

IEA2021 POST-CONGRESS REPORT

21st Triennial Congress of the
International Ergonomics
Association
(Virtual, June 13-18, 2021)



October 7, 2021

Ian Y. Noy, Congress Chair

Lessons for a connected world

This report summarizes the planning process, challenges and decisions taken during the development of IEA2021. Numerous unprecedented challenges posed by a global pandemic that imposed worldwide restrictions on travel and gatherings forced the transition of the traditionally in-person conference to a fully virtual Congress. Despite these challenges, the Congress was a resounding success, advancing the field of Human Factors and Ergonomics. The lessons learned in transforming the Congress model will have long-lasting impact on future conferences of the IEA.



IEA
VANCOUVER
2021

21st Triennial Congress of the IEA:
HF/E in the Connected World/L'ergonomie 4.0

Ian Noy, Ph.D., CPE, Organizing Chair

POST-CONGRESS REPORT¹



Introduction

This report summarizes the planning process, challenges and decisions taken during the development of IEA2021 and documents the remarkably successful outcome of the Congress, both scientifically and financially. Unprecedented in the history of the IEA, the Congress was a fully virtual, having been transformed from an in-person event to a fully virtual event due to the COVID-19 pandemic and worldwide restrictions on travel and gatherings. Specifically, Part I covers five main topics: Venue, Administration, Technical Program, Promotions and Communication, and Sponsorships & Exhibits. Part II presents the results of the Congress and Suggestions for future Congresses. Part III includes a separate set of appendices. Additional archival material is available.

¹ Revised October 7, 2021

PART I

Background

For general background on IEA Congresses, please refer to the relevant section of the History Book (1985-2018) available on the IEA website, <https://secureservercdn.net/50.62.89.79/m4v.211.myftpupload.com/wp-content/uploads/2020/04/IEA-Historical-Book-1985-2018.pdf> . The Canadian bid to host the 2021 Congress was submitted in April 2015 and approved by IEA Council at its meeting later that year held in conjunction with the IEA Congress in Melbourne, Australia.

Venue

We briefly chronicle the transformation of the Congress from an in-person event to a Hybrid event to a Fully Virtual event, a transformation made necessary by the devastating and relentless COVID-19 pandemic that is still raging at the time of writing.

Planning the In-Person Congress

The Congress venue was selected after a detailed site evaluation of contending hotels and convention centers from 5 major Canadian cities (Montreal, Halifax, Toronto, Calgary, and Vancouver), based on assessments of ease of travel and accessibility, destination attractions, hotel meeting capacity and capability to support large conference logistical needs. Although the ACE bid proposed Banff as the Congress venue, it became clear early in the process that it neither met the capacity nor accessibility criteria to be suitable for a major international meeting. The Hyatt Regency in Vancouver was deemed the most suitable venue bolstered by the fact that Vancouver is a superb meeting destination (voted as most popular convention city in North America). It was to serve both as the Congress conference HQ and principal hotel accommodation. Bedroom rates were negotiated at favorable levels, though admittedly Vancouver is an expensive city. In addition, student accommodations were to be arranged at the University of British Columbia housing. The hotel meeting facilities could accommodate upwards of 1600 delegates and the entire hotel meeting space was booked for the week of the Congress plus the previous weekend in consideration of a guaranteed bedroom block and minimum Food and Beverage spend. There was no charge for meeting space provided we fulfilled the room block. Between 11 and 13 concurrent meeting rooms holding at least 125 delegates theatre style were available in addition to smaller rooms for ad hoc meetings or ancillary gatherings (some of the rooms could hold upwards of 400 delegates).

Conversion to Hybrid Congress

As the COVID-19 pandemic began to spread internationally in March of 2020, major disruptions to travel and meetings were instituted worldwide. From the Congress planning standpoint, the

expectation during the spring and summer of 2020 was that the pandemic would come under control and not affect the Congress, which was more than a year away. The priority at the time was to develop the Technical Program and the strategy was to develop delivery plans that would be flexible and respond to the situation as it might unfold. However, as summer months continued to ravage the global health system there was increasing concern over accessibility for hard-hit countries or economic sectors, we began to explore the possibility of introducing a satellite virtual conference. In July 2020, we wrote,

As you might guess, COVID is uppermost in our minds and while it is too early to make any definitive statements about next year, there are things we can tell you now to keep you informed of our plans. I will stress that at this point, we are very confident the Congress will take place as planned. However, if circumstances dictate, we will be ready to pivot to another format (likely a virtual conference). The good news is that this has little impact on the work to develop the technical program, which is progressing extremely well. As you know, we are very excited about the response we got to the Call for Special Sessions.

You will be interested to know that in any case we have been exploring how to introduce virtual sessions to complement the in-person event for delegates who will be unable to travel, making the Congress effectively a hybrid event. We believe this effort will actually provide greater programming flexibility and greater accessibility and is unlikely to detract in any way from the in-person Congress. How this might affect session assignments and the overall program structure will need to be carefully defined. This initiative is still under development and at this stage we are proceeding according to original plans.

This was followed by the following announcement a few days later.

IEA2021 will be a hybrid event, comprising both an in-person conference and a virtual conference. Plans for the in-person conference are going exceedingly well and we are confident we will deliver a dynamic, enriching, and memorable experience. The Congress will comprise 5 days of technical content, including plenary sessions at the start of each day followed by 12 concurrent sessions. We have also added ePosters to enhance the traditional poster boards. The ePosters will be dynamic, supporting several presentation formats. Times for interacting with the authors will be posted, but the posters will be available on your mobile app during the Congress and for 30 days afterwards. We believe this initiative will promote greater interaction and will have great impact.

Going hybrid will allow people who, for a variety of reasons, will not be able to join the in-person conference in Vancouver to participate in the most important human factors and ergonomics conference of 2021. As such, this initiative will take the IEA mission to elaborate and advance ergonomics science and practice while expanding its scope of application and contribution to society to a whole new level. We are introducing the virtual conference as an integral part of the Congress, but it will have more limited technical content than the in-person conference. The virtual conference will have up to 28 unique webinar-style sessions, compared with about 144 sessions of the in-person conference. The plenary sessions in Vancouver will be live streamed to the virtual conference delegates.

Registration fees will be reduced to make the virtual conference widely accessible. Additionally, virtual session delegates will be able to join the online webinars at scheduled times to pose questions and interact with the authors. The recorded virtual sessions will be available on demand for 30 days post Congress. In-person delegates will have full access to the virtual conference as well as the in-person conference.

The main body of the Congress will be the in-person conference. We urge everyone to submit proposals for lectures or ePosters and plan to attend the in-person event. It will be truly unforgettable! Nothing can really replace the in-person experience.

Pivoting to Online Virtual Congress

Although pressure was mounting in the fall of 2020 to go fully virtual, we were contractually obligated to the Hyatt Regency. The contract contained a Force Majeure Clause that would allow canceling the contract for a variety of reasons beyond our control, including a pandemic. However, invoking this clause needed the consent of the hotel to avoid the very hefty cancellation penalty. While concern about the viability of an in-person event mounted as the pandemic persisted, we agreed with the hotel in November of 2020 that a final decision would be made on March 1, 2021, and that we would be allowed to cancel the event without penalty at that point if the situation did not improve or continued to jeopardize the viability of the Congress. So, while we began to work on pivoting to a fully virtual Congress, we continued to promote the in-person event so that we would not adversely affect registrations if indeed the in-person conference was to take place.

We encouraged registration for the in-person event and established policies that ensured that no one would be penalized if they registered for the in-person event if we later pivoted to a virtual Congress (they would receive refunds). We also developed a Frequently Asked Questions and Answers document to help explain the Hybrid model as this was new to the IEA, if not to most scientific conferences.

However, in early February, 2021 it was clear that the situation in Canada and internationally would not improve before June and a decision was needed prior to the March 1 decision date as delegates increasingly requested information they needed to plan their participation. Accordingly, on February 8 we contacted the Hyatt to explain our predicament with the result that the hotel agreed to release us from the contract and to refund the deposits that had been paid to secure the meeting space. This marked a major change in direction for the Congress and it came not soon enough to deal with the myriad of the technical program adjustments that were necessary, or the many exigencies associated with building a large virtual conference.

A clear advantage of the virtual Congress is that it would provide access to recorded sessions that can be viewed on-demand after the event. However, it was clear that an online event would not support human interactions to the same extent and is far more prone to outside

distractions than an in-person event. To enhance informal and flexible interactions among delegates, we introduced a separate platform, REMO (see discussion later in the report).

Congress Administration

As a result of previous Congress planning experience, the Congress Chair opted for a minimal size Organizing Committee. The members of the formal Congress Organizing Committee are shown below, though it should be acknowledged that several other people (mostly students) were involved in various parts of the planning process (including aspects such as social media, database checks and correction, etc.). Each of the OC members contributed enormously to the success of the Congress. However, it should be noted that the Technical Program co-chairs, Nancy Black and Patrick Neumann, devoted enormous time and energy creating and managing a very complex program. They involved the IEA technical Committees early in the planning process, which proved extremely beneficial for the Congress as well as the committees themselves. We were extremely fortunate that Nancy Black was able to commit her partial sabbatical towards this effort at a time when the workload was at its peak.

One of the first order of business was to select a Professional Conference Organizer (PCO). A Request for Proposals was issued to both Canadian and American PCOs and meeting planners. We receive more than a dozen bids and selected Prestige Accommodations, Int'l, Inc., operating out of California, based on cost per value metrics and their extensive PCO experience and familiarity with HF/E, having organized the HFES annual meetings for over 30 years. Tragically, Steve Marlin, CEO of Prestige Accommodations, Int'l., Inc. passed away in early 2021. Steve provided outstanding support and wise counsel, always with a smile. He was sorely missed. We remain indebted to the Prestige staff, whose expertise and outstanding professionalism guided us through the planning process and Congress implementation. In particular, we are grateful to Laurie Ybarra, Sr. Meetings Manager, who oversaw the many diverse aspects of our ever-changing plans and Christine Reinhard, Director of Operations, who skillfully managed the budget, website and registration system.

The next milestone was to define the Congress theme, ***HF/E in the Connected World/L'ergonomie 4.0***, and design the Congress logo. These were completed in time to launch the Congress promotional campaign at the 2018 Congress in Florence via an exhibit booth and presentations at the Closing Plenary. The logo depicts diverse human forms at the center of a connected world.

Congress Planning Timeline

An overall Congress Gantt Chart was prepared, as depicted below. However, it was not referred to often and held little real value. There were similar Gantt charts created for the Technical Program development that are not shown here. Instead, the Technical Program kept an Excel spreadsheet with milestone data that were reviewed and updated weekly.

