

Introducing the 2017-2020 IFAC Fellows continuation of a series

Marco Campi

Marco Claudio Campi is a professor of Automatic Control at the University of Brescia (IT) where he has taught topics related to data-driven control and systems theory for more than twenty-five years. He is a distinguished lecturer of the Control Systems Society and until recently he was the chair of the IFAC Technical Committee on Modeling, Identification, and Signal Processing.



M. Campi has held visiting and teaching appointments at several institutions and has served in various capacities on the editorial boards of *Automatica*, *Systems and Control Letters*, and the *European Journal of Control*. He is a Fellow of IEEE and a recipient of the Giorgio Quazza Prize of the Politecnico of Milano (IT) and the IEEE CSS George S. Axelby Outstanding Paper Award, received for the article *The Scenario Approach to Robust Control Design*.

He has delivered plenary addresses at major conferences, including CDC, MTNS, and SYS-ID. The research interests of M. Campi include data-driven decision making, learning systems, stochastic control and the foundations and interpretation of probability theory

Angeliki Pantazi

Angeliki Pantazi is a research staff member at the IBM Research – Zurich in Switzerland. She received her Diploma and Ph.D. degrees in Electrical Engineering and Computer Technology from the University of Patras (GR) in 1996 and 2005, respectively. In 2002, she joined IBM Research – Zurich as a Ph.D. student and became a Research Staff Member in 2006. She was named IBM Master Inventor in 2014 and became a senior member of the IEEE in 2015. She was a co-recipient of the 2009 IEEE Con-

trol Systems Technology Award for contributions to nanopositioning for MEMS-based storage and other applications, the 2009 IEEE Transactions on Control Systems Technology Outstanding Paper Award and the 2014 IFAC Industrial Achievement Award for the application of advanced control technologies in the nano-domain to magnetic tape data storage. In 2017 A. Pantazi received an IBM Corporate Award for Archival storage for big data and analytics and the IEEE Control Systems Society Transition to Practice Award for the development of advanced control technologies for magnetic tape data storage and nanopositioning applications.



A. Pantazi's research interests include multiple control-related aspects of data storage systems, where she particularly contributed in the research and development of advanced servo control technologies for magnetic tape drive systems. Recently, her research is also focusing on neuromorphic technologies combined with emerging memory concepts such as phase-change memory. She has published more than 90 refereed articles and holds over 40 granted patents.

Peter Caines

Peter E. Caines received the BA in mathematics from Oxford University (UK) in 1967 and the PhD in Systems and Control Theory in 1970 from Imperial College, University of London, (UK), supervised by David Q. Mayne, FRS. After PDFs and visiting positions at Stanford University (US), UC Berkeley (US), University of Toronto (CA) and Harvard University (US), he joined McGill University (CA) in 1980, where he is Distinguished James McGill Professor and

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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>

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Macdonald Chair in the Department of Electrical and Computer Engineering.

In 2000, the paper on adaptive control which P. Caines coauthored with G. C. Goodwin and P. J. Ramadge (IEEE TAC, 1980) was recognized by the IEEE Control Systems Society as one of the 25 seminal control theory papers of the 20th century. In addition to being an IFAC Fellow P. Caines received the IEEE Control Systems Society Bode Lecture Prize in 2013, is a Fellow of the Royal Society of Canada, CIAR, SIAM, IEEE, the IMA (UK), and is a member of Professional Engineers Ontario.



P. Caines is the author of *Linear Stochastic Systems* (Wiley, 1988), which was republished as a SIAM Classic in June 2018, and is a Senior Editor of *Nonlinear Analysis: Hybrid Systems*. He has been an Associate Editor of the *SIAM Journal on Control and Optimization* and of both the *IEEE Transactions on Automatic Control* and *Information Theory*. His research interests include stochastic systems, mean field game theory, systems on complex networks and hybrid systems theory, together with their applications in natural and artificial systems.

David J. Hill

David J. Hill was born in Sydney, AU in 1949. His early education was by correspondence while living in outback Australia. He received the BE (Electrical Engineering) and BSc (Mathematics) degrees from the University of Queensland (AU) in 1972 and 1974, respectively. He received the PhD degree in Electrical Engineering from the University of Newcastle (AU) in 1976.

After postdoctoral work at the University of California- Berkeley (US) from 1978-81, his early academic career was spent at the University of Newcastle starting with a Queen Elizabeth II Fellowship and reaching full professor level in 1988. In 1994, he was appointed to the Chair of Electrical Engineering at The University of Sydney where he has held various positions including the Chair until 2002 and again during 2010-2013 along with an Australian Research Council Professorial Fellowship. During 2005-2010, he was an ARC Federation Fellow at the Australian National University and, from 2006, also a Theme Leader (Complex Networks) and Deputy Director in the ARC Centre of Excellence for Mathematics and Statistics of Complex Systems. He has also held academic and substantial visiting positions at other universities including Melbourne (AU), Lund (SE), Munich (DE) and City University of Hong Kong (HK CN). From 1991-1993, he served as Assistant

Dean of Engineering in Newcastle, and in 1996-1999 and 2001-2004, as head of the respective departments in Sydney and Hong Kong.

Since 2013, D. Hill holds the Chair of Electrical Engineering in the Department of Electrical and Electronic Engineering at the University of Hong Kong (Hong Kong, CN) where he directs the Centre for Electrical Energy Systems and is the Program Coordinator for the multi-university RGC Theme-based Research Scheme Project on Sustainable Power Delivery Structures for High Renewables. He is also a part-time Professor (and was founding director) in the Centre for Future Energy Networks at The University of Sydney (AU).



