

Spring 2020 Newsletter

May, 2020



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Letter from the President

By Dr. Gabriel Ibarra-Mejia
MD, PhD, MSErg
University of Texas at El Paso

This newsletter is being published at an interesting time, a time that is affecting all of us as a society. For when you receive this newsletter, this world will still be in the middle of an unprecedented societal phenomenon figuring how to respond to a pandemic. I hope when you receive it, you and your loved ones are keeping safe and successfully coping with the situation.

When thinking and figuring out what to include in this section, I must accept that it was difficult for me even to begin. Where to start? How does one plan to move forward and develop plans in times of uncertainty? Planning in times of such uncertainty has made us dig deep into both personal and our society's resiliency. This time it hit close to home. One way or another, each one of us has been affected by the current pandemic.

However, I told and assured myself that we would get over this. Therefore, this society will move forward, maybe not as planned, but forward. The Executive Committee had to continue meeting as scheduled and working on new initiatives such as organizing our first webi-

nar or reviving past ones such as the renewed effort to engage in social media through LinkedIn and Tweeter. Moreover, currently, we plan to move forward with our conference. A couple a weeks ago, the conference committee members decided to reschedule the conference meeting for a later date with the support of our fellow association, the Society for Industrial and Systems Engineering (SISE). Strategically, we contacted and agreed to terms with SISE to join them in their annual Industrial and Systems Engineering World Conference in Newark, NJ. Estimating it will take a while for the situation to "normalize," the new dates for the conference are September 17 & 18.

Our conferences will be conducted parallel to each other. Attendees will also have the option to attend both conferences for an additional fee, and if they decide, they can also submit a different manuscript to the SISE conference and possibly be invited later for an extended version to be published in their indexed journal. Abstracts are being submitted through the EasyChair platform for the first time, which will allow us to institute a more transparent peer-review

process. Deadlines for submitting abstracts have been modified to a later date to aid our colleagues in planning to attend in person or opting for remote presentations, which are an option if travel may not yet be a possibility. As we receive abstract submissions from potential attendees, it is stimulating to see how researchers, students, and practitioners from several countries are willing to share their work with us. The conference committee has already contacted and awaiting confirmation from our guest speakers.

So, we are moving forward, always considering our priorities and always focused on maintaining the safety of ourselves, our families, colleagues, and friends. I thank you for your invaluable support to our society and hope to see you at our next conference. If you have any comments or suggestions regarding our proposed society's activities, please don't hesitate to contact me at any time at gabmeija@utep.edu. Hope to see you in New Jersey soon!



**Gabriel Ibarra-Mejia
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2020 ISOES Conference

Please note that the 2020 ISOES conference has been postponed due to Covid-19. The new details are:

- When: September 17-18
- Where: Newark, NJ, USA

More information at:
[www.iso.es/info/
conference_home.html](http://www.iso.es/info/conference_home.html)

See the updated call for abstracts on the next page!



XXXIInd Annual International Conference
International Society for Occupational Ergonomics & Safety
 (Concurrent with Industrial and Systems Engineering Conference)

Call for Abstracts

[Online attendance & Web-based Remote Presentations Option Available](#)

Date & Venue **September 17-18, 2020**
[Embassy Suites by Hilton Newark Airport](#), 95 International Boulevard
Elizabeth, NJ 07201, USA.

Submission Requirement & Deadlines

Abstract submission (350 words): **[July 31, 2020 \(New\)](#)**
Acceptance Notification: **[August 7, 2020 \(New\)](#)**
Final Abstract/Paper Submission* **[August 17, 2020 \(New\)](#)**

- Extended Abstract: 2 Pages
- Full Paper: 6 Pages

* Check www.iso.es.info/ for abstract/paper template and additional information on online attendance and remote presentations.