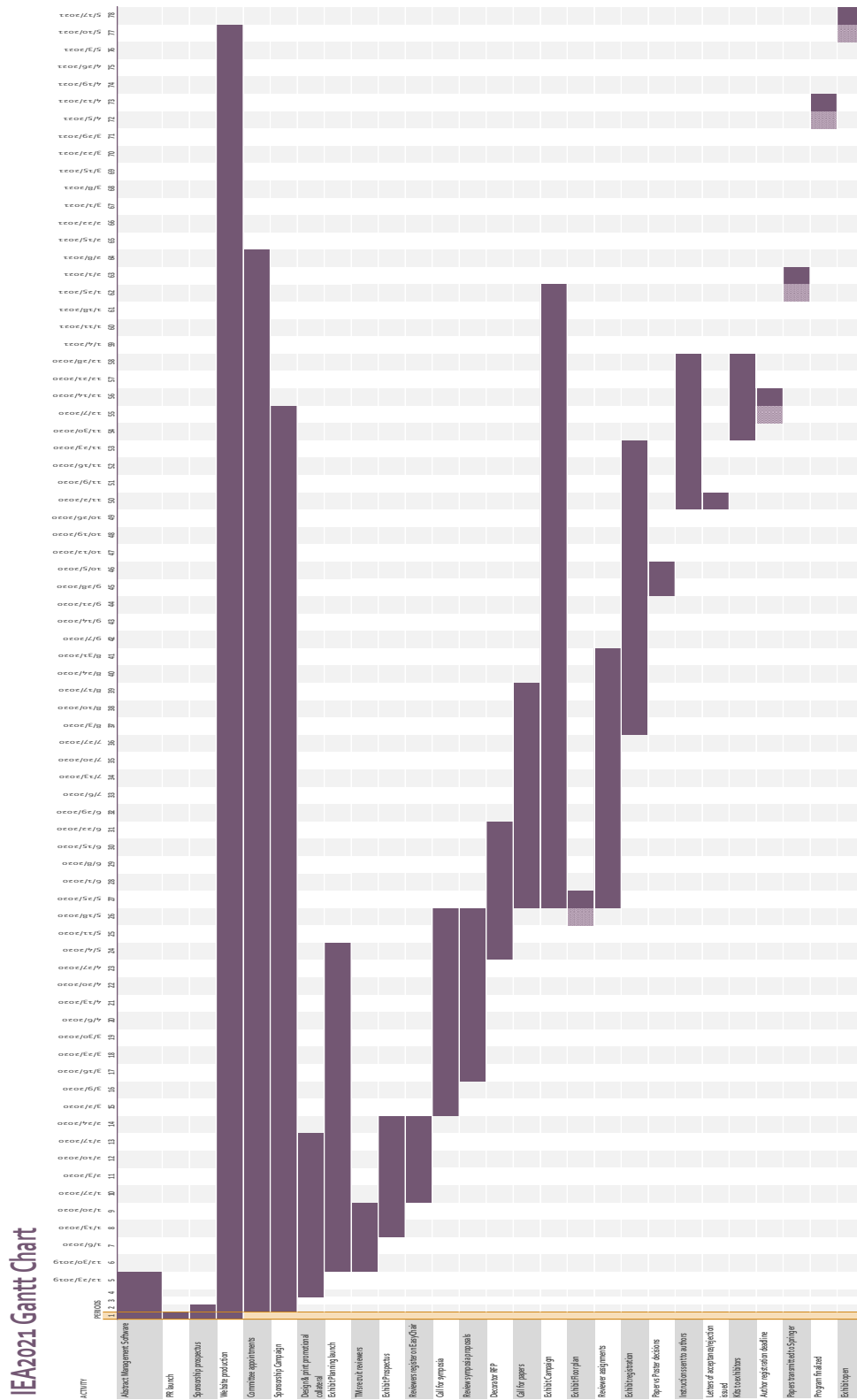


Figure 1: IEA2021 Overall Plan Gantt Chart

IEA2021 Organizing Committee

Ian Noy

Congress Organizing Chair



Nancy Black

Technical Program co-chair
Université de Moncton



Patrick Neumann

Technical Program co-chair
Ryerson University



Anne-Kristina Arnold

Technical Program -
Posters
Simon Fraser University



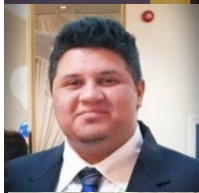
Colleen Dewis

Platform Technical Liaison
Dalhousie University



Sadeem Qureshi

ECR Program Coordinator
Ryerson University



François Taillefer

French Language
Université du Québec à
Montréal



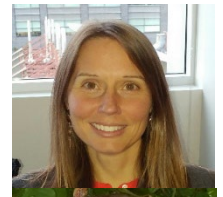
Manobhram (Manu) Nellutla

Developing Countries
Actsafes Safety Association



Abigail Overduin

Exhibits
The University of British
Columbia



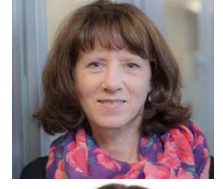
Heather Kahle

Media Relations
WorkSafeBC



Jenny Colman

Media Relations
WorkSafeBC



Gina Vahlas

Events/Social
WorkSafeBC



Era Poddar

Events/Social
Consultant



Alison Heller-Ono

Events/Social
CEO, Worksite International



Tobi Durowoju

Remo Coordinator
EWI Works Inc.



Jeanne Guerin

Canadian Academic Liaison
Consultant



Hayley Crosby

Media outreach



Software Platforms

Four initial software platforms were selected by mid-2019; (1) Cvent for registration, which was the preferred platform by the Professional Conference Organizer (PCO), (2) the, IEA2021.org website, created by the PCO team using GoDaddy, (3) EasyChair, selected based on our evaluation of competing Abstract Management Platforms, and (4) a mobile app from Core-apps. As ideas for a digital poster evolved, we contracted with Community Brands (aka EventTechGroup who either owned Core-apps or bought it /merged with it) to provide their ePoster module that we expected would be embedded within Core-apps' mobile platform (we also looked at other digital poster platforms). When we decided to go hybrid, things started to become more complicated as we needed to add a Virtual Event Place (VEP), while the mobile app was becoming redundant. Finally, when we pivoted to fully virtual, we no longer needed a mobile app and we believed the VEP would encompass the ePoster module seamlessly. Within a few weeks of the Congress start, we experienced the functional characteristics of VEP and realized that VEP had limited ability to support synchronous interactions. Consequently, we decided to add a video chat platform, REMO.

The evolution of the various platforms over time is depicted in the following Figure 2.

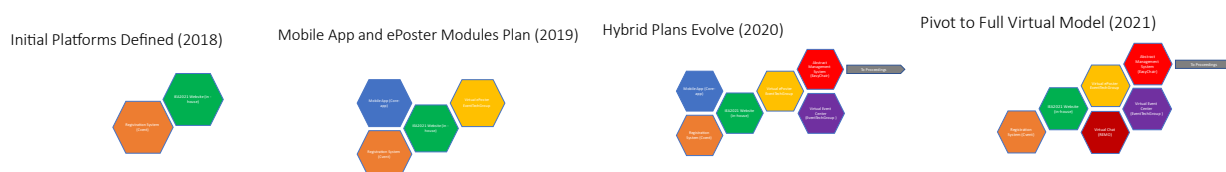


Figure 2: Software platforms adapted over 4 years as needs evolved

Thus, six ultimate software platforms that were utilized as illustrated in Figure 3. **In the selection of software platforms and planning the Congress architecture, it was necessary to consider how information would be shared across the various platforms, though this turned out to be a major impediment that was not adequately addressed during the selection of the products.** It must be conceded that platform overload was a problem for some participants. With hindsight, perhaps different products would have been selected. However, as selections had to be made in stages the detailed technical capabilities and limitations of the various software platforms were not fully known or appreciated. Despite having worked out the data flow needs across platforms (see Figure 3) it was not possible to test the way this might be accomplished prior to actually acquiring and configuring the products. Moreover, it should be noted that the technologies for delivering virtual events was in a constant state of flux and improving. In the end, it turned out that transferring information across platforms required much manual manipulation that was prone to error, requiring tedious quality checks and

several iterations. Even within a given platform such as EasyChair, certain elements of the software were not accessible to other elements of the platform.

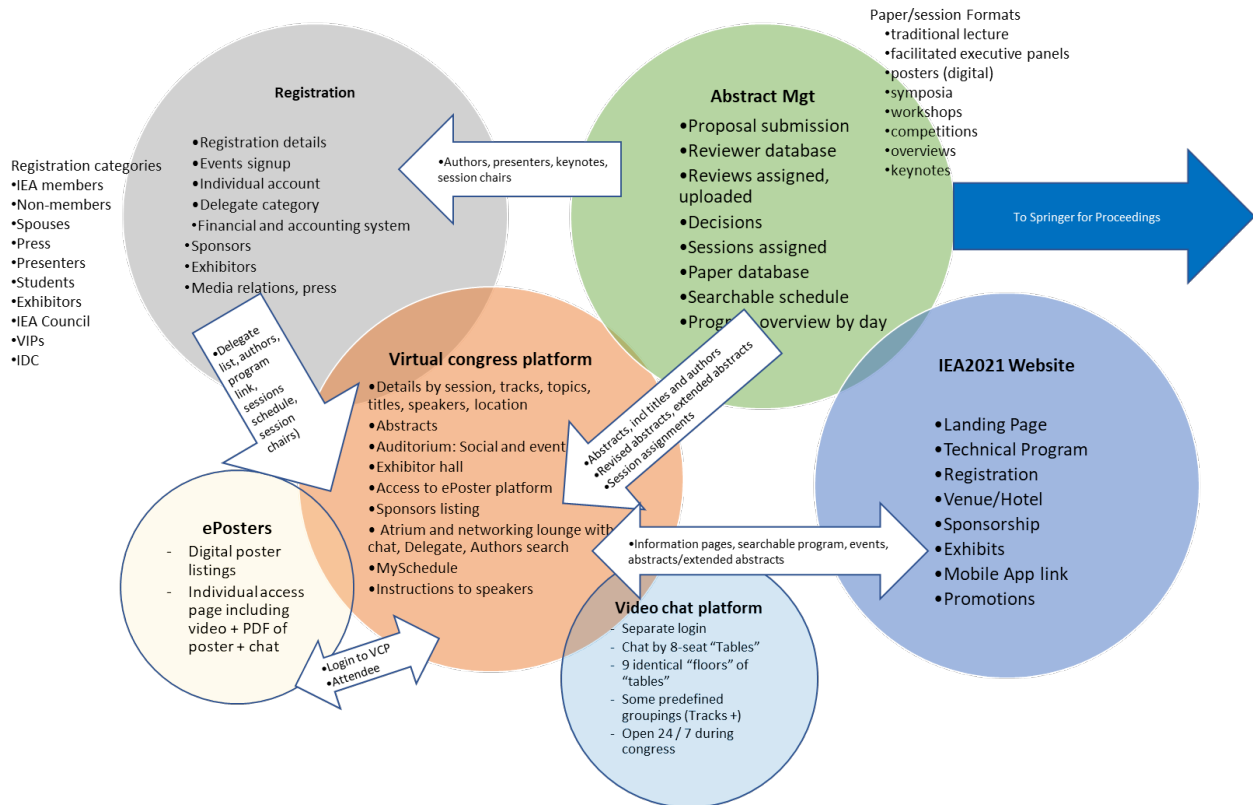


Figure 3: Virtual Congress Architecture. The ePosters were accessible via VEP through a separate platform of Community Brands.

Notes regarding use of EasyChair

- There are challenges with any online conference tool. While EasyChair is widely used, the platform orientation we received did not really prepare us for some of the inherent constraints or familiarize us with best practice. Some of the issues we faced are listed.
 - We were not advised of the constraints associated with final files and that authors were expected to upload their final papers directly into the proceedings module. Instead, authors entered the final files in submission section, which turned out could not be easily transferred within EasyChair or to other platforms, resulting in enormous effort on the part of student volunteers to transfer the files.

- Barriers between different pieces of software created problems (e.g., if you change a title in Submission after having started the program/ proceedings, that change may not carry over properly).
- The Proceedings feature lacked critical functionality - it did not create a single, searchable document. The output was a large zip file with every paper separate. This proved very frustrating when sending items off to Springer or posting online.
- Tracks were helpful within the submissions section and allowed Track chairs to assign their own reviewers. However, track associations did not carry over into the proceedings or program building section, so it was necessary to have multiple files open to be able to check tracks if the Track chairs had not grouped the papers appropriately.
- Some of these issues could have been overcome if a decision were made at the beginning to standardize on a platform and tailor settings and procedures for repeated use. However, these limitations only became apparent with time and experience.

Notes regarding use of the Community Brands Virtual Event Place (VEP, later renamed FORJ)

- VEP had numerous issues, both in terms of software functionality and customer experience. It is not a recommended product.
- The VEP would not accept committee spreadsheets of authors/ presenters, titles, session numbers that were needed to build the platform. The data had to be transcribed to a completely different and seemingly arbitrary format for VEP AND yet a different format for the ePosters. The VEP and ePoster modules were originally the products of different vendors and were not well integrated by Community Brands (most likely because they were new to them at the time).
- A related problem was the session times. The EasyChair times were expressed in Pacific Daylight Time as legacy from the in-person Congress and to preserve the Vancouver brand. However, VEP insisted on using Eastern Daylight Time. Thus, we had two sets of times that proved to be confusing for some delegates despite our broadcasting daily notices about time zones. However, the VEP system also displayed the session times in the local time zone (according to participant location), and this was very useful.

Notes regarding use of the Community Brands Attendee Interactive (for ePosters)

The ePoster program team was very responsive to our needs, in contrast to Community Brands. The platform was very good and provided the gateway for the Virtual Event Platform. However, despite FORJ² (previously VEP) being the Congress platform, attendees could only access

² Just prior to the Congress, Community Brands renamed their platform Virtual Event Place (VEP) as FORJ

ePosters through an obscure tab at the top of the FORJ platform. All other aspects of programming in FORJ had a banner within the screen as well as a tab across the top of the screen. The lack of a more salient link to ePosters within FORJ was disappointing and could not be corrected due to vendor inflexibility.

Knowing these issues, and similar issues not listed here, earlier on in the planning process would have prevented a great deal unnecessary effort and frustration.

Media Outreach

With Canada hosting the 2021 IEA Congress in Vancouver, the Media Outreach team knew this would be a great opportunity to not only promote the Congress, but to also expand the Ergonomics and Human Factors network within this country. Further details regarding media outreach are provided under the heading “Promotions and Communication” later in the report.

Congress Budget

The Congress Budget underwent several revisions as the delivery model changed from in-person to ultimately a fully virtual event. The Appendix provides an Excel spreadsheet that provides full details of the original in-person budget as well as the fully virtual budget. High level comparisons of the two main budget formulations are provided below. Interim budgets were also prepared for the hybrid models on the assumption of reduced attendance given the impact of the pandemic. These budgets were intentionally conservative, the main defining principle being ‘underestimate revenue and overestimate expenses’.

