

Special Issue “Digital Human Modelling in Ergonomics 4.0”

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Background

The fourth industrial revolution, also named *Industry 4.0*, is affecting almost every industry worldwide. It is rapidly transforming how businesses operate. Industry 4.0 uses transformative technologies to connect the physical world with the digital world. Current trends include: advanced automation and robotics; machine-to-machine and human-to-machine communication; artificial intelligence and machine learning; and sensor technology and data analytics. Four key drivers enable this trend: 1) rising data volumes, computational power, and connectivity; 2) emerging analytics and business-intelligence capabilities; 3) new forms of human-machine interaction, augmented, and virtual reality systems; 4) improvements in transferring digital instructions to the physical world and 3D printing. Industry 4.0 technologies have the potential to provide a substantial boost to economic competitiveness, and could substantially offset traditional challenges such as high labor costs and distance to markets. Benefits and opportunities of Industry 4.0 include: better connectivity between customers and supply chains through real-time access to production information, logistics, and monitoring; greater flexibility for businesses to produce differentiated products and services to tap unmet consumer demands, compete in global markets, and capture emerging opportunities; and enhanced workplace safety, production, and improvements across the entire value chain.

Ergonomics 4.0 is the technology driven and virtualized implementation of advanced ergonomic tools that enable Industry 4.0 concepts. *Ergonomics 4.0* is a necessity to assure a Human Factors centered approach in *Industry 4.0*, which is based on cyber-physical systems, a “complicated network of machines, physical contacts, virtual items, computing facilities and storage, communication devices that interact with each other and exploit the enormous potential of new technologies” (Lim Lay Hsuan, leaderonomics.com, 10/27/2017).

Motivation

Digital Human Modelling (DHM) and Digital Twin are advanced methods in Ergonomics, which by their very nature lend themselves to *Ergonomics 4.0*. DHM has matured over the last three decades to become an important area within Ergonomics (Scataglini & Paul, 2019). Further, as virtual tool based on information and communication technology, DHM is developing alongside technological advances, and DHMs are rapidly evolving in their abilities and applications.

This special issue aims to provide a snapshot of the recent advances in DHM, and a vision of how DHM contributes to *Ergonomics 4.0* as a critical element in the framework of *Industry 4.0*.

The special issue will be based on selected presentations from the 21st Triennial World Congress of the International Ergonomics Association (IEA2021) in Vancouver, Canada.

Submissions:

- Please submit a 2-page abstract through the IEA 2021 conference management system by 25th September 2020. Upon submission, make sure to select the option “DHMS stream”.
- If your 2-page abstract is accepted, please submit your 4-page paper by 18th December 2020, again in the “DHMS stream”, as a full paper for the conference proceedings. Make sure to select “Special Issue DHM in Ergonomics 4.0”.
- Acceptance decisions and reviewer feedback on 4-page papers will be provided by 4th January 2021.
- Selected authors of accepted 4-page papers will be invited, by the special issue editors, to submit full papers to the *IJSE TOEHF* journal for potential inclusion in the special issue, along with the reviewer feedback. These invitations will be sent by 6th January, 2021. Selection of invited papers will be based on scientific merit and occupational relevance.
- Submissions for the *TOEHF* special issue must be completed by 5th February 2021. NOTE: authors considering submitting to the special issue should consider preparing their papers early, given the limited time available between acceptance of conference papers and the submission deadline.
- In the *TOEHF* submission system (<https://mc.manuscriptcentral.com/tand/oehf>), make sure to:
 - i. select Special Issue = IEA2021 - Digital Human Modelling in Ergonomics 4.0 for your submission.
 - ii. indicate in your Letter of Transmittal that your 4-page submission to the IEA 2021 conference has been accepted by the IEA.
 - iii. please review the *TOEHF* authors instructions, available at the submission site, especially regarding the different manuscript types that can be submitted. The following submission types are invited for this special issue, with others considered on a case-by-case basis: Original Research; Methods, Models and Theories; and Reviews.
 - iv. to avoid copyright concerns, please minimize any re-use of material from the conference papers in the journal submission.

Review and Publication Timeline:

- Reviewer feedback will be provided by approximately 15th March 2021 and revised final papers will be due within one month of receiving decision letters.
- We anticipate that papers will be published in the special issue at the time of the IEA 2021 conference in Vancouver.

Reference:

Scataglini, S., & Paul, G. (2019). *DHM and Posturography*. Academic Press.