D. Hill's research interests have progressed from dissipative systems and stability theory to power system stability, adaptive control, nonlinear control, various power system problems and complex dynamical networks. His work is now mainly on control and planning of future energy and power networks with some ongoing interest in basic stability and control questions for dynamic networks and systems. He is the co-author of the following books: *Deterministic Learning Theory for Identification, Recognition and Control*, 2010 (with C.Wang), and *Nonlinear Control of Dynamic Networks*, 2014 (with T.Liu and Z.P.Jiang).

Besides being an IFAC Fellow, D. Hill is a Life Fellow of the Institute of Electrical and Electronics Engineers, USA and a Fellow of the Society for Industrial and Applied Mathematics, USA, the Australian Academy of Science, the Australian Academy of Technological Sciences and Engineering and the Hong Kong Academy of Engineering Sciences. He is also a Foreign Member of the Royal Swedish Academy of Engineering Sciences.

Maria Domenica Di Benedetto

Maria Domenica Di Benedetto is a Professor of Automatic Control at University of L'Aquila (Italy). She received her Master degree (summa cum laude) in Electrical Engineering and Computer Science from University of Roma "La Sapienza" in 1976. She received her PhD degree ("Docteur-Ingenieur" Spécialité Automatique et Traitement du Signal) in 1981 and the degree "Doctorat d'Etat ès Sciences" (Spécialité Sciences Physiques) in 1987, both from Université de Paris-Sud (Orsay, France). She has been Adjunct Professor from 1995 to 2002, and McKay Professor from 1990 to 1995, at the Department of EECS at the University of California- Berkeley. She held visiting positions at MIT, at the University of Michigan- Ann Arbor, and at the Ecole Nationale Supérieure de Mécanique in Nantes (France). Her research

From the IFAC President

Dear Friends and Colleagues,

4147. What sounds like a book title of a Sci-Fi-Thriller was actually the outcome of another thrilling undertaking: it is the number of paper submissions to the IFAC World Congress in Berlin. And, as every good thriller, organizing the World Congress has many moments of suspense, and receiving these numbers was certainly a moment of relieve. Taking also the submitted proposals into account pushes the number of submissions even beyond 4300. We are very happy that so many colleagues and friends from all over the world are interested in presenting their work at the IFAC World Congress in Berlin and we can't wait to host you all!

Besides the total count of submitted papers, the stats also give us other interesting insights to authors and keywords. The total keyword count presented "Control of renewable energy resources" as the most used keyword (149 times), which fits nicely into the IFAC 2020 motto: "Automatic Control – Meeting Societal Challenges". The highest number of submissions is from China, closely followed by Germany. (I would say, my dear German friends, with the late breaking results submission coming up in February – Germany should accept this challenge :-)) But more importantly, the stats show that people from all around the world submitted to the IFAC World Congress: from A like Albania to V like Vietnam (next time, Zimbabwe!). With authors from a total of 79 countries (and this is only considering corresponding authors) I think we can happily conclude that the IFAC World Congress 2020 in Berlin is indeed a truly global WORLD Congress. Not only the high number of submissions from all over the world, but also the breadth in topics once more represents what IFAC stands for: serving all those concerned with the theory and application of automatic control and systems engineering in the broadest sense, wherever situated.

While these statistics and numbers are quite interesting, the number of submissions does of course not equal the number of contributions at the World Congress. To ensure good quality for all papers in all categories and fields, there are now a whopping 450 Technical Associate Editors and Editors working on acquiring high quality reviews. Let me take this opportunity to thank all the busy bees that work hard to make this World Congress a success while maintaining the highest quality standards.

However, we are not yet at the end of this thriller, and there are many more chapters to come. We are constantly working on improving the social and technical program, the competitions, and much more. The last chapter, the IFAC World Congress, will be a one of a kind experience, a big finale, and certainly exciting up to the last minute.

Holiday greetings from Stuttgart,
Frank Allgöwer

PS: No chapter without a cliffhanger. You're interested in the plenary speakers at the IFAC 2020 World Congress? Stay tuned for the next column...

interests are in the areas of nonlinear and hybrid systems control theory, diagnosability and predictability in cyber-physical systems, and applications to automotive, smart grids and traffic control.

From 2001 to 2019, M.D. Di Benedetto was the director of the Italian Center of Excellence for Research DEWS "Architectures and Design Methodologies for Embedded Controllers, Wireless Interconnect and System-on-Chip" established at the University of L'Aquila in 2001. She has been a Member of the International Advisory Board for LCCC (Lund Center for Control of Complex Engineering Systems) from 2010 to 2018. She has been the president of the Italian Association of Researchers in Automatic Control (SIDRA) from 2013 to 2019. Since 2009 Di Benedetto has served as President of the European Embedded Control Institute since 2009.



M.D. Di Benedetto became an IEEE Fellow in 2002. She has been a member of the IEEE Control Systems Technical Fields Award Committee, from 2007 to 2010. She has been the Chair of the Standing Committee on Fellow Nominations of the IEEE Control Systems Society from 2003 to 2007, and a member of the IEEE Fellow Evaluation Committee of the Control Systems Society from 2012 to 2016. She has been an associate editor of numerous journals, including the IFAC journals *Annual Reviews in Control* and *Nonlinear Analysis: Hybrid Systems*. She is a member of the IFAC Nichols Medal Selection Committee for the 2017-2020 triennium.

