

Inaugural Address of IFAC President Hajime Asama

Delivered as part of the V-IFAC 2020
Closing Ceremony on 17 July 2020

Dear IFAC Friends, Ladies and Gentlemen,

It is a great honor and a privilege to deliver this speech as the 23rd President of IFAC.

I must start by expressing my deepest appreciation to the German team led by now the past President Frank Allgöwer for their unimaginable amount of work they have put together to realize this virtual World Congress. Their preparations took a totally different course towards the end due to the worldwide COVID-19 came pandemic.

Since 1957, IFAC has contributed greatly to promoting outstanding scientific activities and technological developments in the field of automatic control and various related areas, and has also provided excellent services for research and education, thanks to the great contribution of IFAC's successive presidents, officers, and council members.

Overall, IFAC is currently in very good health. From technical activities including journals and conferences, to federation management and services for members and affiliates, we heavily rely on the efforts of about 2,000 volunteers who are highly competent. All the administrative tasks are handled perfectly and timely thanks to Kurt Schlacher, the IFAC Secretary, and the IFAC Secretariat, Katharina Willixhofer, Elske Haberl, and Harald Albrecht working at the IFAC office in Laxenburg, Austria. In particular, Kurt has fulfilled this position since 2005. I am extremely grateful to all of them.

I'd like to express my thanks to the NMOs of many countries for their strong support of IFAC as members, as well as the Austrian government through the BMK (Austrian Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology), for their longtime association support subsidy.

IFAC has introduced a number of important changes to improve our activities and services. IFAC works with Elsevier to publish many journals. In particular, IFAC-PapersOnLine is an open access journal in which the papers presented at IFAC technical meetings are indexed and archived. Juan A. de la Puente, the EiC of IFAC-POL, made tremendous efforts for this. IFAC-POL has even changed to Diamond Open Access.

We can all benefit from submission and download of papers without any fees.

Moreover, IFAC is currently making major change of executive structure to cope with changes in social needs, technological advancement, and environmental situations. The current Executive Board is replaced with the Executive Officers, and the Publications Board and the Conference Board are newly created. In addition, new committees such as the Activity Funds Committee, Distinguished Lecturer Program Committee, Diversity and Inclusion Committee are established. These changes have been planned under the leadership of Frank Allgöwer, the 22nd president of IFAC, and by the hard work of IFAC officers, council members, and Frank's assistant Anne Koch. During my term, I would like to continue with these policies and implement the changes with newly elected IFAC officials. Moreover, I would like to carry out the reform through digital transformation to further expand the possibility for diverse people to participate in IFAC activities and events.



Hajime Asama (JP)
IFAC President 2020-2023

The next IFAC World Congress in 2023 will be held in Yokohama, Japan. This is the second World Congress held in Japan since 1981. It was a long-cherished dream of the Japanese control community to host the IFAC World Congress again. I am very excited about this great occasion. I would like to express my gratitude to my Japanese colleagues, such as Shinji Hara, Junichi Imura, Hideaki Ishii, Tetsuo Sawaragi, and Keiko Takahashi, who worked on the proposal for the bid, and acknowledge the support by Japan National Tourism Organization, Yokohama Convention & Visitors Bureau, Pacifico Yokohama (venue of IFAC 2023), as well as the many academic societies repre-

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The IFAC Journals

Automatica

<http://www.journals.elsevier.com/automatica>

Control Engineering Practice

<http://www.journals.elsevier.com/control-engineering-practice>

Engineering Applications of Artificial Intelligence

<http://www.journals.elsevier.com/engineering-applications-of-artificial-intelligence>

Journal of Process Control

<http://www.journals.elsevier.com/journal-of-process-control>

Annual Reviews in Control

<http://www.journals.elsevier.com/annual-reviews-in-control>

Journal on Mechatronics

<http://www.journals.elsevier.com/mechatronics>

Nonlinear Analysis: Hybrid Systems

<http://www.journals.elsevier.com/nonlinear-analysis-hybrid-systems>

IFAC Journal of Systems & Control

<http://www.journals.elsevier.com/ifac-journal-of-systems-and-control>

IFAC-PapersOnLine

<http://www.journals.elsevier.com/ifac-papersonline>

sented by Society of Instrument and Control Engineers of Japan, companies, and national ministries.

Even though technologies have solved many problems in our life, as revealed in the COVID-19 pandemic this time, many issues still remain for scientists and engineers to contribute. Cooperation is especially important and essential to tackle societal problems for sustainable developments in the future. I would like to make efforts to construct an arena for cooperation, because automatic control is the key technology for it.

Based on this idea, for the IFAC 2023, we have proposed the concept of “Wa (Harmony)”. From the Japanese perspective, it means harmony of traditional culture and innovative technology, but in a broader sense, it represents the design of the large harmonious control loop to solve societal problems and to create societal values. IFAC 2023 will provide many opportunities for us to discuss the cooperation of various stakeholders in the world related to automatic control to achieve the goal for addressing societal problems, creation of new values, and sustainable developments.

I very much look forward to working with you in the next triennium.

Thank you very much.

Hajime Asama (JP), IFAC President 2020-2023

What Happened in IFAC 2017-2020?