Industry	Topics	
Aerospace Agriculture Automotive Construction Defense Electronics Fishing Forestry Health Care Info Technology Manufacturing Marine Mining Oil and Gas Office Retail Transportation Utilities Warehousing and Others	Ergonomics & Human Factors <ul style="list-style-type: none"> • Physical • Cognitive • Organizational Safety & Health <ul style="list-style-type: none"> • Systems/Behavioral • Culture/Climate • Environmental • Home • Prevention through Design • Risk Assessment/Management • Artificial Intelligence • Nano Products/Processes • Automated Vehicles/Equipment • Exoskeleton/Robotics • Wearable Technology • Virtual/Augmented Reality • User Experience/Usability • Data Analytics 	Workplace Exposure Examples <ul style="list-style-type: none"> • Aging Workforce • Overweight/Obesity • Health & Wellness • Stress and Fatigue • Remote Working • Sit vs Stand • Vibration <ul style="list-style-type: none"> ○ Whole Body/Segmental • Slips, Trips, and Falls • Repetitive Motion • Work Rest Cycles • Distraction/Inattention/Boredom • Manual Handling/Overexertion • Musculoskeletal Injuries/Disorders • Environmental <ul style="list-style-type: none"> ○ hot/cold, humidity, lighting • Other Emerging Topics

[ISOES 2020 Conference Proceedings will receive a unique DOI \(Digital Object Identifier\)](#)

Student Awards

- ISOES selects up to three students each year to receive a merit-scholarship waiver.
- Scholarship includes free conference registration, two nights at the conference hotel, & airfare (up to a maximum of \$400).
- Candidates must be currently enrolled in an accredited university pursuing an undergraduate or graduate degree with an ergonomics or safety focus.
- Final **student** submission **due by June 20th**
- The scholarship recipient will be expected to register and attend the annual conference and present his/her research.

Conference Organization Committee

Gabriel Ibarra-Mejia (Chair), James G. Borchardt, Anand Subramanian, Clarence Rodrigues,
 Chao Wang, Jaejin Hwang, & Steve Fleming

Abstracts/Papers will be published in the [ISOES Conference Proceedings](#).

Digital Conference Proceedings on USB will be available to all conference participants.

ISOES Safety 2020 Expo Booth - Rescheduled to Safety 2021



James G. Borchardt
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Due to potential exposure from Covid-19 to attendees, presenters and staff, the American Society of Safety Professionals (ASSP) has decided to change the “in-person” Safety 2020 conference to Safety 2020 – Virtual Conference. If you want to register for this Virtual Conference on/before April 30, ASSP is still offering ISOES

members a significant “educator discount”. Contact me and I will provide you the discount code which you apply when you check out of the ASSP Safety 2020 registration.

The concurrent ASSP Safety 2020 Exposition of the 600+ exhibitors including the ISOES Expo Booth will be rescheduled to ASSP’s Safety 2021 Conference and Exposi-

tion in Denver June 6-9, 2021. ISOES members will be provided additional details at a later date on how to become an “ISOES Booth Volunteer” to promote ISOES’ Mission & Vision to thousands of Safety, Health & Ergonomic (SH&E) practitioners, academics and students who will be attending this conference.

“...I am aiming to promote safe and ergonomic professional practice of procedures”



Research Opportunities

Occupational safety and physical ergonomics

- Evaluation of cervical muscle activity while using computers/laptops/tablets/cell phones
- Evaluation of health literacy to find out its effect on safety climate
- Ergonomic training program

Psychosocial Ergonomics

- Is negative psychosocial environment a predictor of physical symptoms of MSD
- Is there enough female data for anthropometry

Construction Innovation

- What are the facilitators and barriers of construction innovation?



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Assistant Professor of Occupational Safety health and Environment (OSHE)
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I am conducting research in the above mentioned domains which cover some of the highlighted areas of International Society of Occupational Ergonomics and Safety (ISOES). While conducting my research in the domain of occupational safety and ergonomics, I

am aiming to promote safe and ergonomic professional practice of procedures. I aim to establish the importance of psychosocial work environment in debilitating the physical symptoms of musculoskeletal disorders through my research on psychosocial ergonomics. While conducting my research in

construction innovation I aim to find out the facilitators and barriers of an innovative idea that might facilitate or barricade a healthy, safe and productive work procedure in the construction sector.

There is much which the self-contained worlds of ergonomics in North America and Europe have in common, but can also learn from each other. In the end, all ergonomics derives from the same words; érgon – work, and nómos – law. The fundamental properties of workplace design, stress and strain, and physical, physiological, and psychological measurement still apply. In stark contrast however, are the available tools and methods, the body of literature on which those are based, down to the economic incentives for ergonomics.