Kameshwar Poolla

Kameshwar Poolla is the Cadence Distinguished Professor at University of California-Berkeley (US) in Electrical Engineering, Computer Sciences, and Mechanical Engineering since 1992. Previously he has held appointments at the University of Illinois at Urbana-Champaign (US) and McGill University (CA).



K. Poolla's research interests span from Robust Control and System Identification to Microeconomics and Optimization. Most recently, he has worked on many aspects of future energy systems including markets, security, and commercialization.

K. Poolla was the Founding Director of the IM-PACT Center for Integrated Circuit manufacturing. He co-founded OnWafer Technologies which was acquired by KLA-Tencor in 2007. He has served as a technology and mergers/acquisitions consultant for Cadence Design Systems.

In addition to being an IFAC Fellow K. Poolla has been awarded a 1988 NSF Presidential Young Investigator Award, the 1993 Hugo Schuck Best Paper Prize from the American Automatic Control Council (AACC, the US IFAC National Member Organization), the 1994 Donald P. Eckman Award from the AACC, the 1998 Distinguished Teaching Award of the University of California, the 2005 and 2007 IEEE Transactions on Semiconductor Manufacturing Best Paper Prizes, and the 2009 IEEE CSS Transition to Practice Award.

Rodolphe Sepulchre

Rodolphe Sepulchre was born in Brussels, Belgium in 1967. He received the engineering degree (1990) and the PhD degree (1994), both from the Université catholique de Louvain (BE). He was a postdoctoral research associate at the University of California- Santa Barbara (US) from 1994 to 1996. He was then appointed at the Université de Liège (BE) in 1997. In 2013 he moved to Cambridge (UK), where he holds the control chair in the Department of Engineering and a professorial fellowship in Sidney Sussex College.



He held visiting positions at Princeton University (US) from 2002-2003, the Ecole des Mines de Paris (FR) from 2009-2010, California Institute of Technology (US) in 2018, and part-time positions at the University of Louvain (BE) from 2000-2011 and at INRIA Lille Europe (FR) from 2012-2013. He was the Petar Kokotovic Distinguished Visiting Professor of University of California- Santa Barbara in 2019.

He is a Fellow of IFAC (2020), IEEE (2009), and SIAM (2015). In 2008, he received the IEEE Control Systems Society Antonio Ruberti Young Researcher Prize. He was elected at the Royal Academy of Belgium in 2013.

R. Sepulchre is (co-) author of the monographs *Constructive Nonlinear Control* (1997, with M. Jankovic and P. Kokotovic) and *Optimization on Matrix Manifolds* (2008, with P.-A. Absil and R. Mahony). His current research interests include the differential theory of nonlinear systems and the feedback control principles of neuronal circuits. His research is currently funded by the ERC advanced grant Switchlets (2015-2020).

Jay A. Farrell

Jay A. Farrell earned B.S. degrees in physics and electrical engineering from Iowa State University (US) and M.S. and Ph.D. degrees in electrical engineering from the University of Notre Dame (US). While in the Autonomous Vehicles Group at Draper Lab, he received the Engineering Vice President's Best Technical Publication Award in 1990, and Recognition Awards for Outstanding Performance and Achievement in 1991 and 1993.



He is a professor in the Department of Electrical and Computer Engineering at the University of California, Riverside. He served as Vice President of the American Automatic Control Council (AACC) in 2018-2019 and as President in 2020-2021. He has served the IEEE Control Systems Society (CSS) as Vice President Finance and Vice President of Technical Activities, as General Chair of IEEE CDC 2012, and as President in 2014.

He was named a GNSS Leader to Watch for 2009-2010 by GPS World Magazine in May 2009 and a winner of the Connected Vehicle Technology Challenge by the U.S. Department of Transportation's (DOT's) Research and Innovative Technology Administration in July 2011. He is author of over 250 technical publications and three books; a Distinguished Member of IEEE CSS; and, a Fellow of AAAS, IEEE, and IFAC.

Don Bartusiak

Don Bartusiak is Chief Engineer, Process Control for ExxonMobil Research and Engineering (US). He has 32 years of experience in process control and advanced computing with ExxonMobil, and seven years of experience in process development research with Bethlehem Steel. During his career with ExxonMobil, he has been a process control application engineer working on artificial intelligence, linear and nonlinear model predictive control, and real-time optimization at facilities in the U.S. and U.K in both central engineering offices and manufacturing. From the mid-1990s D. Bartusiak held supervisory or senior technical positions with responsibility for instrumentation, process analyzers, control systems, and control applications at facilities in Texas and Virginia. From 2000 to 2002, he was Lecturer and Adjunct Professor of Chemical Engineering at Rice University (Houston, TX, US).

D. Bartusiak received a B.S. (ChemE) from the University of Pennsylvania (US) and M.S. and Ph.D (ChemE) degrees from Lehigh University (US). He is a former National Director

of the Computing and Systems Technology (CAST) Division of the American Institute of Chemical Engineers (AIChE), Process Control Programming Chairman for the Ethylene Producers Committee, and a member of Technical Committee 6.1 for Chemical Process Control in the International Federation of Automatic Control (IFAC). Currently, he is At-large Executive Board Member of the International Society of Automation (ISA), Managing Director in the Standards and Practices Board of ISA, and Co-chair of the Open Process Automation Forum of The Open Group.