A recap of the past IFAC triennium

Dear Friends and Colleagues,
Dear IFAC Officials and IFAC Affiliates,

With the end of an IFAC World Congress, there is always a change of leadership within IFAC, meaning that also my term of presidency ended and Hajime Asama was elected the new IFAC president. Even though I tried to keep you - all of the IFAC affiliates and Newsletter readers - up to date on some IFAC news with the bimonthly president's column, I want to use this opportunity to recap and summarize the last triennium and the major changes and new initiatives within IFAC that were implemented or started during the last three years.

Let me start with a short summary of all the usual IFAC activities and IFAC's day-to-day business. Altogether, the executive and technical activities of IFAC are in an excellent state. IFAC's main activities include the organization of conferences in the broad area of automatic control. During the past triennium 62 IFAC Technical Events (and, additionally, 33 co-sponsored events) were held between the World Congress in 2017 and 2020. All events

went well and for the few conferences this year that were affected by the spread of COVID-19, the transition to virtual formats went remarkably smooth. IFAC also has a strong portfolio of eight journals that are all performing well both in terms of impact and readership. All events held in the triennium have their proceeding published on IFAC-PapersOnLine, which registered an increasing impact factor. In addition, the work in all 39 Technical Committees went well and was productive. Furthermore, IFAC takes pride in recognizing outstanding members of the community through the IFAC awards program. All nominations and selections of the winners of the major IFAC Awards went very well.

A big thanks goes to all the Boards and Committees and to the more than 2000 volunteer for their hard work during the past triennium that kept IFAC running so smoothly!

Besides the day to day business, the past triennium can probably be best characterized by the many changes, new ideas and projects that were initiated.

The most significant change within the last triennium was certainly the comprehensive overhaul of the structure, working procedures and self-conception of IFAC's operation, which resulted in a new executive structure and more than 178 constitutional changes that were approved by IFAC's General Assembly. The underlying principle of the new executive structure is that IFAC's operation is structured such that the Executive Officers are acting as a leadership team. Each Executive Officer has a specific thematic responsibility connected to a board or committee. This together with a significantly increased meeting frequency of the Executive Officers guarantees that the regular business is taken care of in an agile and active way, but also that there is continuous strategic planning and monitoring. This makes IFAC not only ideally prepared to incorporate new initiatives and projects, but also optimally prepared for future challenges and changes in general.

Next to these important changes in IFAC's governance, also quite a number of new initiatives have been brought forward. Maybe most interesting for many Newsletter readers is that IFAC developed and implemented the IFAC Activity Fund within the past triennium. The aim of the Activity Fund is to support and promote grass-root activities of the control community. The fund sponsors initiatives that: Maximize control community engagement; Promote inclusion and diversity in alignment with the IFAC guidelines; Increase control engineering influence in public discourse and decision making. The funding is open to all individuals, committees and non-profit organizations with the support of IFAC representatives and especially targeted at the many IFAC Technical Committees. Please keep your eyes open for the upcoming information on IFAC's website.

Within the last year, we also changed IFAC-PapersOnLine to a Diamond Open Access publishing model, which implies that all articles will be immediately open access right after publication without any embargo period, and neither the reader nor the author or their institutions need to pay anything. Furthermore, the authors retain the copyright, while an open license can remove most restrictions on distribution, use and reuse. IFAC-PapersOnLine hence fulfills the highest standards with respect to the ongoing Open Access transformation.

Another document that was developed in the first year of the past triennium is a Code of Conduct for IFAC. IFAC is a leading professional society in the field of automatic control. Towards the control community, this implies an obligation to act according to ethical and professional standards. IFAC is hence obliged towards the control community to provide rules to which individuals acting on behalf of IFAC can refer to.

Clearly, diversity and inclusivity, including gender equality, are values to which IFAC fully subscribes to. Yet, before 2018 IFAC had no Inclusion and Diversity Strategy on how to make sure that the organization stays committed to those values and no strategy regarding the measures needed, or useful, in order to further improve IFAC's standing in that respect. Since then, IFAC approved a diversity and inclusion statement, introduced a new Diversity and Inclusion Committee as well as included its chair as ex-officio member in the IFAC Council to raise the importance of this topic to the highest level within IFAC.

During the past triennium, IFAC also developed and introduced the Distinguished Lecturer Program. The idea of this program is that IFAC pays large parts of the travel costs of distinguished speakers to technical events or seminar visits that take place in developing countries. At each World Congress, eight such speakers are awarded the title “distinguished lecturer of the IFAC for the triennium xx-xx”, which will be presented on the IFAC website with possible lecture titles. Furthermore, a new committee, the Membership Committee, is tasked to evaluate and elaborate on further benefits that IFAC could offer to financially weak countries.

The advantages of having a conference app instead of printed conference brochures are numerous (e.g., fast distribution of announcements, possibility to download papers, social interactions and sustainability). To maximize the benefit for the community, IFAC identified in the past triennium a suitable IFAC Conference App, which will be provided as a free service to all IFAC event organizers and participants while IFAC covers the costs.

In the past triennium, IFAC also introduced that all Technical Committees (TCs) are allowed and encouraged to establish their own IFAC TC Awards under unified rules that guarantee appropriate standards. In the first rounds of proposals, already eleven new TC Awards from nine TCs were formally approved by IFAC's Technical Board in the course of 2019.

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To register as an IFAC affiliate or to update your information please use the IFAC affiliate registration form.
<https://www.ifac-control.org/about/ifac-affiliate-registration>

Another topic within the past triennium was the content, style and format of the IFAC Newsletter. To this end, a Newsletter Task Force was implemented to evaluate and compare different formats (interactive, web-based...), to collect interesting further topics that might be helpful for our audience and think about a suitable corresponding layout until next year. Any inputs, wishes or recommendations in this regard are very welcome.