The NIOSH Lifting Equation, is probably one of the most widely used (some might say misused) tools in North America. Its influence has even spread to parts of Central and South America, even though few attempts have been made to adjust for known anthropometric difference. Conversely, the Key Indicator Method, originally

developed by a regulatory body in Europe in 2001, and recently revised to cover most all workplace activities, is known to few outside of Europe.

Likewise, one can compare the bodies of research between the two continents. Anyone who has read a few scientific journal articles regarding ergonomics topics will recall seeing the same names repeatedly. The authors' names however, will differ widely, depending on the language of the paper. While the quality of the research is equally high, many core principles of the field have seemingly been discovered and documented independently.

Finally, the way in which musculoskeletal disorders are handled presents its own challenges depending on location. Although neither North America nor Europe has successfully implemented any current legislation on ergonomics, the notion of a “safe workplace” has been expanded in recent years to in-

clude classic “ergonomics” related hazards. However, the financial incentives for improving ergonomics are much different. Costs for injuries are directly attributable and therefore calculable in a country like the United States, since these are costs bourn directly by the company. In contrast, depending on the type of socialized healthcare, costs may be hidden (actually unknowable) in a much larger employer contribution, making financial arguments for ergonomics difficult.

The purpose of this piece is to cause the reader to think outside the box. Even the comparison between North America and Europe made here is somewhat presumptuous. Undoubtedly, there are methods, research, and practices used elsewhere in the world which might advance the body of knowledge even further. There are no right or wrong ways to do ergonomics, just different paths with the same goal.



**Marc Snell
PhD, Eur.-Erg.**

“There are no right or wrong ways to do ergonomics, just different paths with the same goal.”

ISOES Social Media

Dear ISOES members and newsletter readers,

We are pleased to offer our members and those interested different avenues to stay up-to-date on the latest news concerning ISOES. Please click the links below to access the various social media and information exchange platforms:



LinkedIn:

<https://www.linkedin.com/groups/8240131/>



Twitter:

<https://twitter.com/ISOESinfo>



Forum:

<https://isoes.createaforum.com/>

Ergonomic awareness of virtual reality/ augmented reality interactions



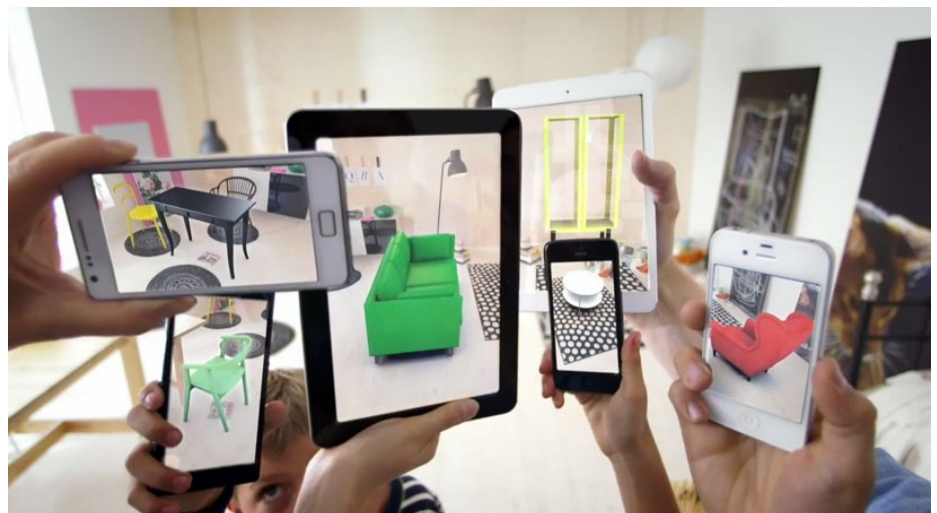
Jaejin Hwang
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**“The Future of
Jobs Report
2018 from the
World Economic
Forum expected
that large
portion of
companies are
likely to adopt
AR/VR
technologies.”**