In 2011, D. Bartusiak received the Computing Practice Award from the CAST Division of AIChE. He was inducted into Control Engineering's Automation Hall of Fame in 2015 and in 2016 was named to Smart Industry's Top 50 Innovators. In 2018, he received the Excellence in Leadership Award from the International Society for Automation. He has published ten journal articles and is co-inventor on five patents.

Claire Tomlin

Claire Tomlin is the Charles A. Desoer Professor of Engineering in EECS at the University of California- Berkeley (US). She was an Assistant, Associate, and Full Professor in Aeronautics and Astronautics at Stanford (US) from 1998 to 2007, and in 2005 joined Berkeley. Claire works in the area of control theory and hybrid systems, with applications to air traffic management, UAV systems, energy, robotics, and systems biology.



In addition to being an IFAC Fellow C. Tomlin is a MacArthur Foundation Fellow (2006), and an IEEE Fellow (2010). In 2017 she was awarded the IEEE Transportation Technologies Award, and in 2019 was elected to the National Academy of Engineering and the American Academy of Arts and Sciences.

Editor's Note: The full list of 2017-2020 IFAC Fellows (including citations), as well as a description of the Fellows and the names of all IFAC Fellows can be found at: <https://www.ifac-control.org/awards/ifac-fellows>

Chinese Friendship Award Honours for members of the IFAC community

Three members of the IFAC community received the 2019 Chinese Government Friendship Award on 30 September 2019. They are Larry Biegler (2017-2020 IFAC Fellow), Ian Craig (IFAC Past President), and Anders Lindquist (2010 IFAC Fellow).

The award is the highest honour given to foreign experts who have made outstanding contributions to China's economic and social progress. Recipients were awarded by Vice-Premier Liu He and congratulated by Premier Li Keqiang at a ceremony held in Beijing at the Great Hall of the People. The 2019 awards were especially significant as the award ceremony was part of the celebrations of the 70th anniversary of the People's Republic of China. Awardees attended four events from 29 September to 1 October 2019 where President Xi Jinping was in attendance.

One hundred foreign experts representing amongst others academia, the business community and NGOs received the award in 2019. Notable 2019 awardees include the Nobel Prize winning American economist James Heckman, and Bernard Bigot, the Director-General of the ITER International Fusion Energy Organization.

From the IFAC community Lorenz T. (Larry) Biegler is the Bayer University Professor and Head of Chemical Engineering at Carnegie Mellon University (US). Anders Linquist is a Zhiyuan Chair Professor in the Department of Automation at Shanghai Jiao Tong University (CN) and an Emeritus Professor at the Royal Institute of Technology in Stockholm (KTH, SE). Ian K. Craig is Professor and Section Head: Control Systems in the Department of Electrical, Electronic and Computer Engineering at the University of Pretoria (ZA). He is also an IFAC Advisor, the current Chair of the IFAC Foundation and the Chair of the IFAC Publications Committee.

Submitted by Ian Craig (ZA), IFAC Advisor

Mobile Textbook and Other Resources Available Provided by Quanser

The Experience Controls mobile textbook may be able to help solve the challenge of presenting control systems without complicated language, excessive theory, and multiple pages of equations. This free, highly interactive app helps instructors introduce students to control systems fundamentals in a unique way, via accessible language, real-time dynamic simulations, and self-directed learning.

Developed for a typical undergraduate Control Systems courses, the Experience Controls app covers a range of topics, from system modelling and response to PID control, state-space, and more in a comprehensive, yet comprehensible way. The app uses clear and concise language, emphasizes concepts through ex-

amples and diagrams, tying them to industrial contexts and modern applications.

The app also includes real-time dynamic simulations to vividly demonstrate how contemporary control systems operate and allows to remotely interact with real control plants. Furthermore, mini-lecture podcasts, problem sets, and assessment questions help students check their understanding of studied concepts as they progress through the content.

Instructors using Experience Controls in their courses have access to free comprehensive resources, including lecture slides, homework, practice, and exam problem sets. These resources are designed to support modern engineering pedagogy approaches, such as flipped classroom, blended learning, and self-directed learning, and make incorporating Experience Controls into any new or existing control systems courses easy and smooth.

To learn more, visit www.quanser.com/experience-controls - or simply download the Experience Controls textbook app for free on the App Store or Google Play. If you like it, share it with your students!

The Experience Controls textbook app has been developed by Quanser to mark its 30 years of innovation in engineering education and research. The app, as well as the instructor resources, are available for free to the controls community and all those interested in learning more about control systems.

Submitted by: Zuzana Fabusova, Quanser

Control Curriculum Survey

Undergraduate students in many engineering and applied sciences programs around the world take only one control course that covers a limited set of topics. The IFAC and IEEE Technical Committees on Education and the IFAC Industrial Committee are coordinating a survey to help the global control community share its views on what topics should be included in this one and only introductory control course. For this survey to be useful to the international control community, as many responses as possible are needed. Please use the link below to take the survey and encourage your colleagues to do the same.

<http://iolab.sk/ifac/index.php>

The results will be presented at the 2020 IFAC World Congress in Berlin. The results are intended to be useful not only to those immediately involved in planning and delivering introductory control courses. They will be of interest to many others, especially from industry, who may benefit from an awareness of the entry-level engineers' competencies in control.