Another question that came up within IFAC even before the spread of COVID-19 was: How can IFAC contribute towards sustainability? One of the dimensions that certainly has to be considered is to avoid unnecessary traveling, but there are many more directions where IFAC should and will make a change. Therefore, IFAC initiated a task force that will develop and prepare a Sustainability Strategy within IFAC and the consequent measures. One of the many questions that this task force faces is to come up with goals, a strategy and finally guidelines for virtual and hybrid conference formats. Another newly established task force started to look into how conferences can focus more on discussions possibly even without a publication.

IFAC Technical Events were generally an important reoccurring discussion item during the last triennium. IFAC has developed and implemented numerous initiatives targeted at lowering the registration fees. This includes the possibility to receive a loan from IFAC for organizing a technical event, some form of insurance where IFAC partly offsets a loss (if one occurs), and generally offers help with the budget. IFAC is willing to spend even more money to support all IFAC Technical Events for the benefit of the community. (And please note: IFAC does not earn any money with the IFAC technical events!).

Other initiatives include regular journal reviewing of the IFAC journal portfolio, regular exchange with and reviews of our national member organizations, a new dedicated IFAC server for all paper submissions, separation of the election of the IFAC president and the next World Congress location, IFAC Technical Event website archiving, student activities, adjustment of the prize money for IFAC's Major Medals, and much more.

I am happy and proud what we all together have achieved during the past triennium. I hope that all the initiatives will gain traction and really make a difference in serving all those concerned with the theory and application of automatic control and systems engineering, wherever situated. This was a team effort, and it would certainly not have been possible without the support of the many IFAC volunteers. Thanks to all IFAC officials for their exceptional performance, and to all the volunteers for their support and hard work. Once more, I wish all the best to the new IFAC officials under the leadership of Hajime Asama!

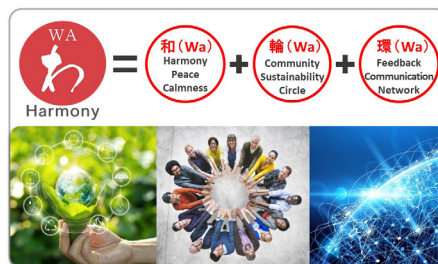
With best wishes from sunny Stuttgart,
Frank Allgöwer (DE), IFAC Immediate Past President/IFAC President 2017-2020

22nd IFAC World Congress Preview 9-14 July 2023 Yokohama, JP

Yokohama – “Wa (Harmony)” for our prosperous future society

IFAC 2023 will be hosted in Yokohama, a cultural and vibrant city where traditional culture and modern technology coexist in harmony. Yokohama is adjacent to Tokyo, within a 30-min train ride, and is in fact the second largest city of Japan. It is designated as an eco-future city, with many innovations taking place. It has a unique history as an international meeting place, as it was the first port in Japan opened to the world in 1859 after centuries of isolation. In its suburbs, one can also visit Kamakura, an ancient capital from the samurai times with many temples and shrines.

The congress venue Pacifico Yokohama is on the shore at the city center. It is the top convention complex in Japan, with large halls for plenaries and exhibitions, and a conference center with 50 meeting rooms of different sizes. Around the venue, there are many hotels, large shopping malls, museums, and several subway/train stations.



The vision of IFAC 2023 is “Wa” (Harmony in Japanese), which represents the design of large harmonious feedback loop to solve societal problems and to create societal values. Interestingly, there are three characters for “Wa” having different meanings as shown in the figure above. Very clearly, all Wa's express significant implications for the future technology of automatic control.

Promotion for IFAC 2023 was launched at the IFAC World Congress 2020. Please visit our Congress website for the details: <https://www.ifac2023.org/>

The Japanese team will do our best to organize an exciting world congress and very much look forward to welcoming all of you in Yokohama in July 2023!

Submitted by: Jun-ichi Imura (JP),
IFAC 2023 General Chair



Introducing the 2020 IFAC World Congress Prize Winners APP and YAP

Two congress prizes were awarded for papers contributed to the V-IFAC World Congress 2020. These were the Applications Paper Prize (APP) and the Young Author Prize (YAP). The planned Interactive Paper Prize (IPP) was not awarded in 2020 due to the fully online format of the congress.

Applications Paper Prize: This prize, created in 1986, is awarded at IFAC World Congresses for the best Applications Paper. **Winner: A. D. Bonzanini, J.A. Paulson, D. B. Graves and A. Mesbah (US): Toward Safe Dose Delivery in Plasma Medicine using Projected Neural Network-based Fast Approximate NMPC**

Angelo D. Bonzanini received his combined bachelor's and master's degree in chemical with nuclear engineering from Imperial College London (UK) in 2017. He then started his Ph.D. at the University of California- Berkeley (US) under the supervision of Prof. Ali Mesbah, and is expected to graduate in 2022. His research is focused on learning-based diagnostics and model predictive control of nonlinear systems under uncertainty, with applications ranging from atmospheric pressure plasma jets for medical treatment to autonomous vehicles in collaboration with Mitsubishi Electric Research Labs.

