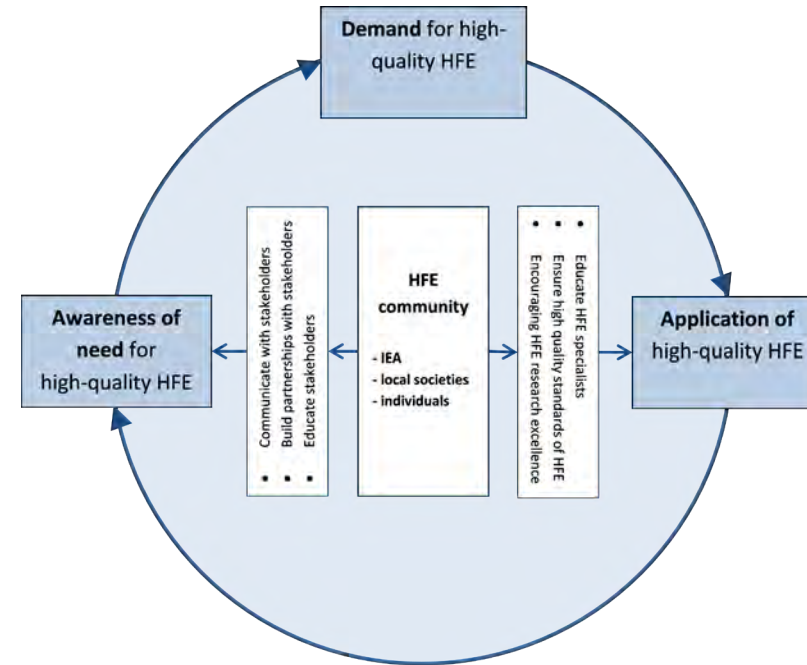


Figure 4. Summary of the “proposed strategy (or some alternative strategies) for the ergonomics discipline in general and for the IEA in particular to safeguard the success of ergonomics in the future”. From: Dul et al, 2012

Kim, Karsten Kluth, Kazutaka Kogi, Ernst Koningsveld, Rabiya Lallani, Johan Molenbroek, Karen Lange Morales, John Lee, Jean-Luc Malo, Nicolas Marmaras, Svend Erik Mathiassen, Dave Moore, Dimitris Nathanael, Patrick Neumann, Ian Noy, Clas-Hakan Nygard, Enrico Occhipinti, Ahmet F. Özok, Gunther Paul, Ruud Pikaar, Anna Ptackova, David Rempel, Luz Mercedes Saenz, Martha Helena Saravia, Christopher Schlick, Schu Schutte, Patricia Scott, Paul Settels, Barbara Silverstein, Marcelo Soares, Cláudia Stamato, Carol Stuart-Buttle, Andrew Thatcher, Andrew Todd, Takashi Toriizuka, John Walter, Eric Min-Yang Wang, Christine Waring, Klaus J. Zink, Moustafa Zouinar, Gert Zülch.

**Final position paper and decision making (February 2012)**

The final paper was offered to the IEA executive committee shortly before their meeting in Recife. They approved the paper for discussion in the IEA council. At the council meeting the decision was made as described in the first paragraph of this chapter. The position paper was presented to the IEA 2012 participants during my keynote address. Before and after that presentation the participants received a hard copy of the paper as published in *Ergonomics*. The on-line version of this publication became available at the same time (open access for more than a year), and the paper was officially published in the April issue of *Ergonomics*.



## What next?

The position paper suggests that the implementation of the strategy is the common responsibility of individual ergonomists, local ergonomics societies and the IEA. The plan is meant to be an inspiration (not a rule) for individuals and local societies to shape their futures given their contexts. For example, the Nordic Ergonomics Society has actively redefined its strategy based on ideas in the position paper, including a name change towards the 'Nordic Ergonomics and Human Factors Society'. Also the Dutch Ergonomics Society changed its policies and name inspired by the position paper and is now called Human Factors NL. The paper published in *Ergonomics* is one of the most downloaded and cited papers ever in this journal. Members of the FOE committee have given keynote addresses and other contributions at ergonomics congresses about the future of ergonomics. In the first three years after the publication of the new strategy, the IEA has been somewhat silent about the implementation, but from 2015 IEA president Yushi Fujita has been a driving force to implement the ideas in all activities of the IEA and has established a special task force on the Future of Human Factors and Ergonomics under the leadership of Sarah Sharples. In all, the ergonomics community started to build its prosperous future. As a final note I would (again) like to thank all ergonomists who contributed to formulating the strategy for our valued discipline and profession. I am grateful to Liberty Mutual for awarding the position paper as the best paper of 2012 in the journal *Ergonomics*, and to the IEA for awarding me (and through me all who contributed) the Distinguished Service Award 2015. If we want the change, we can do it!

## References

- Anon. Ergonomic principles in the design of work systems. ISO, 1981
- Bongers, PM., De Winter, CR., Kompier, MA., and Hildebrandt, VH. Psychosocial factors at work and musculoskeletal disease. *Scandinavian journal of work, environment & health*, 1993, 297-312.
- Breedveld, P., and Dul, J. The position and success of certified European ergonomists. *Rotterdam School of Management, Erasmus University, Rotterdam*, 2005
- Department of Labor. Occupational Safety and Health Administration, Ergonomics Program. Final Rule, *Federal Register* 65 (No. 220), 2000, 68262-68870.
- Dul, J. and Weerdmeester BA. *Vademecum Ergonomie*. Kluwer Bedrijfswetenschappen - Nederlandse Vereniging voor Ergonomie, 1991
- Dul, J. and Weerdmeester BA. *Ergonomics for Beginners*. CRC Press, 1993
- Dul, J., and Neumann, WP. Ergonomics contributions to company strategies. *Applied ergonomics*, 2009, 40(4), 745-752
- Dul, J. Bruder, R. Buckle, P. Carayon, P. Falzon, P. Marras, WS. Wilson JR and Van der Doelen, B. A strategy for Human Factors/Ergonomics: Developing the discipline and profession. *Ergonomics*, 2012, 55 (4), 377-395
- Grandjean, E. *Fitting the Task to the Man: An Ergonomic Approach*. Taylor & Francis Ltd. 1969
- Kellerman, T, Van Wely PA, Willems, P. *Vademecum Ergonomie*. Philips, 1963 (later editions published by Kluwer).
- Neumann, WP., and Dul, J. Human factors: spanning the gap between OM and HRM. *International journal of operations & production management*, 2010, 30(9), 923-950

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