Submitted by: Atanas Serbezov, TC 9.4 (Control Education) Vice-Chair (Industry)

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>

IFAC 2020 Update

21st IFAC World Congress in Berlin, Germany, July 12-17, 2020

Automatic Control – Meeting Societal Challenges

The final (extended) submission deadline for contributed papers passed on 20 November 2019. We received a record number of **more than 4300 submissions** from 79 countries! The reviewing process has now started. Overall more than 400 Technical Associate Editors and 50 Editors are involved. We expect that more than 20000 reviewer invitations will be sent out. The reviewing process requires that each regular paper receives three qualified reviews. Notification of acceptance will be in February 2020.

There are two more deadlines coming up:

- 1) The deadline for workshop and tutorial proposals has been extended to 20 December 2019.
- 2) **Late breaking results papers can be submitted until 28 February 2020.**

Late breaking results contributions are the final chance to present your research at the largest control conference in the world. Intended to facilitate the presentation of last-minute research results, late breaking results papers can be up to four pages long and will be reviewed.

Three competitions with open calls for participation are organized: The F1/10 race car competition, the MathWorks Mini Drone Competition, and the Aerospace Industrial Fault Competition. Further information on the competitions is available at

<https://www.ifac2020.org/program/competition/>.

IFAC Foundation Support of Developing Countries Young Authors: The submission deadline for applications is extended to 31 January 2020.

For up to date information, please visit ifac2020.org.

Follow us on Twitter:
<https://twitter.com/IFAC2020>

Join our LinkedIn group:
<https://www.linkedin.com/groups/13755007/>.

Submitted by: Uwe Hanebeck (DE), IFAC 2020 Publicity Chair

Berlin Reply Form for IFAC Officials

The 21st IFAC World Congress in Berlin is approaching, and so are the administrative meetings of IFAC.

The reply form is now available online. Please inform the IFAC Secretariat as soon as possible about your meeting room request and provide the proposed date, expected number of par-

ticipants, and the estimated duration of your meeting. You can send it via e-mail, or using the online reply form. Final deadline for meeting room requests:

March 31, 2020

Other Important Deadlines:

TC chair reports: March 1, 2020

CC and EC reports: March 11, 2020

Please note that all chairs are responsible to inform their committee members of the date, time and venue for their respective meetings!

The Reply Form for IFAC Officials is now available! Please submit this form to the IFAC Secretariat by May 15, 2020.

<https://www.ifac-control.org/AdminMeeting-Form>

14th IFAC/IFORS/IFIP/IEA Symposium on Analysis, Design and Evaluation of Human-Machine Systems (HMS 2019)

**16-19 September 2019
Tallinn, EE**

The 14th IFAC/IFORS/IFIP/IEA Symposium on Analysis, Design and Evaluation of Human-Machine Systems was held in Tallinn, Estonia from 16-19 September 2019 in the Park Inn Radisson Meriton SPA and Conference Hotel. More information can be found on the symposium website <https://cs.ttu.ee/hms2019/>.

HMS is a triennial symposium sponsored by the IFAC Technical Committee on Human-Machine Systems (TC 4.5) and co-sponsored by the IFAC Technical Committee Adaptive and Learning Systems (TC 1.2), IFAC Technical Committee Control Design (TC 2.1) and IFAC Technical Committee Social Impact of Automation (TC 9.2). The symposium was also supported by the following organizations: International Federation of Information Processing (IFIP), International Federation of Operational Research Societies and International Ergonomics Association.

The objective of the symposium is to provide an international forum for the latest scientific and technological achievements in Human-Machine Systems research. The symposium aims to bring together researchers working in this field and provide them with opportunities to exchange ideas, to overview achieved results and develop the vision for future research. The role of humans is important in a wide-range of applications in the domains of intelligent and autonomous systems, robotics, virtual reality, healthcare, etc., requiring advanced solutions for efficient and safe human-machine interaction.

During the last twenty-five years Estonia has experienced rapid technological development and is now one of the leading countries in areas such as e-governance, cyber-security and

e-medicine. All these areas rely heavily on human-machine interaction technologies and were set as main themes of this symposium together with the established themes of previous IFAC HMS symposiums.

IFAC HMS strongly promotes the research of young scientists in the field. This time IFAC Young Author Award was given to Husam Muslim for the paper "*Trust and Acceptance of Adaptive and Conventional Collision Avoidance Systems*". The Best Paper Award was given to Mareijn Willems, Daan Marinus Pool, Kasper van der El, Herman J. Damveld, Rene van Paassen, and Max Mulder for the paper "*Analysis of Human Skill Development in Manual Ramp-Tracking Tasks*".



HMS 2019 group photo after the closing ceremony

Five keynote lectures were given during HMS 2019. "*Incident Response Case Studies: Reality vs Security Theatre*" was presented by Kieren Nicolas Lovell (University of Cambridge, UK and Tallinn University of Technology, EE). The main point of the lecture was paid to the cybersecurity aspects and dangers of social networks. Prof. Aaro Toomela (Tallinn University, EE) discussed "*Problems Of Intelligence Versus Artificial Intelligence from the Viewpoint of Psychology*". In order to strengthen contacts between academia and local industry three keynote lectures were organized. "*Remote Tower for ATM - Possibilities and Challenges*" by Dr. Meelis Nõmm (Cybernetica AS, EE) "*Meaningful Human Control of Unmanned Ground Vehicles*" by Prof. Mart Noorma (Milen Robotics, EE) and "*Unmanned Aircraft Systems (UAS) – Present and the Future*" by Martin Jõesaar (Threod Systems, EE).