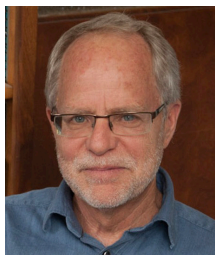


Joel Paulson received his B.S. (with highest honors) in Chemical Engineering from the University of Texas at Austin in 2011, and his M.S. and Ph.D. degrees in Chemical Engineering from the Massachusetts Institute of Technology (MIT) in 2013 and 2016, respectively. Upon completion of his postdoctoral work in systems and control theory at the University of California, Berkeley in 2019, he was appointed as an Assistant Professor in the Department of Chemical and Biomolecular Engineering at The Ohio State University where he is also a core faculty member of the Sustainability Institute and an affiliate of the Translational Data Analytics Institute.



J. Paulson's research focuses on data-driven optimization and control of complex systems under uncertainty with applications in next-generation biochemical and smart manufacturing processes such as continuous pharmaceutical manufacturing, colloidal self-assembly, and non-equilibrium plasma jets.

David B. Graves joined the University of California at Berkeley Department of Chemical Engineering in 1986 after receiving his PhD (Chemical Engineering) from the University of Minnesota. He retired from UCB in May 2020 and joined the Princeton Plasma Physics Lab as Associate Lab Director, effective June 1, 2020. He also has an appointment as Professor in the Department of Chemical and Biological Engineering at Princeton University. His research interests are in plasma materials processing, biomedical and other applications of non-equilibrium, low temperature plasma phenomena. His group studies the physics, chemistry and biology of chemically active low temperature plasmas.



D. Graves is a fellow of the American Vacuum Society and the Institute of Physics and was the recipient of the Electrochemical Society Young Author Award, the NSF Presidential Young Investigator Award, the Tegal Plasma Thinker Award, and the 3rd annual Plasma Prize of the Plasma Science and Technology Division of the AVS. He was named the first Lam Research Distinguished Chair in Semiconductor Processing at UC Berkeley for 2011-16. He received the Allis Prize for the Study of Ionized Gases from the American Physical Society in 2014 and the 2017 International Symposium of Dry Processes Nishizawa Award.

Ali Mesbah received the B.S. and M.S. degrees in Chemical Engineering from University of Tehran and Delft University of Technology, respectively, and the Ph.D. degree in Systems and Control from Delft University of Technology. He spent two years at the Massachusetts Institute of Technology as a senior postdoctoral associate. He is currently Associate Professor at the University of California Berkeley.



A. Mesbah's research interests are in the areas of learning and predictive control of uncertain systems, with applications spanning from (bio)

molecular processes to manufacturing systems. Mesbah has received several awards in recognition of his research, including the AIChE's 35 Under 35 Award in 2017, the IEEE Control Systems Outstanding Paper Award in 2017, and the AIChE CAST W. David Smith, Jr. Publication Award in 2015. He is a senior member of IEEE and AIChE.

Young Author Prize: This prize, created in 1986, is awarded at IFAC World Congresses for the best paper of which the first and presenting author is younger than 30 years. **Winner: Luca Ballotta (IT): *From Sensor to Processing Networks: Optimal Estimation with Computation and Communication Latency***

Luca Ballotta received his Bachelor's Degree in Information Engineering in 2017 and his Master's Degree in Automation Engineering in 2019 from the University of Padova, where he is currently pursuing the Ph.D. degree in Information Engineering, curriculum of Information science and technology. His research interests include communication and control design for networked control systems subject to resource constraints, and distributed optimization.



The IFAC Control Orchestra: A Look Behind the Curtain

Plenty of new ideas and formats were introduced during the 21st IFAC World Congress. One of the new formats that certainly stood out was the 1st performance of the IFAC Control Orchestra: an orchestra consisting only of musicians from the automatic control community. Since the COVID-19 pandemic prevented the planned live performance on-stage in Berlin, the orchestra premiered virtually during the opening and closing ceremonies of the World Congress. Since the performance of the control orchestra impressed many attendees of the World Congress, let us take a look behind the curtains by interviewing the two masterminds behind the organization of the orchestra: Jochen Rieber from Airbus Defence and Space in Friedrichshafen, Germany, and Julian Berberich from the University of Stuttgart in Germany.

Jochen, how much preparation time was necessary for the control orchestra, and where and when did this idea originate?

Jochen Rieber: The idea to initiate an IFAC Control Orchestra came from past IFAC president Frank Allgöwer in 2017. I remember when he called me, and - in his well-known enthusiastic way - pitched his idea and asked me for support. We then released a first announcement and call for participants in 2018, so the overall organization took us roughly two years. Of course, the last six months were the most

intensive part due to the finalization of the sheet music, the collection of the recordings, and especially the audio and video mixing of the contributions.

Julian, how many musicians were interested in the originally planned on-stage performance and how many participated in the virtual version in the end?

Julian Berberich: Originally, we were planning with roughly 30-35 musicians for the live performance in Berlin. We were very happy that almost all participants maintained their interest when we announced that we would go for a virtual version. Therefore, we ended up having 27 members contributing to the orchestra performance.

Wow, I guess we can consider this a full success. Jochen, among the two of us, how many wrong notes did you have to cut out? :-)

Jochen Rieber: Honestly - I am very impressed by the skills of all participants. Of course, there is still a difference. After all, some of the musicians are semi-professional - but all were quite amazing. It is indeed not easy to play all by yourself, with a very strict tempo and facing a camera. I want to take the opportunity to thank all musicians once more.