It must be said that financial projections leading to the Congress were extremely tenuous since the IEA has no history of virtual event attendance, and the economic impact of the pandemic was highly uncertain. A virtual Congress has definite advantages as well as disadvantages in relation to an in-person event, but there was no basis for developing attendee projections. On the one hand, a virtual event is more accessible, especially to delegates from lesser developed countries or who are otherwise unable to attend in person. Yet, it was impossible to know how increased accessibility would actually translate into registration numbers. On the other hand, it was impossible to know the extent to which the economic impact of prolonged pandemic on business and academic sectors would adversely affect registrations or sponsorships. We were flying blind so to speak. To facilitate attendance and promote accessibility, registration fees were set deliberately low.

The table below presents comparative budget plans for a Hybrid Congress and the fully Virtual Congress.

Budget: in-person Congress & Virtual satellite		Proposed budget for fully virtual Congress	
Total Registration Fees	1,120,750	Total Registration Fees	437,543
Total Other Income	<u>185,500</u>	Total Other Income	<u>130,000</u>
TOTAL RECEIPTS	1,306,250	TOTAL RECEIPTS	567,543
EXPENSES		EXPENSES	
Total Meeting Planner	96,240	Meeting Planner	103,000
Total Finance	50,400	Bank and credit card fees	50,400
Total Exhibits	10,000	Invited Speaker Honoraria/expenses	4,000
Total Speakers	15,000	Signs/Graphics/Banners	6,300
Total Printing/Mailing	70,130	Mobile App	2,250
Total Registration Area	10,080	Mobile App Graphics	1,000
Total Facilities	30,300	EasyChair AMS	8,336
Total Food/Beverage	403,312	Miscellaneous postage/printing/apps	3,520
Total Entertainment	10,000	ADA Interpreting Services	1,000
Total Public Relations	33,560	Virtual Congress platform	186,004
Total Transportation	2,500	Opening Show	10,000
Total Audiovisual/Computers	101,260	Marketing	12,000
Total IEA Capitation Fees	28,224	Capitation fees (\$28 US per delegate)	28,224
Total Contingency	<u>83,980</u>	Miscellaneous	40,000
		Shipping	5,000
		Committee Expense	<u>25,200</u>
EXPENSES	<u>944,986</u>	EXPENSES	<u>486,234</u>
NET INCOME	<u><u>361,264</u></u>	NET INCOME	<u><u>81,309</u></u>

Registration Fees

There were three distinct Congress models defined as the Congress evolved, necessitating careful review, analysis and and formulation of differing fee structures, as enumerated below. As mentioned earlier, there were little data available to guide these formulations.

1. Initial Plan for the in-person Congress (Vancouver), based on traditional model
2. Introduction of the satellite virtual conference (Hybrid model)
3. Fully Virtual Congress
 - a. Despite pronouncements that in the event the Congress would go fully live and that the registration fees for the virtual satellite would be increased, the decision was made at the time of pivoting to the full virtual Congress (February 8) that the virtual conference fees would not to be raised for delegates already registered or who would register within the next 10 days. Nearly 1,000

delegates registered at the full fee of CAN\$ 299.00 (students and LMIC delegates at CAN\$ 199.00)

- b. On February 19, new registration fees came into effect (and widely publicized in advance) to reflect the cost of delivering a fully on-line event
- c. As we began to experience unforeseen expenses, the announcement was made that late fees would be raised on May 10 and then again June 7
- d. The registration fees for students and LMIC delegates were kept to minimal levels.

The announcement about going fully virtual was made February 8, 2021 and it was indicated that the Virtual Conference rates would apply for the full event for another 10 days, after which it would increase per the table below.

Summary Table of Registration fees as a Function of Time and Congress model. The rates are expressed in Canadian currency (CA\$).

Registration Fees (comparison over time)	In-person	Hybrid VC	Full Congress	After May 10	After June 7
		7/7/20 - 2/18/21	2/19/21 - 5/9/21	5/10/21 - 6/7/21	6/7/21 +
Full Congress, Member Advantage Rate	995	299	499	599	699
Full Congress, Member Regular Rate	1,250	299	499	599	699
One Day, Member	500				
One Day, Nonmember	600				
Full Congress, Nonmember Advantage Rate	1,250	395	595	695	795
Full Congress, Nonmember Regular Rate	1,495	395	595	695	795
IEA Council/ACE Council/2021 Committee	700				
Full Congress, Student Member	300	125	125	225	325
Full Congress, Student Nonmember	350	125	125	225	325
One Day, Student	75				
Full Congress, Developing Countries (LMIC)	700	125	125	225	325

All in-person registrations received prior to pivot were changed to virtual and if already paid, then refunds were.

It should be pointed out that a number of people (18) registered but did not pay or log in. They were written off and removed from the books. A further 17 people registered and participated but had not paid. As at time of this report, a number of these had paid, but not all.

As a footnote, we were surprised that numerous firms required invoices sent to them in their prescribed format. Normally, we would generate an IEA2021 invoice when necessary. However, generating individualized invoices to specific firms required an enormous amount of effort.

Technical Program

Development of Technical Program

The program was planned for 5-days of scientific content with 12-15 parallel sessions. Two calls were made: the first for special sessions and a subsequent call for individual communications, as described below.

The initial tasks of the Technical Program Committee (co-chaired by Nancy Black and Patrick Neumann) were to engage with the IEA TC Chairs and other individuals nominated by IEA-member societies to serve on the Scientific Committee. Over the span of 2 years, the Scientific Committee met via Zoom half a dozen times to communicate plans, define roles and responsibilities, obtain input, and establish and review action plans.

Most of the TC Chairs were engaged and appreciated the fact that they were approached very early in the process. The next step was to select the Abstract Management software and after some comparative research it was decided to go with EasyChair. It seemed to have the capability to deal with the complexity of Tracks and concurrent sessions and it was reportedly compatible with what Springer would eventually require to publish the Congress Proceedings. EasyChair, as it turned out had to be customized for the Congress and had several shortcomings that were not known until it came time to process the data or export files in a format that could be used to transfer data. Had we known early on how EasyChair would process the data inputted by authors we would have set it up differently. A major problem with EasyChair is that the training they offer is superficial. We were fortunate in having a dedicated person to manage EasyChair and liaise with technical support, a task that required ongoing effort throughout the planning and implementation of the Congress. It is recommended to have a dedicated technical coordinator as part of the team.

The overall development of the Technical Program was defined having the following phases and deadlines. Links to relevant instructions and templates were uploaded to the IEA2021 website, and available in Appendix. Some advance work was done to set the stage for special sessions - i.e., specific groups were recruited to generate proposals.

MARCH 31, 2020: Call for Special Session Proposals

- Proposals for Special Sessions can include Symposia / Panels / Workshops & other content formats in 90-minute blocks.
- Other formats do not need to fit into any of the existing IEA Technical Committee fields and can be associated with new or developing ergonomic fields.

JUNE 26, 2020: Deadline for Special Session Proposals

JULY 3, 2020: Feedback on Special Session Proposal acceptance / rejection, including comments.

JUNE 26, 2020: Call for Researcher or Practitioner Presentation (Oral / Poster) Proposals

- Each submission must be associated with ONE conference Track. Many of these relate to existing IEA Technical Committees; an "Other" Track is available for subjects which do not align with the specified Track topics.
- Students and early career researchers were asked to indicate this when submitting their abstracts so they can be considered for available prizes.
- At this congress, lecture and poster presentations are of equal scientific importance. While authors may suggest their preferred format, the Technical Programming Committee will determine the format for each presentation.

SEPTEMBER 25, 2020: Deadline for Researcher or Practitioner Presentation (Oral / Poster) Proposals

DECEMBER 4, 2020: Feedback to authors of Researcher or Practitioner Presentation (Oral / Poster) Proposals including acceptance / rejection and suggestions for improvement.

FEBRUARY 5, 2021: Final Papers (Full length or Extended abstract) due from all authors

The next step was to define the Tracks and identify Track Managers. This was completed after the Call for Special Sessions when accepted symposia would augment the topic areas covered by the IEA TCs.

Calls for Special Sessions

As mentioned above, the Call for Papers was accomplished in two separate phases. The first was a Call for proposals to organize special sessions. This Call was launched March 31, 2020, with a deadline of June 26, 2020. Special Sessions were defined as Panels, Workshops, alternate format sessions, and symposia (which are sessions on specified topics/themes defined by the organizer but to be created from the response to the general Call for Papers rather than a special session for which the organizer would propose the participants). The symposia that were to be formed from the submissions to the general call were defined as “open”, while the

ones where the organizer invited the participants were defined as “closed”. All accepted symposia were advertised to authors during the second call and in some cases, this expanded the scope of the initially planned symposium.

About 100 proposals for special sessions were received during the period. Special sessions, including workshops and Symposia, were reviewed in advance of the general call for submissions; the scientific program co-chairs determined those worthy of inclusion and these elements became new informal organisational “blocks” within the program, assigned to one of the existing Scientific Tracks.

Tracks

Thirty-four Tracks, some corresponding to responsive Technical Committees; others defined by accepted special sessions. The Tracks are listed below, along with the respective Track Managers in brackets.

Practitioner Cases (Ruud Pikaar)

HF/E Practitioners participate in design and engineering projects, applying a systems ergonomics approach, resulting in real-world interventions in work systems.

Share your practical approach, methods, results, and lessons learned, with colleagues, project engineers, and academics. One way to share insights and best practices is through case studies, thus bridging the gap between theory and practice.

Aerospace (Guy André Boy)

Aerospace HFE track is looking for contributions from research, academia and industry on novel approaches in aircraft and air traffic management human systems integration from various perspectives, including physiological, psychological, social, organizational, cultural, philosophical and political issues. We will provide a forum for discussions on the role of humans and organisations in analysis, design and evaluation of aeronautics and space complex systems.

Activity Theories for Work Analysis and Design (Francisco Moura Duarte)

ATWAD documents and disseminates theories and methods based on Activity approaches for field analysis and design. “Activity approaches” are understood in the broad sense: cultural and historical activity theory, but also situated approaches of action and cognition at work, workplace studies and practice-based approaches.

Affective Design (Rosemary Seva)

Affective design involves designing products, interfaces and services that are capable of eliciting emotional experiences from users. It also aims to determine emotions that are experienced by users in different contexts of product use.

Aging and Work (Jodi Oakman)

As the population ages, sustainable employment is critical. Work demands must be matched to fit with employee capacity to ensure older workers can remain at work. This stream will explore the issues facing older workers, interventions to maximise work ability and policy approaches to ensure successful longer working lives.

Agriculture (Peter Lundqvist)

To present results and discuss how to reach a sustainable working life particularly with climate change, illnesses and

other new challenges are more frequent for the farming population on top of the daily working life.

Anthropometry (Karen Bredekamp)

Techniques and findings in the measurement, standardization, comparison and application of Anthropometric data. The application of Anthropometric data could include amongst others the design and/or evaluation of wearable products, human modelling / Digital Human Models, workstations, occupant areas, clothing and footwear.

Biomechanics (Rauf Iqbal)

Analysis of human movement, work posture and work method for bringing out factors leading to strain and fatigue at work. Application of the findings for humanizing work and ergonomic design of equipment/tool in order to achieve better efficiency and higher productivity.

Building and Construction (John Smallwood)

Building & Construction addresses the three broad areas of ergonomics: physical, cognitive and organisational. Although historically, the focus has been on physical ergonomics, there is a need to address cognitive, and organisational ergonomics relative to building and construction. With the advent of Industry 4.0, such related submissions add major value.

Ergonomics for Children and Educational Environments (*Sarbjit Singh)

A forum for the international exchange of scientific and technical ergonomics information related to children and educational environments. It promotes professional and public awareness of ergonomics related to children of all abilities in all aspects of their lives and the application of ergonomics in all educational environments.

Ergonomics in Advanced Imaging (Jukka Hakkinen)

Ergonomics of advanced imaging systems such as virtual and augmented reality, stereoscopic displays, ultra-high resolution and high-dynamic range displays. All physical, physiological, psychological, cognitive, experiential, expressive and social characteristics of these display systems. Predicting and preventing cybersickness.

Ergonomics in Design for All (Isabella Tiziana Steffan)

Research and implementation of the transversal design approach called Design for All / Universal Design / Inclusive Design. This includes person-centred design and applications to communication systems, environments, public services and fast-moving consumer goods, so that each environment / product / service can be accessed and used by as broad a range of people as possible. Involvement of real users including those with disabilities, the elderly, children, etc. in the design process. Ergonomic knowledge on differing human abilities / capabilities and diverse design goals.

Ergonomics in Manufacturing (Jim Potvin)

Ergonomics and human factors related to occupational tasks in facilities of mass production. Examples include controlling injury risk while ensuring quality and productivity on assembly lines, accounting for engineering constraints, optimizing the cognitive aspects of process control systems, integrating lean manufacturing and the migration to Industry 4.0.

