

## Editorial

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# Human factors and ergonomics in an interconnected world: Promising directions for the future – introduction to the IEA2021 special issue

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The 21st Triennial World Congress of the International Ergonomics Association (IEA2021) was held from June 13-18, 2021, with the theme of *Human Factors and Ergonomics in an Interconnected World; Ergonomie 4.0*. This event brought together over 1200 participants from around the world in a virtual space for the first time in this congress series. After a year of COVID-19 related restrictions, the complexity and benefits of interconnectedness were evident at IEA2021 [1]. IEA2021 included over 900 communications involving authors from 61 countries and from six continents sharing research and practice progress in Human factors and Ergonomics (HF/E) grouped into 34 scientific tracks. Attendees gained inspiration for future directions of the HF/E science and profession. Extending reflections on the rich evolution of the International Ergonomics Association (IEA) Triennial congress programming made in this WORK journal in 2012 [2] and in 2019 [3], this first, complete special issue devoted to IEA Triennial Congress content illustrates the breadth and relevancy of HF/E even in times of a global pandemic. Furthermore, this special issue illustrates IEA

efforts to mobilize the world scientific community and partners particularly focusing on two of the IEA's seven Strategic policies, specifically "Stakeholder Engagement" (Policy 1) and "Contribute to science, technology and practice" (Policy 3) to produce and disseminate high quality HF/E knowledge and information.

This special issue of WORK brings together 22 new papers based on outstanding oral and poster communications first presented at IEA2021. These papers include additional advances and analyses and illustrate a sampling of the topics presented, including insights of authors from 14 countries.

Two insightful papers are presented by keynote authors: one focusing on the hidden power of affective products and environments [4] and the other reflecting on the machine as a partner to humans [5].

Anthropometry issues are considered for populations by nationality [6], work environment (surgeons seating design, [7] in Japan), and abilities around the world [8].

HF/E's ability to support clear communication to overcome challenges is illustrated in four papers: to

support integration of early career coalition members of the E/HF community [9], when using social media by government agencies and stakeholders during COVID-19 surges in Brazil [10], with integrated approaches between governmental and private groups at all levels to successfully confront COVID-19 in Cuba [11] as well as individually, using vocal ergonomics factors for sports coaches [12].

Four articles present an overview of the evolution and progress associated with particular IEA Technical Committees: Gender and Work [13], Ergonomic Work Analysis and Training (EWAT, [14]), Ergonomics in Design for All [8], and Human Factors in Sustainable Development [15].

COVID-19 is an integral factor of the environments considered. Authors consider the impact of hybrid and work-from-home formats on workers' vision and eye discomfort [16], organizationally, as for health-care in Cuba [11] and governmental communications by Twitter in Brazil [10], and on consumer behaviour, studying purchases by e-commerce in Brazil [17].

Industrial and manufacturing environments are considered, through the ergonomics as a design discipline for oil platforms [18] and their maintenance [19], consideration of an alarm management report to reduce the impact of "bad actors" in a gas logistic plant environment [20], design of a future plant involving assembling additive metal manufacturing processes in an aeronautics fabrication company [21] and the link between work activity and automation in an important cork-producing district in Portugal [22]. Participatory ergonomics approaches enhance measurable positive impacts in these work environments.

Finally, organizational design and management is shown to be crucial to attaining best results in various work environments: aeronautics [21], simulations of work to improve operations centres in the oil industry [23], and in a national water ambulance service requiring resilience engineering [24]. Integration of HF/E in organizations can be facilitated by understanding them using the "Ergonomics Maturity Model" [25].

This is the first full issue devoted to IEA Triennial Congress communications. The guest editorial team included past and current members of the IEA Executive Council: Kathleen Mosier, IEA President from 2018–2021; José Orlando Gomes, IEA President for 2021–2024; Thomas Alexander, IEA Vice-president and Treasurer 2021–2024; Sara Albolinox, IEA Vice-president and Secretary General 2018–2021; and Nancy Black, IEA Science Technology and Practice Standing Committee Chair 2021–2024. Beyond this

team, many others assisted with blind scientific evaluation ensuring that the articles included here are of great interest and high quality. The guest editorial team is particularly grateful to WORK's founding and general editor, Karen Jacobs (named an IEA Fellow in 2022).

The papers in this special issue of WORK give an idea of the rich programming at typical IEA Triennial Congresses. We are excited to share this window into the state of Human Factors and Ergonomics in the world in 2021 illustrating the interconnectedness of the world today and pointing to promising "*Directions for the future*" and a better world.

We hope that this special issue of WORK inspires readers to consider participating in future IEA Triennial Congresses, both as an author and learner. The next IEA Triennial World Congress occurs August 25–29, 2024, on Jeju Island, Republic of Korea, hosted by the Ergonomics Society of Korea.

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