How was it possible to have all musicians at exactly the same pace? Any adaptive or robust control approaches?

Julian Berberich: Our approach is inspired by synchronization methods from multi-agent control. :-) Each musician recorded her or his performance while listening to a so-called background track of the musical piece via headphones. In this way, we ensured that all musicians played at the same pace and only little hand-tuning needed to be done.

As a big fan of the control orchestra - where, when and how can I find more songs to listen to?

Jochen Rieber: For now, we have the two songs from the World Congress performance available on Youtube (which has an endless repeat option - if you wish). :-) The links as well as all other information on the orchestra can be found on www.ifac-control.org/about/ifac-control-orchestra. And if you are not only a 'passive fan' that wants to listen to our songs, but you are interested in joining and participating in the orchestra's next performance, then you are highly encouraged to leave us a message there!

Any concrete plans on future performances?

Julian Berberich: Not too concrete as of yet: We're still overwhelmed by the positive feedback we've received after the past IFAC World Congress and we now enjoy the significant increase in spare time after the audio and video editing was finalized. We will certainly keep contact with the orchestra participants and any further interested musicians. We also plan to get in touch with the next World Congress organizers, and maybe there will be an even earlier comeback. Overall, this was a really fun experience and the positive reception encourages us to make the control orchestra a permanent institution within the automatic control community.

'Sounds' great to me! So, let's hope that we will have great songs from the control orchestra "for a lifetime", as their musical piece in the opening ceremony of the World Congress promised. And for all musically talented colleagues and friends from the automatic control community that missed the first chance to participate: Don't forget to sign up on www.ifac-control.org/about/ifac-control-orchestra to stay tuned for any news on future performances. Thank you, Jochen and Julian, for your commitment, your time and effort with the IFAC Control Orchestra, and thank you for this interview.

Submitted by: Anne Koch (DE), University of Stuttgart



V-IFAC 2020: The 1st virtual IFAC World Congress 11-18 July 2020 Berlin, DE

From July 11-17 2020 the 21st IFAC World Congress successfully premiered for the first time ever as a virtual World Congress held in cyberspace. Yes, it was a big challenge, keeping the original meeting point and joining Berlin and Germany with the global IFAC community virtually on the global podium of the World Wide Web.

The Virtual Congress

We never expected that the IFAC 2020 congress motto "Meeting Societal Challenges" would become so alive as we experienced at the very last phase of congress preparations. The exploding coronavirus pandemic challenged us to set up within 10 weeks a completely new congress with formats and technologies, which never had been used and settled before for a scientific event of this size and global attendance. Eventually, the efforts have been successful and worthwhile. The main congress goals could be achieved, keeping congress and publication of papers on time and offering a comprehensive congress program. We tried to preserve the congress elements of a live event, spanning from plenary sessions to social events. At the same time, we stepped out towards new frontiers, combining novel and new virtual and live elements. The Global Live Track, spanned plenaries, keynotes, panel discussions, tutorials, demonstrator sessions, competitions, workshops, and unique social events, offering a total of more than 40 hours live-streamed elements accessible concurrently on 5 continents. The nearly 3000 accepted papers were presented in the form of prerecorded videos that have been made available individually on-demand 24/7 in the Virtual Session Tracks. To facilitate discussions, we complemented all contributions with virtual forum rooms for mutual follow-on discussions.

Setting this up was a non-trivial task. More than 450GB of video material for the virtual sessions and pre-conference workshops needed to be collected, touched up, stored, and made available for individual and live streaming. The videos for the global live track needed to be cut, combined, and reliably streamed to up to 2000 live participants. And all of this needed to be done without a master blueprint, on the fly. Luckily all puzzle pieces did fit together, leading to a never-seen combination of virtual and live events.

We hope that the IFAC-V 2020 provides a valuable blueprint for upcoming congress virtualization, and that future Congresses can benefit from the IFAC-V 2020 experiences. Virtualization inevitably brings new opportunities for scientific dissemination, though it is our firm wish that the level of virtualization should never be governed again by pandemics.

Facts and Figures

Even before the pandemic hit, the IFAC-V 2020 was on the run to be a unique event, having attracted a never seen number of submitted and accepted contributions. A total of 4446 contributions have been submitted for possible inclusion to the IFAC 2020 World Congress. Besides regular contributions, proposals for

- 93 Open Invited Tracks
- 77 Invited Sessions
- 5 Tutorial Sessions
- 34 Workshops

had been received.

The 4237 submitted papers consisted of 3965 IFAC regular papers, 251 extended abstracts, and 21 survey papers. More than 977 contributions were sent for inclusion in open invited tracks, 412 contributions formed 77 proposed invited sessions— furthermore, 2 tutorial session papers, and 30 demonstrator papers, and 101 late-breaking results contributions were received.

The reviewing process had been conducted under the supervision of the International Program Committee Co-Chairs and general program chairs Rolf Findeisen and Sandra Hirche. They organized the reviewing and were supported by the nine IFAC Coordinating Committee Chairs, the 39 Technical Committees Chairs, 340 Technical Associate Editors, and more than 6553 reviewers! 13355 reviews were received as a result of 32290 review requests.

The reviewing process led to the acceptance of 3259 contributions, 66 Open Invited Tracks, 56 Invited Sessions, 5 Tutorial Sessions, and 22 Workshops. The 3109 scientific contributions are made up of 2898 IFAC-regular papers, 194 Extended Abstracts, and 17 Survey papers. Of those are 739 Open Invited Track contributions, 354 Invited Session papers, 2 Tutorial session papers, 29 Demonstrator papers, and 94 accepted Late Breaking Results contributions.