Ergonomics Work Analysis and Training (EWAT) (Catherine Delgoulet, Marta Santos)

Contributions of ergonomic analysis of work activity (of workers, trainers or trainees) to the improvement, design or evaluation of training and learning devices, tools and contents. How training course design, based on an ergonomic analysis of work, allows re-examination of work and its conditions. The resources and conditions needed for the development of workers in a systemic approach linking training and work. The major changes that the world of work is undergoing and accompanying (aging populations, massive data work, cobotics, environmental transformations, artificial intelligence, etc.) are challenges for adequate training conception, for workers and their supervisors,

concerned with their skill development and their health.

Gender and Work (Marie Laberge)

This track aims to describe and discuss diverse approaches to the consideration of sex and gender in ergonomics, including methods, development / implementation / evaluation of interventions, and knowledge transfer, in all activity sectors and topics in the field of ergonomics and human factors.

Health and Safety (Gyula Szabó)

Ergonomic / Human Factors research and application are central to creating workplaces where no accidents or occupational diseases occur. This track encompasses all the leading contemporary applications and advancing technologies used by ergonomists or occupational health and safety professionals to improve safety culture, manage accidents and risk, plan prevention & intervention or use personal protective equipment as a last resort.

Healthcare Ergonomics (Marijke Melles)

The Healthcare Ergonomics track discusses how human factors and ergonomics contribute to the quality and resilience of our healthcare system. Topics range from physical and cognitive to behavioral and organisational ergonomics, e.g., from patient handling and decision making to therapy adherence and value-based healthcare. Special attention will be paid to HFE research methods in the medical domain and COVID-19 related research.

HF in Supply Chain Design and Management (Fabio Sgarbossa)

Human factors determine the performance of all levels of supply chain, from components procurement to production systems, from material handling and intralogistics to operations management, from distribution logistics to forecasting demand. Emerging technologies (Industry 4.0) can support the human at all levels, from operational to management.

This track aims at investigating the development of innovative approaches for the integration of human factors in digital supply chain design and management, with particular emphasis on Industry 4.0 technologies.

HF/E Contribution to Cope with Covid-19 (Sara Albolino, Andrew Todd and Tommaso Bellandi)

The track will include the work done from HFE experts to cope with the emergency during the Covid-19 pandemic. HFE experts gave their contribution in many different areas of work and applied their expertise in order to facilitate workers and citizens in performing difficult activities during the emergency. Sharing knowledge and lessons learned is of great value for participants of IEA2021 and for preparing organizations and systems for future unexpected events.

HF/E Education and Professional Certification (Chien-Chi (Max) Chang, and Maggie Graf)

This track focuses on the development and improvement of professional educational programs in ergonomics and human factors and on building up the profession. The track includes special sessions on education and certification and provides examples for the development of HFE at national or regional level. Participants are invited to share experiences on these topics and participate in discussions on the challenges involved.

Human Factors and Sustainable Development (Andrew Thatcher)

Human Factors and Sustainable Development looks at all aspects related to creating a sustainable future for all. The HFE work ranges from microsystems (the design of sustainable work systems) right the way through to macrosystems (the design of sustainable organisational systems) and global systems (eg. global responses to cross-national work systems - global supply chains and epidemiological work).

Human Factors in Robotics (Sascha Wischniewski)

Bringing together research, that applies theories, principles, data or methods in order to plan, design or evaluate human-centered and productive human-robot interaction systems, including body-worn robotics like exoskeletons.

We strongly welcome a focus on practical applications from various backgrounds including production, service and healthcare robotics.

Human Modeling and Simulation (Gunther Paul)

In virtual prototyping and human-centred product design, digital human modelling and simulation (DHM) is an essential enabler during the conception and design phases. DHM allows the simulation and evaluation of new product and work system designs in terms of usability, performance and comfort.

IEA International Development (Andrew Todd)

The IEA International Development (ID) Standing Committee promotes, coordinates, and implements ergonomic activities in industrially developing countries by supporting local and regional initiatives concerning research, development, training, and conferences. The committee implements ergonomics development programs in industrially developing countries and collaborates with other IEA committees with interests in industrially developing countries.

Mining (Robin Burgess-Limerick)

Applications of human factors and ergonomics to activities associated with the extractive industries broadly defined, including exploration, mining, processing, and rehabilitation.

Musculoskeletal Disorders (Ann Marie Dale)

Share ergonomics research and “best” practices on risk assessment, prevention and management of work-related musculoskeletal disorders. This includes the design of jobs, tasks, tools, and work organization.

Neuroergonomics (Nelson Ekechukwu)

Neuroergonomics is the study of human brain (and other aspects of the nervous system) in relation to performance at work and in everyday settings. We may optimise working conditions, but cognition, emotions and personality will drive the behaviour of people at work.

Interventions are needed that take into account individual differences.

Organizational Design and Management (ODAM) (Laerte Idal Szelwar)

Based on a sociotechnical, macroergonomics, perspective, Human Factors in Organizational Design and Management (ODAM), focuses on the overall innovation and design of work systems, including work content and organization teamwork and management of psychosocial work environment. Participatory approaches are key elements in transforming work systems, understanding dynamic systems, complexity, and examining interactions among human, environmental and societal issues.

Slips Trips and Falls (Richard Bowman)

Holistic falls prevention on level surfaces, stairs, ramps and at heights, considering the capabilities of the individual, their footwear, activity, environmental aspects, slip resistance measurements and design issues.

Systems HF/E (Paul Salmon)

Systems HF/E methods are used to describe, understand and simulate the behaviour of complex sociotechnical systems. This track covers work involving the use of systems HFE modelling methods to optimise safety and performance.

Transport Ergonomics and Human Factors (TEHF) (Peter Burns)

Ergonomics and human factors related to the safe, effective, and practical human use of transportation systems and technology.

Visual Ergonomics (Marino Menozzi)

Scientific and practice-related topics in visual ergonomics, as intervention studies, experimental findings, development of assistive technologies, mixed realities, occupational optometry, visual aids, lighting, organizational measures, theory, and more (see also list of keywords). Discussions following the paper presentations aim to foster the link between theory and practice and to elaborate on minimum standards in visual ergonomics for enabling an optimal combination of comfort, well-being, and performance at visual tasks and system designs.

Work with Computing Systems (WWCS) (Nicole Jochems)

To advance ergonomic knowledge on how to design and evaluate effective and health-promoting computing systems to support the individual and cooperative work of humans in organizations. WWCS considers all kinds of systems for stationary and mobile computing that are used in the workplace.

Other (Wayne Albert)

General Call for Papers

The general call for papers was issued June 26, 2020, with a deadline of September 25, 2020. It was decided as a matter of principle that we would not extend submission deadlines, as this reflects negatively on planning and/or response. Approximately 900 submissions were received. Each submission was evaluated by at least two independent reviewers under the direction of the relevant Scientific Track's Manager.

To recognize the equivalency of posters and lectures, the call for submissions clearly stated that both ePoster and lecture formats would be evaluated to the same standards of scientific/technical merit. Each author chose the format they preferred or specified "no preference".

The ePoster concept underwent a series of fundamental redefinitions and once the decision was made to go fully virtual, ePosters were set up to be available at all times during the Congress and for 30 days afterwards. The ePosters platform provided the authors the opportunity to upload a 350-GB video, as well as the poster itself and relevant PDFs. Access to the ePosters was via Attendee Interactive, a product used by Community Brands, which turned out to be not as fully integrated with VEP as we were led to believe.

In addition to scientific and technical ePosters, the IEA and ACE were invited to submit non-scientific posters to showcase specific projects, TCs, etc. This was initiated to provide the IEA and ACE the opportunity to reach beyond the traditional community and describe current activities as well as invite people to join the effort.

Lectures were assigned a specific time slot (15 minutes including question and answer) in the program, grouped with similar presentations either within a special session or the general track program.

Submissions by Country

Figure 4 presents the number of submissions by country for the top 28 countries. The data are not entirely correct in the sense that several submissions included co-authors from different countries. The country, therefore, is taken as the country of the presenter, or if none were indicated at the time of submission, the country of the first author.

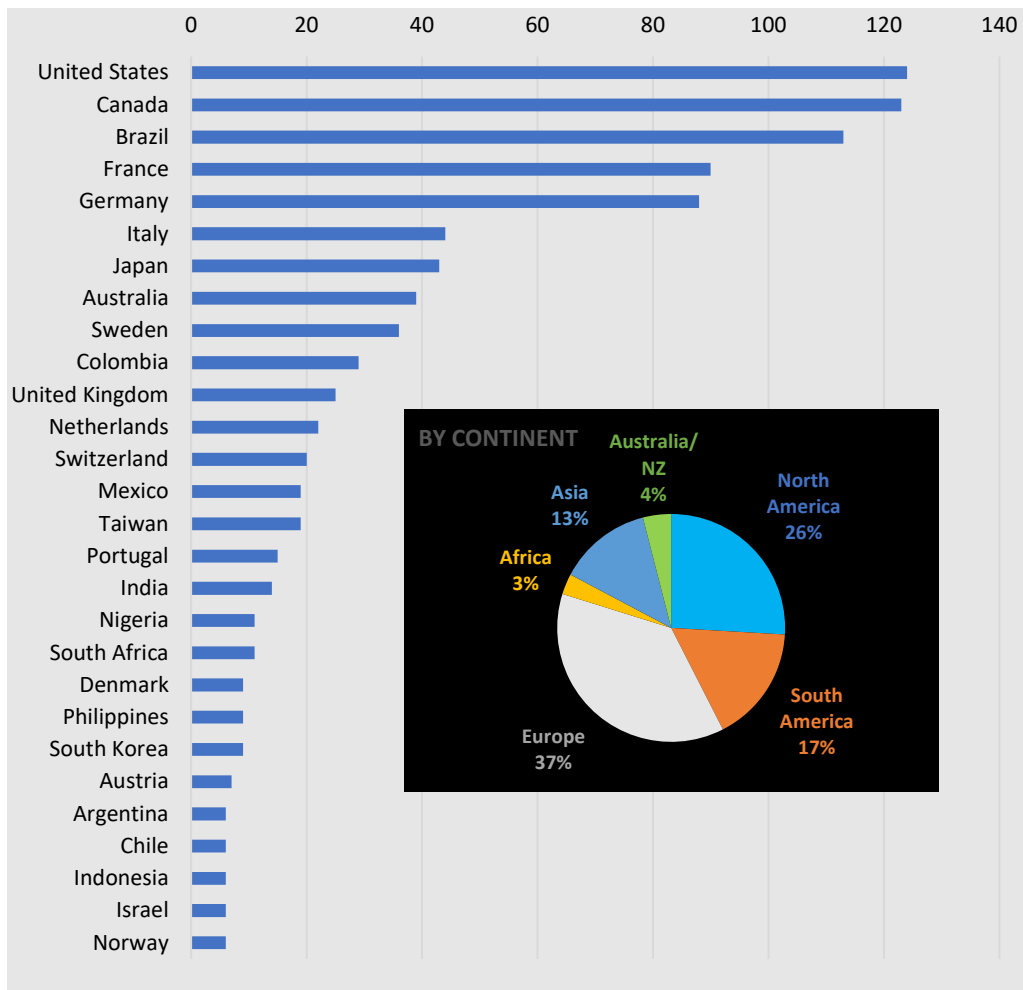


Figure 4: Number of submissions by country for the top 28 countries

Role of Track Managers

The proposals received were directed to the appropriate Track Manager who have established a pool of technical reviewers. This was a complex process given the mix of special sessions and paper submissions. It was made somewhat more complicated as the expectation was that organizers would manage their proposed sessions, but they would be rationalized with the Tracks as defined and would need to coordinate with the Track Managers. Residual submissions were to be reassigned, depending on content area. Figure 5 was created to help explain the process to the managers who were responsible for overseeing the “open” special symposia.