Nowadays, there has been increased attention to virtual reality (VR) or augmented reality (AR) technology. For example, these technologies could be used as a cost-effective approach to simulate the emergency environment, which could effectively train workers how to properly behave. Although VR/AR technologies have potential benefits, there has been less effort to investigate the ergonomic issues while users are interacting with the VR/AR devices. For example, users typically wear the head-mounted display and use their hand gestures to interact with the environment. However, additional mass of the head-mounted display and increased moment-arm relative to the neck could increase the physical demand of the neck. For the worst-case scenario, if users are exposed to sustained neck flexion or extension during the interaction, an increased neck moment could lead to the

discomfort or pain on their neck. Not only for the neck, but users' shoulders are also another body part that are susceptible to the discomfort or pain during VR/AR interactions. In a traditional desktop setting, users normally place their forearms on the armrest, keyboard, mouse, or even the desk surface. Thus, some portion of the user's upper body weight could be transferred through this support. For the VR/AR interactions, there is a lack of support to transfer the gravitational force of the floated arms while users are using their hand gestures in the air. If precision or speed is required for the task, this could also increase the physical demand of the shoulders. Moreover, due to the three-dimensional VR/AR environment, users are exposed to a wider range of shoulder motions compared to the traditional desktop setting. In summary, the combination of awkward postures, a lack of support, and task demand (precision or accu-

racy) could be risk factors increasing the shoulder discomfort or pain. In order to mitigate aforementioned neck and shoulder demands of the users, optimal design and guideline of the user interface (vertical or horizontal target location, target distance relative to the user, and target size) could be an important consideration. In addition, wearable arm support such as lightweight upper extremity exoskeletons may be an innovative way to reduce the users' shoulder stresses. The Future of Jobs Report 2018 from the World Economic Forum expected that large portion of companies are likely to adopt AR/VR technologies. Before it is too late, we should bring more effort to improve ergonomics in VR/AR interactions.



Towards an integrative research framework and automated system for predicting and preventing work-related musculoskeletal disorders

Work-related musculoskeletal disorders (WMSDs) are prevalent and induce high economic burden on industry and society. Earlier studies reported that WMSDs contribute to more than 30% of worker injuries and compensable claims. South Korea and many other countries have a large number of workers' compensation claims for musculoskeletal illnesses and injuries, especially in the construction and heavy industries. Therefore, research on predicting and preventing the risk of WMSDs has significant long-term benefits for the workers.

Even though it is important to predict and mitigate the risk of WMSDs in a scientific and systematic way, it is very challenging to accurately predict (and prevent) WMSD risks in the workplace due to two major reasons: (1) WMSDs surface from a combination of multiple risk factors such as high force, awkward postures, repetitive motions, and duration and frequency of exposure; (2) It is difficult to collect reliable and accurate real-time in-situ data due to work dynamics. Digital human modeling (DHM) tools are becoming more widely used in industry to conduct human performance analyses (ergonomics, safety, etc.) before a work environment is designed and to evaluate the effects of proposed modifications on existing work methods and workstations. Applications of DHM have shown

to significantly reduce a project's time-scale, design and manufacturing costs, and occupational injuries. However, existing DHM approaches have two major limitations. First, motion data is normally collected by a marker-based optical motion capture system, which constrains human movement and limits data collection to a controlled environment. Second, human internal muscle forces cannot be estimated along with joint reaction forces and moments from most of the existing biomechanical models.

The above issues are being addressed by many ergonomics research laboratories, including the Human Factors & Ergonomics Laboratory (<http://hfel.kaist.ac.kr/>) at Korea Advanced Institute of Science and Technology (KAIST). We are actively collaborating with related research groups (e.g., Prof. Yanxin Zhang at University of Auckland) and industrial partners to develop an integrative research framework and automated system for predicting and preventing risks of WMSDs among industry workers through wearable motion sensing and digital human modeling. The wearable motion sensing approach is proposed for reliable/convenient real-time in-situ data acquisition and a digital human modelling technique is developed for rigorous ergonomic evaluation of job tasks. We expect a substantive collaboration between the researchers, industrial partners and government

agencies (e.g., KOSHA, NIOSH) to promote the computerized risk assessment of WMSDs and prevent musculoskeletal injuries in the workplace.



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“The wearable motion sensing approach is proposed for reliable/convenient real-time in-situ data acquisition and a digital human modelling technique is developed for rigorous ergonomic evaluation of job tasks.”