The acceptance rates are 69% for contributed papers, 75% for Open Invited Track papers, and 85% for Invited Session papers. This leads to an overall acceptance rate for articles published in IFAC-PapersOnline of 73%.

IFAC is a vital community, spanning multiple technical fields organized in technical committees. Notably, the top 5 technical committees in terms of paper submissions made up a share of 33% of the total amount of accepted papers, as shown in the following table.

TC	Submitted/Accepted contributions	
2.3	353	248
1.1	323	225
6.3	318	254
1.5	239	180
4.3	216	137

The contributions have been organized in 263 sessions within the Virtual Track, including two Late-Breaking Results sessions comprising 2956 scientific contributions. Despite the COVID-19 pandemic and its multiple challenges, only less than 2% of the accepted papers had been withdrawn. The virtual nature of the congress allowed us to overcome the usual limitation for the size of sessions allowing to make cohesiveness the main criterion for session forming. The session size varied between 4 and 43 papers, with an average of 11 contributions per session. The IFAC-V 2020 Virtual Track opened on July 13. It remains open until 31 August 2020, allowing 24/7 on-demand viewing of the more than 3100 video presentations accompanied by the pdfs of the slides.

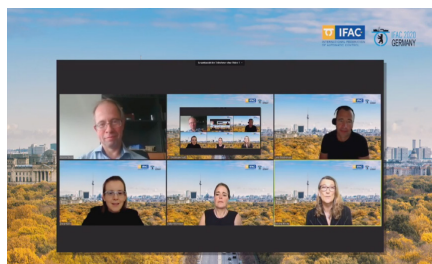
Not surprisingly German contributions made up the biggest share of submissions. The following table shows the countries with the largest share of papers in the final program (based on the country of the corresponding author of a paper).

Country	Submitted/Accepted papers	
Germany	519	434
China	630	353
USA	325	248
France	303	231
Italy	235	199
Japan	205	155
UK	156	108
Brazil	163	93
Russia	174	91
Netherlands	100	89

Finally, more than 3600 people participated in the virtual congress, with a maximum of 2450 logged in participants in a single day. More than 750 listeners joined the pre-congress workshops. And it was a truly international and global event, with participants from 82 countries. More than 18 TB of Internet traffic has been streamed, and more than 22000 paper downloads have been recorded until the end of the live congress week.

Global live and plenary track: The global live track consisted of Tutorials, Demonstrators, and Round Table Discussions, as well as a series of competitions. In the prime time, the 4 plenaries, 5 semi-plenaries, spanning from machine learning to robotics and the control of large-scale wind turbines were streamed live. Additionally, a Corona session discussing what control and systems can do to fight the COVID-19 outbreak and the grand opening and closing were part of the Global live track. More than 2000 live streaming participants watched

and enjoyed the plenaries and semi-plenaries at the peak in parallel. Each of these elements had a live part, consisting of roundtable discussions and even a live laboratory tour. The global live track was complemented by 5 tutorials on current topics such as machine learning in control, the decarbonization of the energy system, or how to control traffic systems. Furthermore, 27 demonstrator contributions have been presented and discussed live.



„Global Live Track” with panelists spanning up to three continents concurrently

Competitions: Despite the COVID-19 situation, three competitions took place live. The F1/10 competitions on autonomous racing received a record number of participating teams, the Mathworks drone competitions were carried out virtually during the congress week, and the aerospace industrial fault detection competition was well received. 2 roundtable discussion, one on education and control, the other one on the interaction of industry, academia and government were very well received.

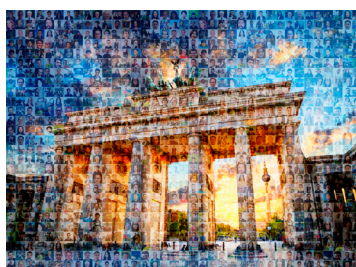
Workshops: A congress of this size would not be complete without workshops, educating the listeners about current and upcoming topics in the field of control and automation. 12 full day and one half-day workshop took place on Saturday before the congress. Those high-quality workshops have been extremely well received, having more than 750 participants from all over the world. They will be available for individual view until 31 August 2020.

Girls in Control Workshop: As an outreach activity the multilingual *Girls in Control* Workshop took place on the first day of the congress. Close to 100 girls of the age 10 to 15 years from all over the world participated in learning sessions about control with the session offered in English, French, German, Italian, Norwegian, and Portuguese. Besides learning control theoretic principles and the brainstorming on the many different control applications, the girls also derived the concept of a proportional controller and finally implemented their first controller.

Social Events

The most challenging events for virtualization for sure are the social events. How can this work in the cyberspace? This question must be answered primarily by the attendees, but from the experiences of the organizers and the positive feedback it can be answered with “Yes!”. The 1st IFAC Virtual Control Orchestra consisted of more than 25 musicians from

our IFAC community who gave two outstanding performances that were presented at the virtual opening and closing ceremonies of the congress. The entertaining online Control-and-the-Universe Quiz, brought together more than 130 quizzers from around the world in around 40 teams. Furthermore, the IFAC-V 2020 Photomosaic Souvenir is comprised of pictures of more than 220 attendees had been combined in one photomosaic showing the Brandenburg Gate in Berlin (see figure above). Among the beautiful and creative pictures, there are even 29 with beer coasters handed out at the 2017 World Congress in Toulouse and advertising the IFAC World Congress in Berlin.