5 PROCESS FOR INCORPORATING SYMPOSIA

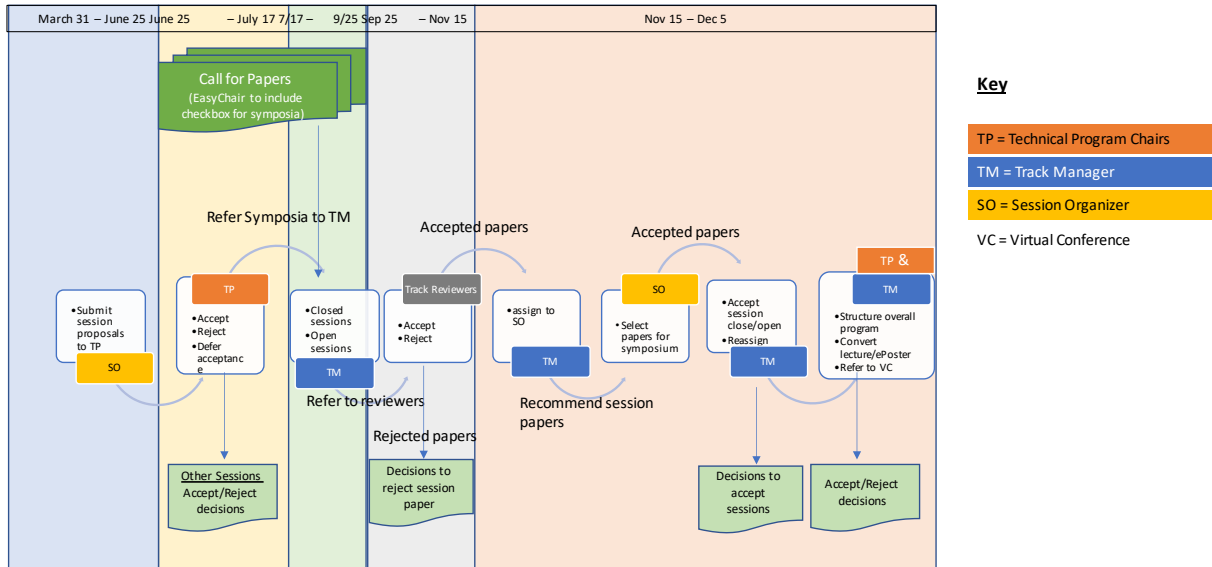


Figure 5: Process Flow Diagram for Reviewing Papers to “open” special sessions

Essentially, the process entailed an initial review supervised by the Track Manager, who would decide to accept or reject the submission. Accepted submissions would be referred to the Symposium Organizer who would determine which should be included in their symposium. It was expected that the Track Manager and Symposium Organizer would confer. For example, if there are insufficient number of papers, the submissions would be returned to the general Track for re-allocation.

The Technical Committee Chairs would ensure that viable symposia would be appropriately scheduled relative to other sessions during the Congress.

About 900 proposals were received in response to the General Call. The rejection rate after reviews and withdrawals was 10%.

Figure 6 indicates frequency of submissions per track.

Submissions by Track

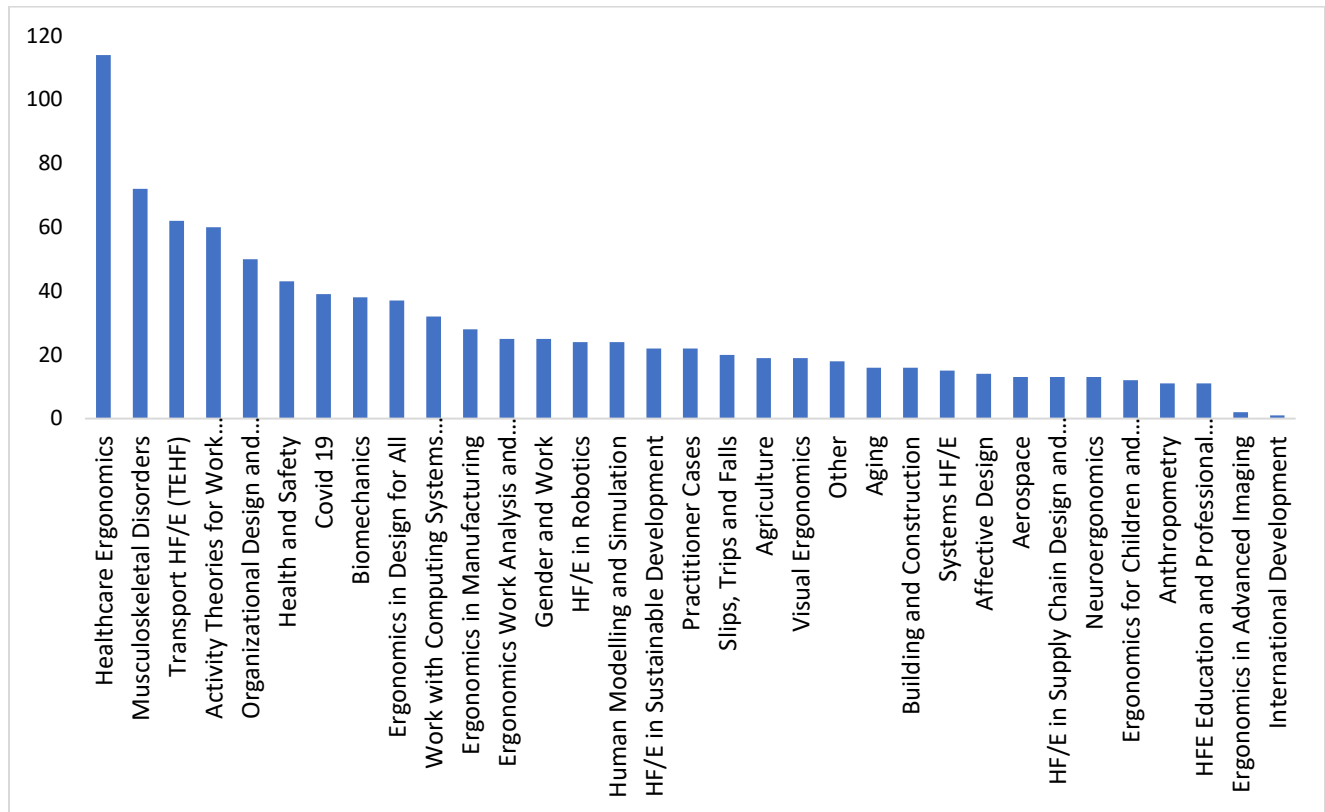


Figure 6: Submissions by Technical Track

Program Overview

The review process resulted in the following structural elements.









- 705 papers presented within a Symposium or a general program session
- 39 individual Symposia
- 93 posters
- 14 panels
- 11 workshops
- 6 ECR special sessions
- 7 Plenary sessions (opening, closing, Executive Panel and 10 keynote speakers)
- 98+ submissions were either rejected or withdrawn

The accepted papers and special sessions were organized in 206 technical sessions over 5 days. In addition, there were 5 sessions devoted to social events and technical visits.

Keynote Speakers

Candidates for keynote speakers were nominated by IEA member societies, the Scientific Board, and personal contacts. In selecting keynote speakers, consideration was given to balance gender, region, and topic. Ten keynote speakers were invited, typically two on each of four days would share a 90-minute session. In two cases, the keynotes decided to do a joint presentation during the 45-minute window. This format offered an interesting alternative.

The following are the keynote speakers.

<p>Karen Messing Forgotten or ignored? Why women (and others) may be left out of the 4.0 economy and what ergonomists can do about it</p>		<p>Rosemary Seva The Hidden Power of Affective Products and Environments</p>	
<p>Guy André Boy Human Systems Integration: The Right Mix of Technology, Organization and People</p>		<p>Ben Shneiderman & Daniel Serfaty</p>	
<p>Fionnuala Rogerson An Architecture of Inclusion</p>		<p>Peter Hancock Trust in Automation and Autonomy</p>	
<p>Nidhi Gupta Measuring and analysing ergonomic demands: which direction to move?</p>		<p>Charles Vincent & Mike English Managing risk in a Kenyan neonatal unit</p>	

It must be noted that the bulk of the technical program planning was shared by the co-chairs, Nancy Black and Patrick Neumann with the help of Colleen Dewis (our EasyChair technical wizard), and Anne-Kristina Arnold (who coordinated the ePosters). For 6 months prior to the Congress, their workload was very intense and from the moment the decision was made to pivot to a fully virtual Congress, the workload intensified beyond reasonable bounds. Luckily, Nancy devoted her half sabbatical to IEA2021 program planning. Without such extraordinary effort, it is difficult to imagine the program coming together as it did, particularly given the hard deadlines imposed by the virtual event platform managers who required detailed data (session

composition, presenter data, presentation videos) as much as a month before the actual event, far sooner than would be the case for an in-person Congress.

Program for Students and Early Career Researchers

Students and early career researchers (ECRs) comprise 60 to 70% of previous conferences' attendees. Reports based on student/ECR engagement events at IEA2015 & IEA2018, Federated societies' student-engagement research, and ad-hoc discussions highlighted that students/ECRs are more interested in competitions, student-focused social events, innovative technical sessions, networking opportunities, student discounts at IEA events, and volunteer opportunities. The ECR committee was created to fulfill these opportunities on social, technical, and non-technical fronts. Several student/ECR focused activities were planned to make IEA2021 more attractive and relatable to the interests and needs of students and ECRs.

Details of this program are contained in the Appendices. **It is recommended that IEA establish a standing ECR Committee to engage early career {researchers and practitioners} at future IEA events.**

Proceedings and Journal Special Issues

Authors of accepted papers were asked to submit either a chapter of at least 4 pages that would be published in the Congress Proceedings, or an extended abstract that would be made available to delegates via the Virtual Event Platform.

Springer agreed to publish the Congress Proceedings at no charge to IEA2021 and to allow registered delegates free eBook downloads for 4 weeks. The chapters submitted were organized in five volumes and submitted to Springer. Each volume contained the chapters associated with one or more tracks. Within Tracks, the chapters were arranged in order of the first author's last name.

The five volumes of the Proceedings are as follows:

Vol. I: Systems & Macroergonomics (ISBN 978-3-030-74601-8)

- Activity Theories for Work Analysis and Design (ATWAD)
- Systems HF/E
- Ergonomic Work Analysis and Training (EWAT)
- HF/E Education and Professional Certification Development
- Organization Design and Management (ODAM)

[IEA 2021 Proceedings-Volume I](#)

Vol. II: Inclusive & Sustainable Design (ISBN 978-3-030-74604-9)

- Ageing and Work
- Ergonomics for children and Educational Environments
- Ergonomics in Design for All
- Gender and Work
- Human Factors and Sustainable Development
- Slips Trips and Falls
- Visual Ergonomics

[IEA 2021 Proceedings-Volume II](#)

Vol. III: Sector Based Ergonomics (ISBN 978-3-030-74607-0)

- Practitioner Case Studies
- Aerospace Ergonomics
- Agricultural Ergonomics
- Building and Construction Ergonomics
- Ergonomics in Manufacturing
- HF/E in Supply Chain Design and Management
- Transport Ergonomics and Human Factors

[IEA 2021 Proceedings-Volume III](#)

Vol. IV: Healthcare & Healthy Work (ISBN 978-3-030-74610-0)

- Health and Safety
- Healthcare Ergonomics
- HF/E Contribution to Cope with Covid-19
- Musculoskeletal Disorders

[IEA 2021 Proceedings-Volume IV](#)

Vol. V: Methods & Approaches (ISBN 978-3-030-74614-8)

- Advanced Imaging
- Affective Design
- Anthropometry
- Biomechanics
- Human Factors in Robotics
- Human Modelling and Simulation (* editors should be Gunther Paul, Gregor Harih, and Sofia Scataglini)

- Neuroergonomics
- Working with Computer Systems
- Plus an addendum of contents from: Ergonomics Work Analysis and Training (EWAT), HF/E Education and Professional Certification Development, Organisation Design and Management (ODAM), Systems HFE/E, Slips, Trips and Falls³

[IEA 2021 Proceedings-Volume V](#)

In addition to the Proceedings, several Special Issues of scientific journals were planned to publish more extensive papers that were presented at IEA2021. This effort is ongoing.

Finally, the Organizing Committee had the opportunity to select the top posters for submission and publication to the journal *WORK*'s website. All ePoster submissions, except the IEA TC ePosters were included. Twenty-two reviewers evaluated the ePoster pdfs based on the scale below. Each ePoster was reviewed by a minimum of 2 reviewers, most by 3. ePosters with scores of 4 were discarded. Mean values were calculated for the remaining and the top 53 ePosters were selected for publication.

1. Exemplary – knocks your socks off!
2. Very good
3. Average
4. Not acceptable

Reviewers were instructed to consider:

- Only the poster pdf, not the paper or video
- The quality of the information in the poster
 - Will the content be of interest to readers of *WORK*?
 - Is the work innovative and/or augmenting the ergonomics knowledge base?
 - Is the work scientifically sound?
- The overall clarity of the message in the poster
 - Is the poster content easy to follow?
 - Is the poster design pleasing and informative?

³ Working across platforms and with a mix of Extended Abstract and Proceedings chapter submissions resulted in several chapters to be missed. Adding them was possible with Springer, but nearly delayed this final volume beyond the Congress which was problematic. Springer came through and access was given by day 2 of the congress. Suggest multiple people reading and verifying content.

Vol. 3 production was delayed due to a submission being excluded from the volume on author request. In future, it should be clear that after a certain date chapter removal is not allowed.

Events

A brief description of social events and tours follows.

1. **Opening ceremonies:** The Hoop Dancer's name is Alex Wells. He is managed through an entertainment company, Notable Entertainment & Events – Brett Brown.

2. **Yoga session and culinary workshop**

Both of these sessions were conducted by Karen Yaworsky. Karen is a yoga instructor, nutritionist and coach. She runs her own company Yaworsky wellness.

Yoga session was pre-recorded; however, the culinary workshop was live. People really appreciated particularly the culinary session as the content was refreshing (given a scientific conference setting) and live-in nature. For some it provided an alternative experience of an in-person conference. This session generated a great deal of interaction among the participants. More than 25 attendees were in attendance to the live session.