In addition a banquet talk of a review nature was given by Prof. Gunnar Johannsen (University of Kassel, DE). Entitled "*IFAC, Control and Communication in Human-Machine Systems-Societal and Cybernetic Perspectives*" the talk was moderated by Frederic Vanderhaegen (Univ. of Valenciennes, FR), TC 4.5 vice-chair. The talk, which covered the historical evolution of the HMS field from the perspective of control systems in its entirety, is available on the TC 4.5 website at: https://tc.ifac-control.org/4/5/newsletter/IFAC-HMS2019_Control%20and%20communication%20in%20HMSs_Societal%20and%20Cybernetic%20perspectives_Gunnar%20Johannsen.pdf

Submitted by: Sven Nõmm (EE), HMS 2019 NOC Chair with input from Jianhua Zhang (NO), TC 4.5 Chair, HMS 2019 IPC Chair

8th IFAC Symposium on Mechatronic Systems & 11th IFAC Symposium on Nonlinear Control Systems (MECHATRONICS/ NOLCOS 2019) 4-6 September 2019 Vienna, AT

The 8th IFAC Symposium on Mechatronic Systems (MECHATRONICS 2019) and the 11th IFAC Symposium on Nonlinear Control Systems (NOLCOS 2019) were organized as a joint conference in Vienna, Austria from 4-6 September 2019. The conference was hosted by Technische Universität Wien (TU Vienna) and organized by the Automation and Control Institute (ACIN) of TU Vienna. The event motto was "Theory Meets Practice", bringing together scientists and researchers from both domains, the more theoretically oriented from NOLCOS with the more application oriented from the MECHATRONICS community.

The main-sponsoring technical committee for MECHATRONICS was TC 4.2 Mechatronic Systems and for NOLCOS TC 2.3 Non-Linear Control Systems, respectively. Support by the following financial sponsors is highly appreciated: Austrian Ministry for Transport, Innovation and Technology, AVL, B&R Industrial Automation, Robert Bosch, Engel Austria, Hoerbiger Wien, KEBA, MicroEpsilon Messtechnik, TTTech Computertechnik, and voestalpine Stahl.

Andreas Kugi (Technische Universität Wien, AT) served as the General Chair of MECHATRONICS and NOLCOS. Ambitious National Organizing Committees (NOCs) and top-class International Program Committees (IPCs) made MECHATRONICS and NOLCOS a big success. Georg Schitter (TU Wien, AT) was the NOC Chair of MECHATRONICS, and Kurt Schlacher (Johannes Kepler Universität Linz, AT) acted as NOC Chair of NOLCOS. Lukas Jadachowski (TU Wien, AT) served as editor for both MECHATRONICS and NOLCOS. Tsu Chin Tsao (University of California- Los Angeles, US) chaired the MECHATRONICS IPC, Klaus Janschek (Technische Universität Dresden, DE) was the IPC vice-chair. Andrew Teel (University of California- Santa Barbara, US) served as the chair of the NOLCOS IPC, Christophe Prieur (CNRS, GIPSA-lab, Grenoble, FR) was the IPC Vice-Chair. A big thank you to all members of both IPCs for organizing the review of 351 submitted full papers. Further appreciation goes to the organizers of the 17 invited sessions, which very much contributed to the success of the conference.

The conference started with a welcome reception on 3 September. This evening event provided a relaxed networking environment for conference participants and their accompanying persons. We were pleased to welcome 362 participants from 32 countries.

On 4 September the program of MECHATRONICS and NOLCOS started with an opening ceremony. It was a great honor that the founding chairs of NOLCOS and MECHATRONICS, Alberto Isidori (IT) and Rolf Isermann (DE), and the IFAC President Frank Allgöwer (DE) gave welcome addresses. A string quartet of the orchestra of TU Wien provided the musical framework for the opening ceremony.

The technical program included 55 regular and invited sessions with 247 full papers, which will be published in the IFAC-PapersOnLine series hosted on ScienceDirect, and 21 short papers including poster contributions. The close relation of NOLCOS and MECHATRONICS in this joint conference was reflected by 17 thematic sessions, which contained contributions from both NOLCOS and MECHATRONICS.

Moreover, the program contained three excellent plenary talks, held by

- Anna Stefanopoulou (University of Michigan, US) on *Using Information to Stretch Vehicle Efficiency*,
- Jan Hill (adidas, DE), on *Flexible Production for the Future – Technology Enablers for Creators*, and
- Aude Billard (EPFL, CH) on *Machine Learning for Non-Linear Dynamical Systems Control and Variable Impedance*.

Outstanding semi-plenary talks associated with MECHATRONICS were given by:

- Michael Baumann (Robert Bosch GmbH, DE), on *Reliable Simulations – Steps into a Virtualized World*
- Urs Staufer (Delft University of Technology, NL) on *Atomic Force Microscope for Harsh Environments*

For NOLCOS:

- Pierre Rouchon (Mines ParisTech, FR) on *Feedback Issues Underlying Quantum Error Correction*
- Luca Zaccarian (LAAS-CNRS, FR and University of Trento, IT), on *Lyapunov-Based Reset Control*.