Mosaic of virtual congress participants

Acknowledgements

Setting up such a big event on a pure volunteer basis requires lots of brains with good ideas, many dexterous hands and skills, and, last but not least strong commitment and sacrifice of private and business life. We are grateful to the German control community. It provided the needed source of creativity through the involvement of the National Organizing Committee, the persistent and always optimistic Core Team, and the terrific Virtual Congress Taskforce, led by Rolf Findeisen, realizing the virtual congress within an unbelievable 10 weeks. Big thanks go to the numerous volunteers, made up in significant part by our young researchers. Honest appreciation is given to the German IFAC National Member Organization, the VDI – Verein Deutscher Ingenieure, for taking the financial patronage. We also thank our industrial sponsors and institutional supporters for financial support, and thanks also go to the endless support of the IFAC Secretariat.

Outlook

Most of the materials will be also available after the congress in the virtual congress hall. Furthermore, the plenaries and semi-plenary contributions and the opening and closing ceremonies will be showcased on the IFAC YouTube channel. The Congress proceedings with all accepted regular contributions will be available soon on IFAC-PapersOnLine.

Thanks to all IFAC-V 2020 participants, you made IFAC-C 2020 a lively and eventually a real and memorable event in the IFAC World Congress series!

In the name of the IFAC-V 2020 organizing team,

Klaus Janschek (IFAC-V 2020 General Chair),
 Rolf Findeisen, Sandra Hirche (IFAC-V 2020 IPC Co-Chairs) and Frank Allgöwer (IFAC President 2017-2020)

2019 European PhD Award

The European PhD Award is given annually in recognition of the best PhD thesis in Europe, in the field of Control for Complex and Heterogeneous Systems, and it is sponsored by EECI <http://www.eeci-igsc.eu>. The aim is to encourage high-quality works among young researchers in their initial research period. Any thesis, which is defended in European Universities, during the period between 15 July, Year(n-1) and 14 July, Year(n), and written in English, is eligible for the Year(n) PhD award. The main scientific contributions have to be related with analysis of involved dynamical systems, development of the control and estimation theory, or their applications to cutting-edge real-world problems. The selection is based on a peer-reviewing process with the Scientific Committee approval.

The list of past winners of this award can be downloaded here <https://bit.ly/3gMc1F6>.

The Scientific Committee of the 2019-year competition co-chaired by Denis Efimov and Luca Greco, was comprised of: Alberto Bernporad, Maria Domenica Di Benedetto, Francoise Lamnabhi-Lagarrigue, Christophe Prieur, and Romeo Ortega.

This yearly competition is in general very tough due to the extraordinary quality of several applications. This year, with the help of 20 international Reviewers, four finalists were selected among 13 applicants whose names in alphabetic order are:

- Cosimo Della Santina, “*Natural principles for design and control of soft robots*”, University of Pisa, Italy, PhD Advisors: Antonio Bicchi and Lucia Pallottino
- Amaury Hayat, “*Stabilization of 1D nonlinear hyperbolic systems by boundary controls*”, University of Sorbonne, France, PhD Advisors: Sébastien Boyaval and Jean-Michel Coron
- Dario Paccagnan, “*Distributed control and game design: from strategic agents to programmable machines*”, ETH Zürich, Switzerland, PhD Advisor: John Lygeros
- Yang Zheng, “*Chordal Sparsity in Control and Optimization of Large-scale Systems*”, University of Oxford, UK, PhD Advisor: Antonis Papachristodoulou

The winners of the 2019 European PhD Award in alphabetical order are:

Amaury Hayat and Yang Zheng

The competition for the 2020 European PhD Award will be open at the end of the year, with the deadline 28 February 2021, see http://eeci2.l2s.supelec.fr/PhD_Award. From this year 2020 competition, the field of the prize will be enlarged to Systems & Control in general.

Since 2018, the awardee(s) of this prize are invited to contribute (vision, review or research tutorial type paper) to *Annual Reviews in Control*, in a new category of papers of this IFAC journal, dedicated to young research talents.