3. **Virtual Tours**

We had two virtual tours:

1. British Columbia Institute of Technology (BCIT) Make Plus Lab
 - Johanne Mattie and Yvette Jones hosted
 - product and process development, evaluation, applied research projects, and education
 - live presentation using PowerPoint and videos
 - approximately 15 people attended
 - participants enjoyed learning about the projects that they are working on
2. University of Waterloo- Occupational Biomechanics and Ergonomics Lab
 - Steven Fischer hosted
 - showcase current research thrusts which aim to better understand determinants of occupational performance, advance functional capacity assessment, advance digital human modeling, and to inform better, safer products
 - self-guided virtual 360-degree tour of the lab

Challenge: privacy concerns with recording

4. **Early Career/ student trivia event**

Pre-conference meet and greet (trivia event)

- 150 registered and 60 attended.

An informal 'ice-breaker' event was organized that catered exclusively for students/ECRs. This provided an opportunity for them to get to know their international colleagues. Attendees enjoyed online recreational games and activities with their global peers.

Post-event, students used Remo to move around virtual tables talking one-on-one or in groups, with their international peers. It was observed that students/ECRs who interacted with each other in this meet and greet event, attended different virtual sessions, together – as a group, during the Congress.

Overall ECR planning Strategy Recommendations

- Work with the Organizing Committee to develop social networking events with a local flavor.
- Connect with local businesses that use ergonomics/human factors in product designs and/or in their workplace to arrange technical tours.

Other Suggestions

1. Start early to have time to confirm events before the program is finalized.
2. It was great to have a pre-conference event for everyone with ice breaker activities that help people meet others.
3. Remo was fantastic for virtual networking. Networking can also be facilitated through the conference platform - look for systems that allow participants to contact each other without being in the same “room” at the same time and that notifies the person that someone has sent them a message.

REMO - Concurrent Delegate Platform

As the planning for the virtual Congress progressed and the team acquired better knowledge of the capabilities and limitations of the platform, it became clear that the ability for delegates to interact informally and network were severely limited within Congress Virtual Event Platform (VEP). A search for a complementary but separate platform that would provide enhanced capability for people to meet and greet outside of the VEP was initiated in April and identified Remo.com as the most suitable.

The REMO ‘building’ we used had 10 floors, each of which had tables and chairs, as depicted in the diagram below. When entering REMO, delegates can go to any floor and take any empty chair. When they do, they can interact with all of the others at the table. Conversations were limited to the table participants, but delegates could join any free table. The tables were pre-assigned to specific themes or languages and a directory of table titles were posted to assist delegates to find a table of interest. A delegate’s guide to using REMO was prepared and is attached as Appendix 2.

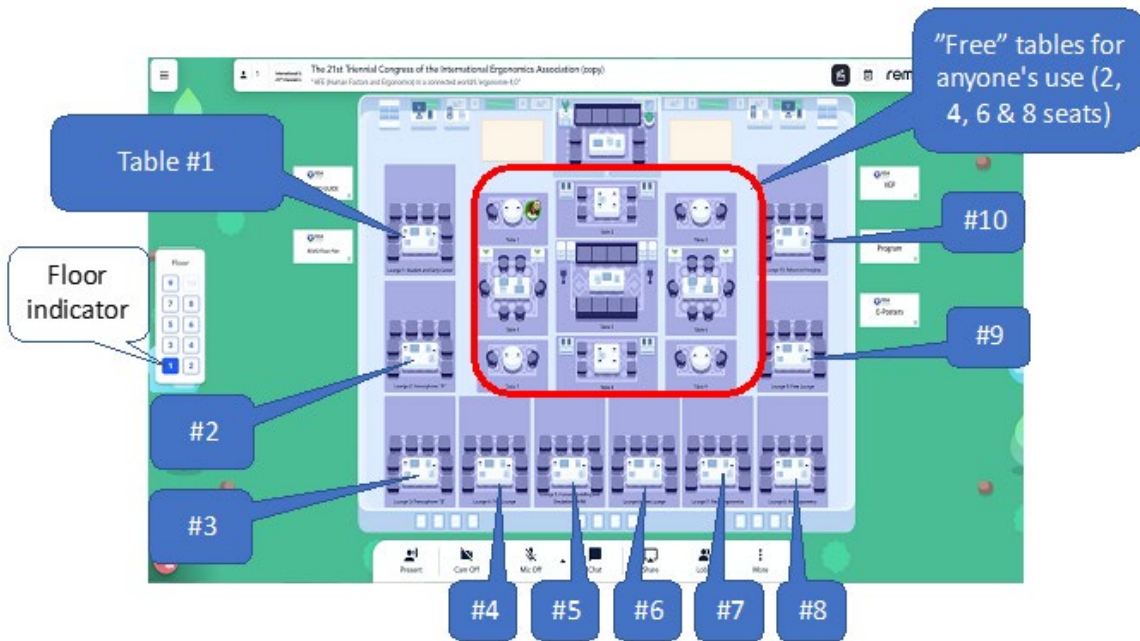


Figure 7: REMO Floor Plan (one of 10 floors)

The Remo development process that included familiarization through use for committee meetings prior to the Congress is depicted in the following slide.



Figure 8: REMO development process

Overall, Remo proved to be very useful and popular. It required that registered delegates be invited to register for Remo as a separate activity. Accordingly, 1257 invitations were sent, out of which 740 registered. A total of 617 delegates used the platform, and the average time spent in Remo per delegate was 200 minutes.

Considerations for future events

- Ideally, REMO features should be an integral part of the main platform, rather than a separate satellite site. As the technology for virtual events evolve this may be more easily resolved. In our case, it would have been far better to have REMO in place of the VEP Networking Lounge, which turned out to have little networking value.
- More Interaction could be encouraged with special events as part of the regular program. Content related events could be held within a REMO-like environment. For example, Poster sessions could be held in which delegates could drop by to meet with poster presenters each at a small table (as in an exhibit booth).
- Virtual platform should be made live throughout the conference period to accommodate delegates from diverse time zones, as was implemented here.
- Platform should be used for preconference activities in order to get delegates familiar with the interface.
- Careful consideration should be given to usability testing when selecting virtual platform. This will ensure all possible scenarios are given considerations.
- Adequate publicity and demos should be provided to ensure delegates are aware of platform, how to navigate it and benefit from its features.

Promotions & Communication

The main channels used to promote IEA2021 were via a dedicated Facebook page and a LinkedIn Group. We also posted on the IEA Facebook page. Weekly or more frequent posts were published via these channels to announce news related to the planning progress, the Call for Papers, keynote speakers, exhibit and sponsorship opportunities, deadline reminders and website updates.

A Media Outreach team was established to exploit the opportunity to not only promote the Congress, but to also expand the Ergonomics and Human Factors network within Canada, as the host country. This group focused on Facebook and other social media channels such as Twitter and Instagram.

Professionals in the field of Ergonomics and Human factors are already part of a growing network of like-minded individuals. However, there are organizations that are not aware of how impactful Ergonomics and Human Factors can be for not only the safety of their workers, but also for their organizational structures and the design of their products. When the group first started planning, they spent a large amount of time researching and contacting with these groups to introduce the profession and promote the opportunity to learn and share information at the 2021 IEA Congress.

The group reached out via email to share details about the Congress and information about Ergonomics and Human Factors. The group then shifted to focus on researching and creating a master list of University and College contacts based on various published programs. Updates about the Congress and the student competitions were communicated to the different schools and programs via email, but it was difficult to determine the impact of this communication.

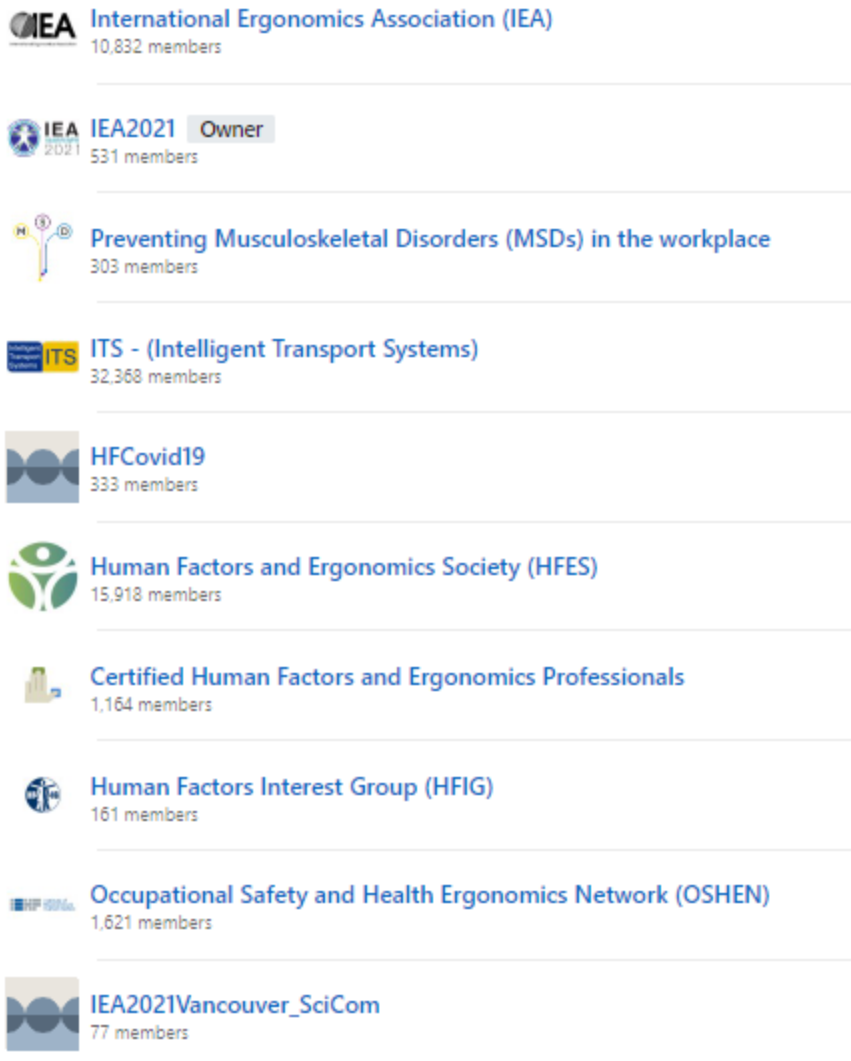
After Christmas, the group had acquired two highly motivated student volunteers who helped create and manage social media posts that were shared on Instagram and Facebook. The posts highlighted important information about the Congress and provided knowledge about Ergonomic and Human Factors. With this approach, the group was able to directly see the connections being made and how the network was expanding based on the number of followers. The number of “likes” on certain posts also made it easier to determine what kind of posts the social community enjoyed.

One of the main struggles that the group faced in the beginning was determining whether the communication channel was impactful or not. There is some benefit to reaching out to organizations individually however, with ongoing scams and cyber security breaches the group predicted that the original emails may not have been opened. Social media was certainly the most impactful and trusted source of communicating and connecting with other working professionals.

To further expand the Ergonomics and Human Factors network, and to better promote these professional events, social media will be the ultimate tool. Future organization groups should focus their time and energy on figuring out how to better use LinkedIn to reach professionals in fields that are not typically thought to be related to Ergonomics and Human Factors. The future group should also start creating and sharing content on as many social media platforms as possible such as Facebook, Instagram, LinkedIn and Twitter. The social community seemed to respond to informational post rather than just post highlighting event details. Links and information about the events should also be easy to find.

The Media Outreach group collected various resources that can be used by future planning groups. The Appendix includes Organization and Association Contact List, University and College Contact List, Various Informational “Letters” and Social Media posts.

Within the LinkedIn platform, regular posts were uploaded to related groups, as listed.



Twitter account @IEA2021Congress

- Twitter was an excellent way to create “buzz” about the Congress. A lot of global participants interacted with each other during the congress on IEA2021 posts.
- An active Twitter account was setup only 7 months prior to congress. As a result, it only got 148 followers. However, if an active account is created earlier, it would generate more traffic.
- The graphics for special sessions were tweeted. These attracted not only more followers to the account but also reminded participants to attend these sessions.
- Hashtags, such as #IEA2021 #ergonomics #humanfactors #IEAVancouver2021 #event #conference #healthcare #design #engineering #ergonomist, will allow this event to be discovered even several years after.
- The social media team is always seeking content to post on their outlets. It is vital that they interact with technical and non-technical session leaders to receive content.
- The lack of an official IEA standing twitter account made it difficult to attract more

followers.

- This @IEA2021Congress can be transformed into IEA's official twitter account, if needs be

Finally, the IEA Secretariat notified all IEA-related stakeholders (Council representatives, networks, society leaders, collaborating organizations, etc.) through the monthly eblasts 'IEA NewsBriefs'.