**Andreas Kugi (AT) speaking at
MECHATRONICS/NOLCOS 2019 in Vienna**

A scientific contribution from the humanities was provided by Sebastian Schütze (Universität Wien/University of Vienna, AT), in the form of an evening lecture on *Dante and the Construction of Hell*. This lecture explored Dante's impact on our collective imagination and the constructive principles of hell. After this event snacks and drinks were served to accompany on- and off-topic discussions lasting until late in the evening.

The banquet dinner took place in the Orangery of Schönbrunn Palace on 5 September. Schönbrunn Palace is the former imperial summer residence and as such was a splendid location for the conference dinner, providing an extraordinary ambience for discussions and talks. An award ceremony was part of the banquet dinner where the following awards were presented:

- 2019 TC 2.3 Award on Non-Linear Control to Miroslav Krstic (University of California San Diego, US)
- 2019 TC 4.2 Lifetime Achievement Award to Roger Goodall (Loughborough University, UK)
- 2019 TC 4.2 Mechatronic Systems Award to Klaus Janschek (Technische Universität Dresden, DE)
- 2019 TC 4.2 Young Researcher Award to Tom Oomen (Eindhoven University of Technology, NL)
- MECHATRONICS 2019 Best Paper Award to Kevin Schmidt (University of Stuttgart, DE)
- MECHATRONICS 2019 Best Young Author Award to Martin Saxinger (Technische Universität Wien, AT)
- NOLCOS 2019 Best Paper Award to Rafal Goebel (Loyola University Chicago, US)
- NOLCOS 2019 Best Young Author Award to Raik Suttner (University of Würzburg, DE)

Congratulations to all award winners!

A variety of culinary delights and the sounds of Mozart, Strauss and other world-famous composers accompanied the banquet dinner. The event closed with a farewell session and lunch on 6 September.

The organizers would like to thank all participants for coming to Vienna and their excellent contributions, which made this event so successful! Last but not least, a big thank you goes to the members of the local organizing team, in particular to Sibylle Kuster of TU Wien, for their excellent work and enthusiastic efforts that have turned this symposium into reality.

Submitted by Andreas Kugi (Mechatronics/NOLCOS General Chair, AT)

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5th IFAC Conference on Intelligent Control and Automation Sciences (ICONS 2019)

21-23 August 2019

Belfast, Northern Ireland, UK

The 5th IFAC Conference on Intelligent Control and Automation Sciences (ICONS 2019) was hosted by the Centre for Intelligent Autonomous Manufacturing Systems at Queen's University Belfast in Northern Ireland (UK) from 21-23 August 2019. ICONS is a triennial conference sponsored by IFAC's Computational Intelligence and Control Technical Committee (TC 3.2). It was first held in Faro, Portugal in 2003 under the auspices of the IFAC Technical Committee on Cognition and Control, the predecessor to the current TC 3.2, as the IFAC Conference on Intelligent Control and Signal Processing. Subsequent editions of the conference were held in Istanbul, TR in 2009, Chengdu, CN in 2013 (where it adopted its current name), and most recently in Reims, FR in 2016. This year's conference was also technically co-sponsored by: TC 1.1 Modelling, Identification and Signal Processing, TC 1.2 Adaptive and Learning Systems, TC 3.1 Computers and Control, TC 3.3 Telematics: Control via Communication Networks, TC 4.3 Robotics, TC4.5 Human Machine Systems, and TC 7.5 Intelligent Autonomous Vehicles.

Since its establishment in 2003 ICONS has served as a platform for scientists, researchers, and practitioners to present and discuss their latest research results and findings, to shape their future directions and development, and to exchange their knowledge and perspectives in the field of intelligent control, automation science, engineering, and its integration into industry and society. This year's conference continued this fine tradition with an exciting and diverse set of technical sessions covering the latest research and development results in robotics and autonomous vehicles, fault detection, diagnosis and fault-tolerant control, advanced manufacturing and industrial control, machine learning and human-centric applications, learning and control, modelling and identification, and nonlinear control and applications. We also had a special session dedicated to recent advances in fuzzy model-based design.

We received 62 full paper submissions for the conference from 148 authors and 28 countries across the globe. Following a rigorous review process the International Programme Committee selected 46 papers for inclusion in the technical program and proceedings of the conference.

Interspersed with our technical sessions, we had a number of exciting plenary talks over the three days of the programme. IFAC President Professor Frank Allgöwer from the University of Stuttgart (DE) gave the opening plenary on "Current Trends in Model Predictive Control". Professor Robert Babuska from Delft University of Technology (NL) addressed the topic

"Nonlinear Control Design Through Reinforcement Learning: Challenges and Open Issues", while Professor Manuel Giuliani from the Bristol Robotics Laboratory (UK) introduced us to "Embodied Cognition for Human-Robot Interaction". Finally, Dr Coorous Mohtadi from Mathworks (UK) presented his views on the current state of AI in a plenary entitled "Are You Ready For AI? Is AI Ready For You?"

An IFAC Young Author Award competition was held as part of the conference, with six student papers shortlisted for consideration by a judging panel consisting of NOC and IPC members. The winner of the competition was Mert Ergürtuna from the Middle East Technical University (TR) for his paper entitled, "An Efficient Formula Synthesis Method With Past Signal Temporal Logic". The runner-up prize went to Christopher Reinartz from the Technical University of Denmark (DK) for his paper entitled "Generation of Signed Directed Graphs Using Functional Models"



**IFAC President Frank Allgöwer (DE) with
Young Author Award winner
Mert Ergürtuna (TR)**

A welcome reception was held on the first evening of the conference in Riddell Hall, where delegates had the opportunity to see a DeLorean car which had been converted to an electrical vehicle as a project by electrical and electronic engineering undergraduate students at Queen's University Belfast. The DeLorean car, made famous by the "Back to The Future" movie series, was manufactured in Belfast in the early 80s.