Submitted by: Denis Efimov and Luca Greco

Calendar of IFAC Events

Title	2020	Place	Further Information
22 nd European Conference on Power Electronics and Applications EPE'20 ECCE Europe	September 07 – 11	Lyon France	https://epe-ecce-conferences.com/epe2020/epe2020@supergrid-institute.com
4 th IFAC Workshop on Advanced Maintenance Engineering, Services and Technologies AMEST 2020	September 10 – 11	Cambridge United Kingdom	https://www.amest2020.eng.cam.ac.uk/ifm-events@eng.cam.ac.uk
KIEE, ACA, IFAC et al. International Conference on Electric-Vehicle, Smart-Grid and Information Technology ICESI 2020	September 16 – 18	Jeju Island Republic of Korea	http://icesi2020.org/yilee@seoultech.ac.kr
12 th INSTICC, IFAC et al. Internat. Joint Conference on Computational Intelligence IJCCI 2020	November 02 – 04	Budapest Hungary	http://www.ijcci.org/ijcci.secretariat@insticc.org
15 th IFAC Workshop on Discrete Event Systems WODES 2020	November 11 – 13	Rio de Janeiro Brazil	https://wodes2020.eventos.ufrj.br/ e-mail: not yet available
ANZCC, IFAC, et al. Conference on Australian and New Zealand Control Conference (in cooperation with IFAC) ANZCC 2020	November 26 – 27	Gold Coast Australia	https://anzcc.org.au/ANZCC2020/l.vlacic@griffith.edu.au
3 rd IFAC Workshop on Cyber-Physical and Human Systems CPHS 2020	December 03 – 05	Shanghai China	http://www.cphs2020.org/ e-mail: not yet available
Title	2021	Place	Further Information
International Conference on Automation, XXV Congreso de la Asociación Chilena de Control Automático - ICA ACCA 2020	March 22 – 26	ONLINE Chile	https://controlautomatico.org/ica_acca2020/ e-mail: not yet available
ACA, ICROS, SICE, IFAC et al. Conference on Asian Control Conference (in cooperation with IFAC) ASCC 2021	May 05 – 08	Jeju Island Republic of Korea	http://ascc2021.org/ e-mail: not yet available
17 th IFAC Conference on Programmable Devices and Embedded Systems PDES 2021	May 18 – 20	Sarajevo Bosnia and Herzegovina	http://pdes-conference.eu/dejan.jokic@ibu.edu.ba
Conference on American Control Conference (in cooperation with IFAC) ACC 2021	May 26 – 28	New Orleans, LA USA	http://acc2021.a2c2.org/ e-mail: not yet available
17 th IFAC Symposium on Information Control Problems in Manufacturing INCOM 2021	June 07 – 09	Budapest Hungary	https://incom2021.org/info@incom2021.org
11 th IFAC Symposium on Fault Detection, Supervision and Safety for Technical Processes SAFEPROCESS 2021	June 08 – 11	Pafos Cyprus	https://safeprocess2021.eu/ e-mail: not yet available
11 th IFAC Symposium on Control of Power and Energy Systems CPES 2021	June 22 – 24	Moscow Russian Federation	http://not yet available e-mail: not yet available
16 th IFAC Symposium on Control in Transportation Systems CTS 2021	June 08 – 10	Lille France	http://not yet available e-mail: not yet available
11 th IFAC Symposium on Advanced Control of Chemical Processes ADCHEM 2021	June 13 – 16	Venice Italy	https://www.adchem2021.org/noc@adchem2021.org
Conference on European Control Conference (in cooperation with IFAC) ECC 2021	June/July 29 – 02	Rotterdam Netherlands	https://ecc21.euca-ecc.org/ e-mail: not yet available

Calendar of IFAC Events

Title	2021	Place	Further Information
7 th IFAC Conference on Analysis and Design of Hybrid Systems ADHS 2021	July 07 – 09	Brussels Belgium	https://sites.uclouvain.be/adhs21/ e-mail: not yet available
7 th IFAC Conference on Nonlinear Model Predictive Control NMPC 2021	July 11 – 14	Bratislava Slovakia	https://www.nmpc2021.org/martin.klauco@stuba.sk
19 th IFAC Symposium on System Identification SYSID 2021	July 14 – 16	Padova Italy	https://www.sysid2021.org/organizingcommittee@sysid2021.org
4 th IFAC Workshop on Linear Parameter Varying Systems LPVS 2020	July 19 – 20	Milan Italy	http://not yet available e-mail: not yet available
6 th IFAC Conference on Engine and Powertrain Control, Simulation and Modeling E-COSM 2021	August 23 – 25	Tokyo Japan	http://not yet available e-mail: not yet available
3 rd IFAC Conference on Modelling, Identification and Control of Nonlinear Systems MICNON 2021	August 25 – 27	Tokyo Japan	http://not yet available e-mail: not yet available
24 th International Symposium on Mathematical Theory of Networks and Systems (in cooperation with IFAC) MTNS 2020	August 24 – 28	Cambridge United Kingdom	https://mtns2020.eng.cam.ac.uk/erd30@eng.cam.ac.uk
13 th IFAC Symposium on Robot Control SYROCO 2021	August/Sept. 30 – 02	Matsumoto Japan	https://syroco2021.com/ e-mail: not yet available
6 th IFAC Workshop on Mining, Mineral and Metal Processing MMM 2021	September 01 – 03	Nancy France	http://not yet available e-mail: not yet available
20 th IFAC Conference on Technology, Culture and International Stability TECIS 2021	September 14 – 17	Moscow Russian Federation	http://not yet available e-mail: not yet available
11 th IFAC Symposium on Biological and Medical Systems BMS 2021	September 19 – 22	Ghent Belgium	https://bms2021.ugent.be/bms2021@ugent.be
10 th IFAC Symposium on Robust Control Design ROCOND 2021	September 21 – 24	Kyoto Japan	http://rocond21.ee.t.kyoto-u.ac.jp/index.html e-mail: not yet available
6 th IFAC Conference on Analysis and Control of Chaotic Systems CHAOS 2021	September 27 – 29	Catania Italy	http://not yet available e-mail: not yet available
Title	2022	Place	Further Information
Vienna International Conference on Mathematical Modelling MATHMOD 2022	February 16 – 18	Vienna Austria	http://not yet available e-mail: not yet available

The IFAC Calendar of Events is constantly updated as additional technical events (Workshops, Symposia, and Conferences) are approved. The online complete version of the IFAC Calendar of Events is available at:


<https://www.ifac-control.org/events/>

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