Sponsorships & Exhibits

Sponsorship and Exhibit prospectuses were created and disseminated via the social media and the IEA network. They were further revised with model changes made necessary by the introduction of the Hybrid and later the Full Virtual model. For example, we introduced virtual exhibit opportunities that were available through the Virtual Event Platform. In addition, there were revisions to the items available for sponsorship.

Sponsors of IEA2021

The sponsorship prospectus for the Virtual Congress is included in Appendix 3. Unfortunately, the sponsorship committee was not very active, with the result that the majority of the funds was raised by the Congress Chair.

A total of CA\$ 114,000 in sponsorship revenues was raised through the campaign.

The following sponsors were secured.

BENEFACTOR LEVEL



Amazon

DIAMOND LEVEL



Healthcare Insurance Reciprocal of Canada

PLATINUM LEVEL

Anonymous Donors

GOLD LEVEL



Huawei Technologies Canada

GOLD LEVEL



Institute for Work & Health (Ontario)

GOLD LEVEL



WorkSafe BC

SILVER LEVEL



Aptima

SILVER LEVEL



Fanshawe College

SILVER LEVEL



Simon Fraser University

SILVER LEVEL

TeamScape LLC

IEA 2021 Exhibitor List

The exhibit prospectus for the Virtual Congress is included in Appendix 17. The following is a listing of exhibitors for IEA2021.

Company	Contact Name	Email
ergoCentric	Lori Skulj	lori.skulj@ergocentric.com
ergoTron	Jared Putz	Jared.Putz@ergotron.com
LifeBooster	Jeffrey Smith	jeffrey.smith@lifebooster.ca
Posture 360	William Choi	william@posture360.com

COEH Berkeley 360	Michelle Meyer	mmeyer@berkeley.edu
TEA	Benoit GAUSSIN	benoit.gaussin@teaergo.com
Between the Lines	Karina Palmitesta	karina@btlbooks.com
ACE (complimentary, host society)	Jennifer Kenny	president@ace-ergocanada.ca
IEA South Korea (complimentary, hosting next IEA)	Taezoon Park	tzpark@soongsil.ac.kr
HFES (complimentary, in exchange for IEA2021 booth at their conference)	Steven Kemp	info@hfes.org

PART II – CONGRESS RESULTS

There were 1,208 registered delegates. However, the actual number of participants is likely much higher, though not known precisely. We are aware of instances of people sharing the login information as well as instances in which several people viewed Congress sessions as a group. A strategy to control unauthorized participation may be needed to discourage this.

Not included in the final registration count of 1208 were a dozen or so people who registered and attended but did not pay and were not responsive to multiple requests to settle their accounts. Normally, registration fees that are outstanding are settled at time of check-in at an in-person conference, but in our case because delegates were allowed to register and given 30 days to pay via wire transfer it was difficult to collect the fees from these individuals after the fact. There was a further dozen or so individuals who registered and did not pay but who did not attend any of the conference sessions. Future virtual events should be prepared to deal with registration anomalies that we did not anticipate.

Registration data indicate that for 59% of the registered delegates, this was their first IEA Congress.

The registration numbers are well within the attendance results of recent Congresses (IEA2000 was an anomaly since it was a joint meeting with HFES). This result is especially noteworthy given the adverse impact of the pandemic on academia, business and HF/E professional activities.

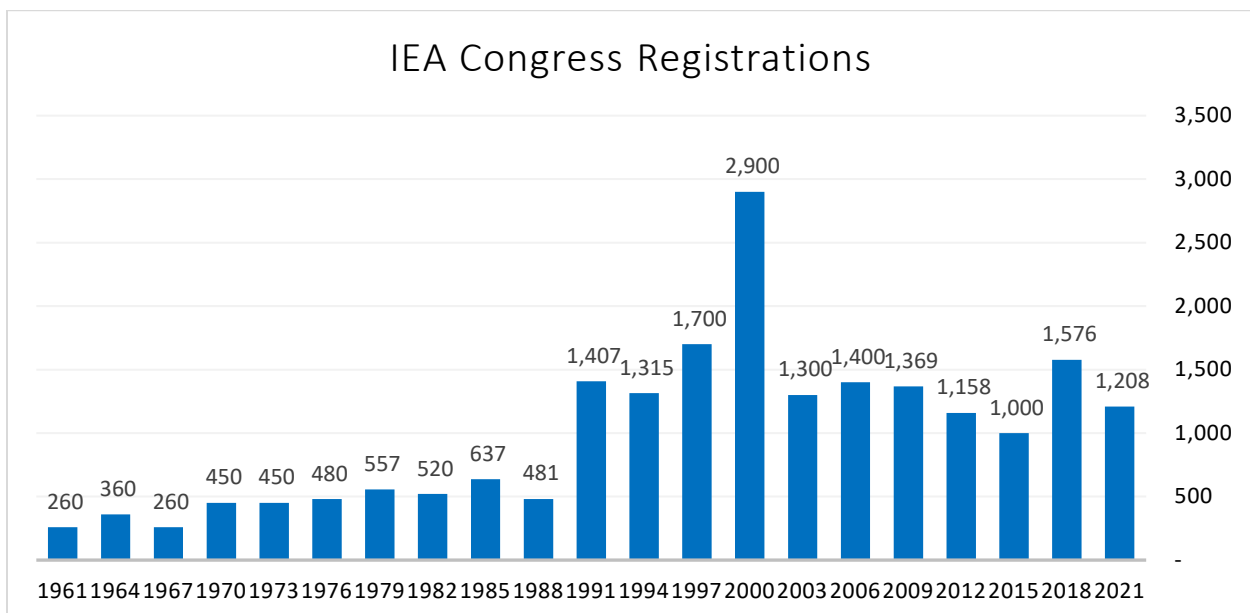


Figure 10: IEA Congress attendance numbers 1961-2021

Congress awareness

Registrants learned about IEA2021 through a variety of sources as indicated in the following table. The most frequent answer (39%) was through colleagues. This highlights the need to encourage people to actively promote the Congress among colleagues and their networks as a key strategy. Perhaps, formulating messages that they can easily forwarded would facilitate this.

Heard about Congress through:	%
IEA Communication (Facebook, LinkedIn, Mailing, Twitter, Website)	11
E-mail from an organization other than IEA	10
Colleague (word of mouth)	39
Attended previous IEA meetings	28
Advertisement in a non-IEA newsletter, publication or website	4

Analytic Views of Registered Delegates

By Track

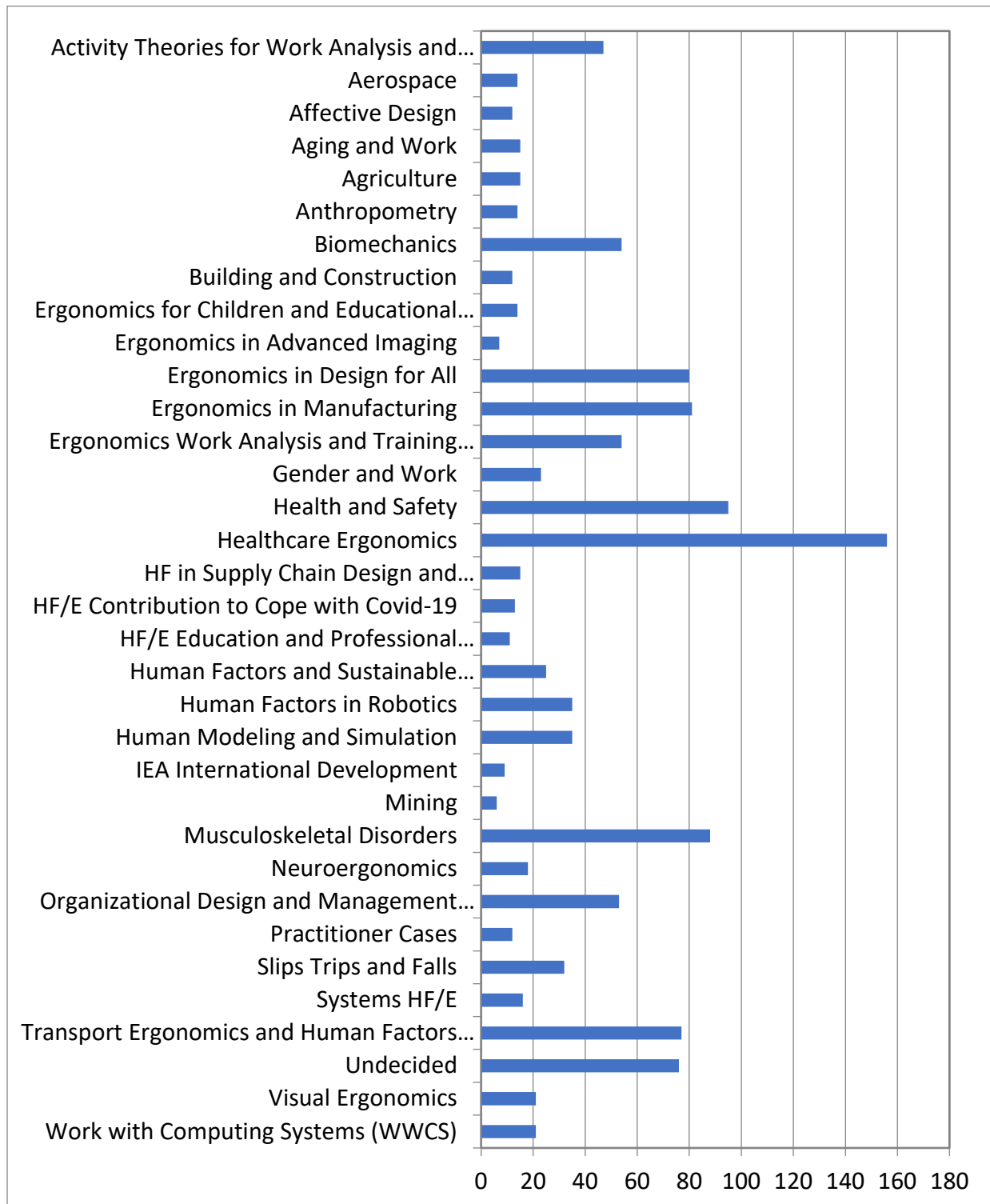


Figure 11: Registrants' interests by Track

Detailed attendance data for each of the Congress sessions is provided in the Appendix, Excel file “Session attendance”.

By pronoun preference

He/Him/His	612
Not necessary	1
She/Her/Hers	632
She/Her/They/Them	1
She/They	1
They/Them/Theirs	3
You	1
Ze/Hir/Hirs	3
~	1

By country

Primary Country	#	Primary Country	#
Canada	253	Philippines	6
USA	175	Peru	6
Germany	84	Tunisia	5
Brazil	84	Serbia	5
France	79	New Zealand	4
Italy	57	Algeria	3
Netherlands	57	Cameroon	3
Japan	46	Ghana	3
Sweden	41	Chile	3
Australia	36	?	3
United Kingdom	35	Iran	2
Colombia	19	Ireland	2
Indonesia	18	Russian Federation	2
Switzerland	17	Slovenia	2
Taiwan	16	Cuba	2
India	15	Kenya	1
Portugal	14	Libya	1
Congo	11	Namibia	1
Hong Kong	11	Uganda	1
Mexico	11	Armenia	1
Republic of Korea	9	Bahrain	1
Belgium	9	Bangladesh	1
Argentina	9	Jordan	1
South Africa	8	Lebanon	1

China	8	Saudi Arabia	1
Finland	8	Singapore	1
Israel	7	Turkey	1
Malaysia	7	United Arab Emirates	1
Thailand	7	Vietnam	1
Austria	7	Czech Republic	1
Denmark	7	Hungary	1
Norway	7	Lithuania	1
Ecuador	7	Spain	1
Nigeria	6	Bolivia	1

By Continent

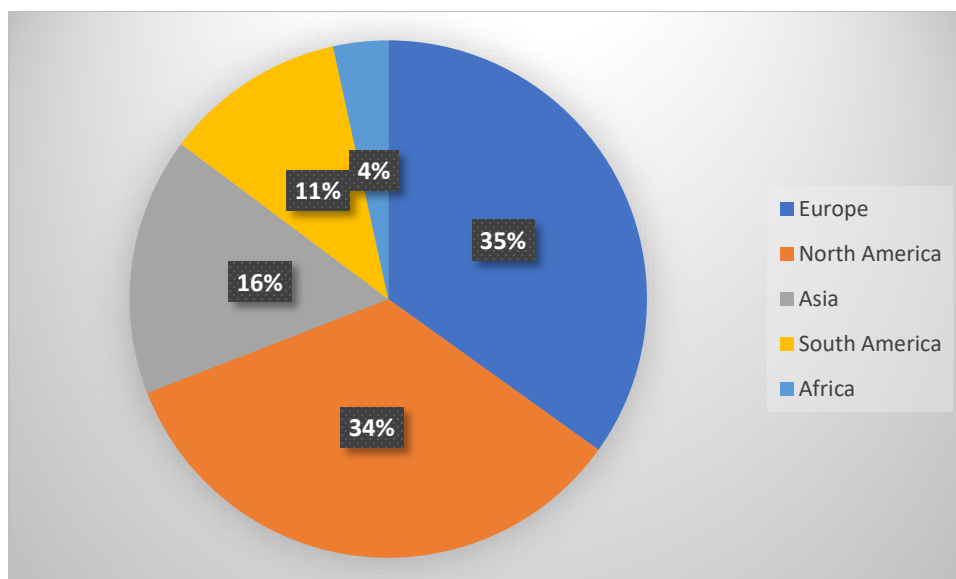


Figure 12: Registrants by continent

By sector

Percent of registered delegates indicating primary sector affiliation as:

Academia	56
Healthcare	1
Non-Profit	5
Industry	12
Government/Military	11
Consulting	15

While healthcare, as a topic, was highly subscribed in terms of the number of sessions and delegate interest, these data suggest that the majority of those interested in healthcare identify with other primary sectors such as academia.