The conference banquet was held in the iconic Belfast City Hall. This grand and magnificent building, which was constructed in the early 1900s, has strong links with the city's ship-building industry and the ill-fated Titanic cruise liner. The banquet featured an address by the IFAC president, the IFAC Young Award presentation, and a demonstration of Irish dancing by Celtic Storm.

We would like to take this opportunity to thank the organizing committee, the plenary speakers, the international program committee and reviewers, the conference participants, and of course, all the contributing authors who

shared the results of their research during the conference. Our sincere thanks also go to the many volunteers who assisted with conference logistics. Last but not least, we would like to express our sincere gratitude to all of our sponsors, including our main conference sponsors, Visit Belfast, Belfast City Council, Mathworks, Elsevier, and the Centre for Intelligent Autonomous Manufacturing Systems at Queen's University Belfast. The generous support from the sponsors helped to make ICONS 2019 a great success.

Further details about the conference programme and photos from the event can be found at <http://www.qub.ac.uk/icons2019/>.

Submitted by: Seán McLoone (ICONS General Chair, NI, UK) Wasif Naeem, Vice-Chair, Kang Li, Vice-Chair

**Check out IFAC's YouTube channel for new
and historical
IFAC video materials!**
<https://www.ifac-control.org/>

**Readers of this Newsletter are kindly
requested to keep their contact details up-
dated with the IFAC Secretariat.**

(To our readers: To comply with the Austrian 'Media Act', every publication must contain a declaration once a year concerning ownership and purpose, as below.)

Offenlegung: Das Medienwerk 'IFAC Newsletter' wird als Organ der 'International Federation of Automatic Control' (IFAC) verlegt und ist Eigentum dieser Internationalen Föderation, deren Tätigkeit der Förderung von Wissenschaft und Technik automatischer Regelung und Steuerung dient. Die Föderation hat ihren Sitz in Zürich und ist nach Schweizer Recht als gemeinnütziger Verein angemeldet. Sie verfolgt weder wirtschaftliche noch praktische Ziele.

Das Sekretariat der IFAC befindet sich seit 1978 aufgrund eines Übereinkommens mit der Österreichischen Bundesregierung mit der Österreichischen Akademie der Wissenschaften in Laxenburg.

Der 'IFAC Newsletter' erscheint sechsmal jährlich in englischer Sprache unter der Redaktion des Generalsekretärs der IFAC, Univ.Professor Kurt Schlacher (Österreich). Die Zeitschrift dient der Information über die Aktivitäten der IFAC. Sie wird kostenlos an Abonnenten in 50+ Länder versandt. Die Kosten werden von der IFAC aus Beiträgen der derzeit 50 Mitgliedsländer getragen.

Präsident der IFAC für 2017-2020 ist Prof. Frank Allgöwer (Deutschland), Vizepräsidenten sind Prof. Paul Van den Hof (die Niederlande) und Prof. Dong-Il „Dan“ Cho (Korea). Alle Funktionen werden ehrenamtlich ausgeübt.

IFAC is on social media!
**Direct links to IFAC's presence on
Facebook, LinkedIn, and Twitter can be
found on the IFAC website.**

**In addition check out
the IFAC Blog at**
<http://blog.ifac-control.org/>

Calendar of IFAC Events

Title	2020	Place	Further Information
6 th ACDOS/IFAC Conference on Advances in Control and Optimization of Dynamical Systems ACODS 2020	February 16 – 19	Chennai India	https://web.iitm.ac.in/acods2020/ acods2020@gmail.com
Conference on European Control Conference (in cooperation with IFAC) ECC 2020	May 12 – 15	Saint Petersburg Russia	http://ecc20.eu/ info@ecc20.eu
15 th IFAC Workshop on Discrete Event Systems WODES 2020	May 12 – 15	Rio de Janeiro Brazil	https://wodes2020.eventos.ufrj.br e-mail: not yet available
14 th International Conference on Automatic Control and Soft Computing CONTROLO 2020	July 01 – 03	Bragança, Portugal	https://controlo2020.ipb.pt/ controlo2020@ipb.pt
Conference on American Control Conference (in cooperation with IFAC) ACC 2020	July 01 – 03	Denver, CO USA	http://acc2020.a2c2.org/ e-mail: not yet available
21 st IFAC World Congress WC 2020	July 12 – 17	Berlin Germany	http://www.ifac2020.org/ info@ifac2020.org
24 th International Symposium on Mathematical Theory of Networks and Systems (in cooperation with IFAC) 24 th MTNS 2020	August 24 – 28	Cambridge United Kingdom	https://mtns2020.eng.cam.ac.uk/ erd30@eng.cam.ac.uk
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
3 rd IFAC Workshop on Cyber-Physical and Human Systems CPHS 2020	December 03 – 05	Shanghai China	http://not yet available e-mail: not yet available
Title	2021	Place	Further Information
Conference on American Control Conference (in cooperation with IFAC) ACC 2021	May 26 – 28	New Orleans, LA USA	http://not yet available e-mail: not yet available
17 th IFAC Symposium on Information Control Problems in Manufacturing INCOM 2021	June 07 – 09	Budapest Hungary	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

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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