By registration category

Of the 1,208 registered delegates, an estimated 493 belong to an IEA member society. It is likely somewhat higher since some of the LMIC delegates may have belonged to an IEA society.

Complimentary Attendee	49
Member of an IEA Society	406
Non-member	270
Low- & Middle-Income Countries	189
Student Member of an IEA Society	87
Student Non-member	<u>207</u>
	1,208

It is clear from this that IEA member societies are not all actively promoting the Congress. Of course, the delegates who indicated they attended previous Congresses or heard from word of mouth may well have received information from an IEA society, so there exists some ambiguity in the numbers. Nevertheless, active promotion by IEA-member societies seems an area that warrants further investigation and improvement. The societies with greater than 4% representation are ACE (23.4%), NES (6.1%), CIEHF (4.4%), GfA (4.2%), HFES (19.4%), HFESA (4.9%), HFNL (10.3%), and SELF (7.7%).

Registrations by date

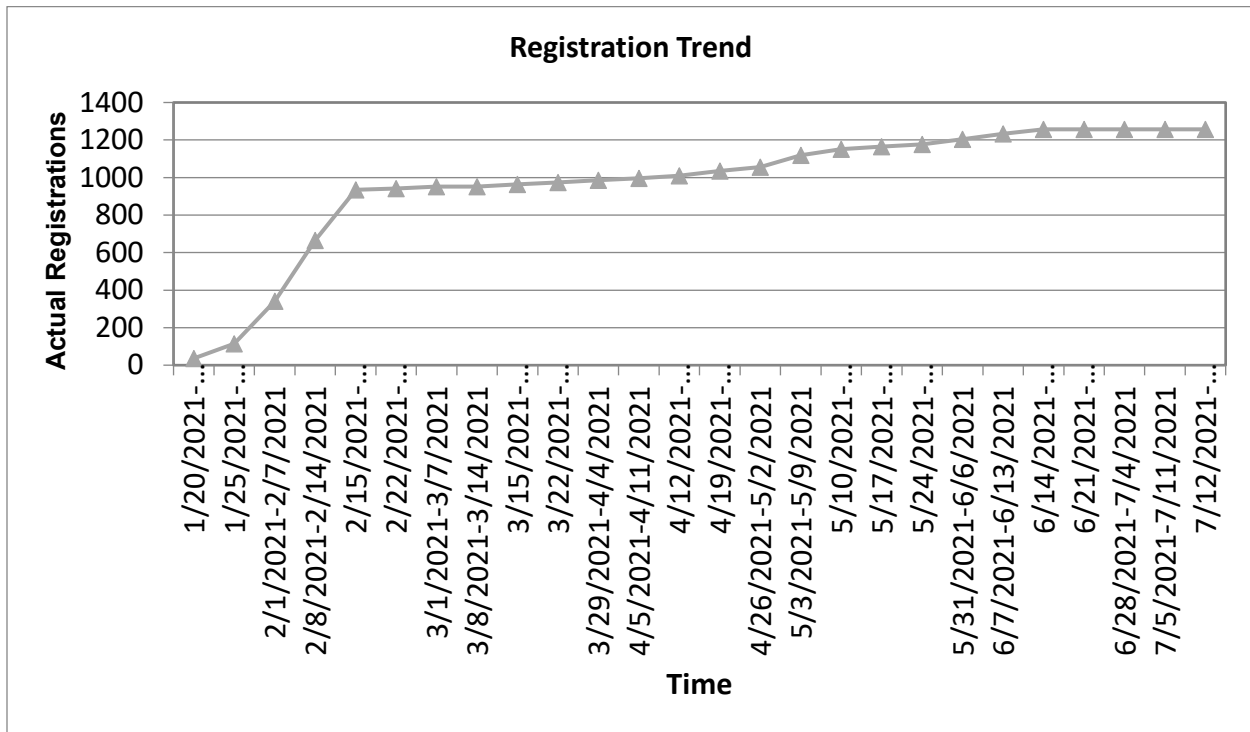


Figure 13: Registrants by date of registration

Delegate Feedback

Two surveys were distributed to collect attendee feedback on the virtual IEA congress experience. The first was distributed to all attendees and 105 provided feedback. The second was distributed to session chairs only (206 sessions were in the program) and 85 were received.

Generally, attendees appreciated the congress overall (Figure 2) with 92% rating the congress acceptable or better. The virtual congress platform was appreciated by 93% of the 102 that responded. Of the 88 respondents providing feedback on the ePoster platform, 95% found it acceptable or better. Of the 87 respondents providing feedback on the video-chat platform, 93% found it acceptable or better. The lower response rates for ePoster and video chat are indicative of the lesser use of this platform amongst respondents. Just over half provided comments about their ratings.

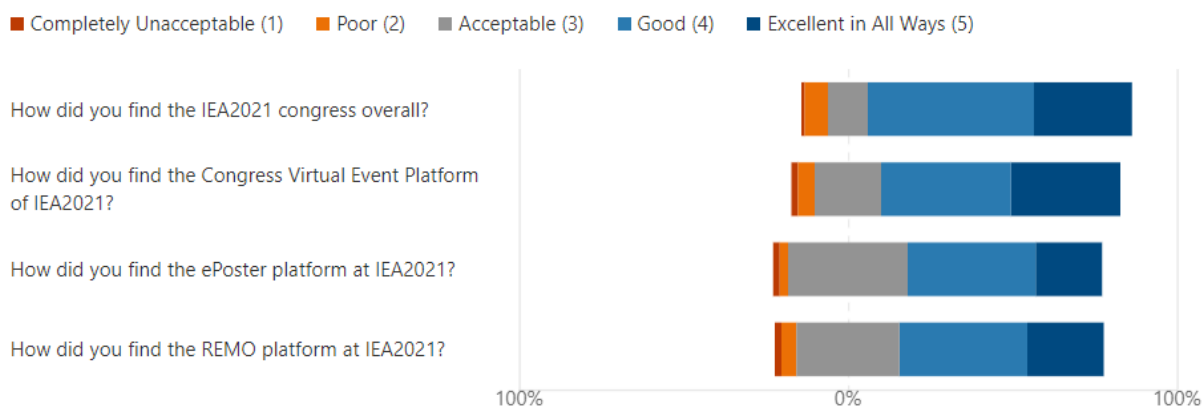


Figure 14: IEA2021 survey respondent perception of congress and its major elements on a 5-point Likert type scale

IEA2021 was the first ever virtual triennial world congress. Feedback was overwhelmingly positive from attendees although platform usability limitations were noted by some session chairs and attendees. Despite the connectivity challenges, respondents appreciated being able to meet, given widely-enacted travel restrictions.

This experience has changed the paradigm. There are clear advantages and disadvantages to virtual conferences. However, the positive experience and lessons learned in planning and delivering IEA2021 will create interesting and creative opportunities for developing a new paradigm - the hybrid congress.

Financial Results

The table below presents the financial results of the Congress. It must be said that these results are remarkably positive, given:

1. All previous IEA Congresses have returned far less, and some actually incurred a financial loss
2. As the first ever virtual Congress with no historical trends to guide projections, the financial risk was extremely high
3. The registration fees were deliberately set at exceedingly modest levels, with students and LMIC delegates paying token fees (albeit meaningful to them)
4. Actual participation was higher than the official delegate count (due to sharing of credentials and delinquent delegates)

As indicated in the Statement of Revenues and Expenses, the net surplus from the Congress is CAN\$ 84,841.33.

According to the Rules of the IEA,

“The IEA2021 Organizing Committee donates a minimum of 50% of the surplus for the purpose of establishing an IEA fund in the name of the host society, where the surplus is defined as the money remaining after capitation fees and all other approved deductions. The terms and conditions of the fund shall be proposed by the host society and approved by the IEA Executive Committee.”

Accordingly, ACE has transferred the equivalent of CAN\$ 42,420.67 to the IEA to establish a Fund the terms of which will be specified by ACE. ACE will retain the sum of CAN\$ 42,420.66 as surplus from the Congress to be used as ACE Council decides.

IEA2021 Statement of Revenue and Expenses		
Registration Fees	Count	CAN\$
Virtual Member Advantage Rate (\$299)	320	85,954.90
Virtual Member Regular Rate (\$499)	53	25,733.40
Virtual Member Late Rate 1 (\$599)	25	13,577.00
Virtual Member Late Rate 2 (\$699)	8	5,592.00
Virtual Nonmember Advantage Rate (\$395)	212	76,043.00
Virtual Nonmember Regular Rate (\$595)	37	20,501.15
Virtual Nonmember Late Rate 1 (\$695)	16	10,118.00
Virtual Nonmember Late Rate 2 (\$795)	5	3,975.00
Virtual OECD Regular Rate (\$125)	110	12,711.50
Virtual OECD Late Rate 1 (\$225)	5	1,125.00
Virtual OECD Late Rate 2 (\$325)	0	-
Virtual Student Member Regular Rate (\$125)	79	8,173.50
Virtual Student Member Late Rate 1 (\$225)	2	450.00
Virtual Student Member Late Rate 2 (\$325)	6	1,950.00
Virtual Student Nonmember Regular Rate (\$125)	197	20,169.00
Virtual Student Nonmember Late Rate 1 (\$225)	8	1,785.00
Virtual Student Nonmember Late Rate 2 (\$325)	2	650.00
Virtual IEA Funded (US\$100)	74	9,430.34
Virtual Comp'd - Exhibitor Attendees	10	0
Virtual Comp'd - IEA Exec Cmte/ACE Officers/Keynote	28	0
Virtual Comp'd – VIPs, IEA Council/2021 OC Cmte	11	0
Total Registration Fees	1208	297,938.79
Exhibits		11,000.00
Sponsorships		113,949.74
Advertising		0
Total Other Income		124,949.74
TOTAL RECEIPTS		422,888.53
EXPENSES		
Total Meeting Planner		105,233.37
Total Finance		14,289.32
Total Speakers		0
Total Printing/Mailing/Apps/Graphics		18,506.40
Total Virtual Congress		140,419.02
Total Facilities		0
Total Entertainment		2,310.00
Total Public Relations		7,940.00
Total IEA Capitation Fees		22,782.83
Total Committee Expenses		26,566.26
TOTAL EXPENSES		338,047.20
NET INCOME		84,841.33

PART III - APPENDICES

LIST OF APPENDICES

There is a mountain of documents that were created as part of the planning and management of the Congress. Many of these have limited usefulness going forward since they pertain to the specific events, particular platform used (e.g., EasyChair, VEP, REMO) including form letters, correspondence and instructions to authors, Technical Program chairs and symposia organizers and exhibits, etc. The Appendices attached to this report contain only those documents that may have historical value or that would be useful to future organizers. The Appendices to this report are listed below in alphabetical order. In addition, the database of registrants agreeing to share their email details were provided to IEA separately.

- 1 Author acceptance notice
- 2 Call for Papers
- 3 Call for Practitioner Papers
- 4 Call for Special Session Proposals
- 5 Call for Special Sessions 1p
- 6 College Outreach
- 7 Contact information for outreach
- 8 Early Career Researcher program
- 9 Extended Abstract template
- 10 Final Paper Submissions
- 11 Final Template for Practitioner Applied Cases
- 12 Final Template for Research Presentation Papers
- 13 General Template for Lecture and ePoster Proposals
- 14 IEA 2021 Code of Conduct
- 15 IEA 2021 Scientific Committee Terms of Reference_v2
- 16 IEA2021 Sponsorship prospectus restructured
- 17 IEA2021 Virtual Exhibitor Prospectus
- 18 Opening slide show (contains graphics used in social media posts)
- 19 Promotion LETTERS
- 20 Session attendance
- 21 Springer Consent to Publish
- 22 Springer template for IEA proceedings
- 23 Template for Practitioner Applied Paper Proposal
- 24 Template for Research Paper Proposal
- 25 Template for researcher extended abstract
- 26 Tour Confirmation Letter_IEA2021_blank
- 27 Universities and programs Additional Contacts Added
- 28 Using REMO at IEA2021