



International Federation of Automatic Control

Secretariat: Schlossplatz 12, A-2361 Laxenburg, Austria

Phone (+43 2236) 71 4 47, Fax (+43 2236) 72 8 59, E-mail: secretariat@ifac-control.org – URL: <http://www.ifac-control.org>

2013
No. 6
Dec.

Newsletter

Newsletter distribution

Contents:

In Memoriam Jan Willems
*
Introducing the 2011-2014 IFAC Fellows (continued)
*
Introducing the 2014 Major Medal Winners
*
Newsletter Distribution Information
*
Forthcoming Events

Impressum:

Medieninhaber und Herausgeber:
International Federation of Automatic Control (IFAC),
Zürich
Schlossplatz 12, 2361 Laxenburg, Austria

Verlagsort und Redaktion:
Univ.Prof. Dr. tech. K. Schlacher,
Schlossplatz 12,
2361 Laxenburg

Hersteller:
Artur Scheffczyk & Sohn
August-Reuss-Gasse, A-1130 Wien

Editor: Kurt Schlacher
Layout: Elske Haberl
published bimonthly

Das Sekretariat der IFAC befindet sich seit 1978 aufgrund eines Übereinkommens mit der Österreichischen Bundesregierung und der Österreichischen Akademie der Wissenschaften in Laxenburg und wird derzeit aus Mitteln des Bundesministeriums für Verkehr, Innovation und Technologie „BMVIT“ gefördert.



Bundesministerium
für Verkehr,
Innovation und Technologie

As many of the readers of this Newsletter are aware the IFAC Newsletter is undergoing a change in the method of distribution.

By the end of 2014 it is planned that this Newsletter will only be sent to affiliates electronically, instead of as a hard copy via the postal mail as has been done in the past. This decision was recommended by the Administration and Finance Committee, one of IFAC's Executive Committees, and approved by the IFAC Council at their meeting in Zurich, Switzerland in July 2013.

An email was sent in August 2013 to all active affiliates listed in the IFAC database, asking them to pick one of three options for newsletter delivery. The options were to switch to the electronic distribution, to switch to the electronic distribution as of the end of 2014 but remain on the hard copy mailing list through the transition period, or be removed from the mailing list. A second email was sent in September 2013 to those who had not responded to the first email. This information was also published on the front page of the October 2013 issue of this Newsletter.

This decision will reduce print and distribution costs while still giving you the same access to IFAC news and upcoming events. Already there has been a reduction in the number of mailed paper copies from 4138 of the October 2013 issue to 2634 of this December 2013 issue.

As a reminder the most current IFAC

Newsletter, as well as an archive dating back to the early 2000s, can be found on the IFAC website.

http://www.ifac-control.org/newsletter_archives

If you have not received the email, please contact the IFAC Secretariat.

Should your contact details change in the future or you would like to change your Newsletter distribution preference, please contact the IFAC Secretariat so that they can update your database entry accordingly.

Please note that this will be the last time the paper version of the Newsletter will be mailed out to affiliates who have not expressly requested this option!



*Season's Greetings
to all Newsletter readers*

In Memorium Jan Willems (1939-2013)



On August 31, 2013 Professor Jan Willems passed away. Although inevitable, the news has left us with a sad, empty feeling, realizing that never again we will be able to enjoy his warm, cheerful, enthusiastic and inspiring company. Jan leaves behind his wife Doke, his children Mark and Mia, Doke's children, their children-in-law, and their grandchildren. In the first place our thoughts are with them.

Jan also leaves behind a large group of former PhD students who all experienced him as nothing less than a miracle when doing research together. Jan was the unique mix of ultimate creativity, associative power, ability of deep thinking, and broad knowledge, combined with an enormous amount of energy, enthusiasm, and perfectionism.

He also leaves behind many collaborators and colleagues from his beloved field of systems and control, a field that he helped to shape in such a prominent way, over such a long period. He influenced not only his Ph.D. students, but also his many masters students, undergraduate students and colleagues in Groningen, as well as those in the rest of The Netherlands, Europe and overseas. He had charisma, that special characteristic that young people nowadays call the X-factor. Although he became an icon for the systems and control community, he was as happy talking to young scientists as he was to top scientists. His door was always open to all. He remained a wonderful, cheerful, considerate, animated and kind person, the ideal colleague and traveling companion.

Jan Willems was born on September 18, 1939 in Bruges in Belgium. After finishing his studies in engineering at the University of Ghent, he moved to the United States. There he obtained his M. Sc. degree in electrical engineering from the University of Rhode Island in 1965, and his Ph. D. degree in electrical engineering from the Massachusetts Institute of Technology (Cambridge, MA, USA) in 1968. His doctoral dissertation, on input/output stability, appeared as the mono-

graph "The Analysis of Feedback Systems", MIT Press, 1971. From 1968 to 1973 he worked as an assistant professor in the Department of Electrical Engineering at MIT.

In 1973, Jan was appointed Professor at the Department of Mathematics of the University of Groningen in the Netherlands to set up the new speciality of Systems and Control. During this period his research covered subjects from differential games, realization theory and physical systems. By the end of the seventies his interests turned to the geometric approach to control, and to problems of disturbance decoupling. This research area attracted a large amount of attention during that period. In the late seventies he introduced the notions of almost controlled invariant and almost conditioned subspaces, that allowed to resolve problems of approximate disturbance decoupling by high gain feedback.

During this period, Jan was also one of the founders (together with Roger Brockett) of the new journal Systems and Control Letters, which had its first issue appearing in 1981. He acted as one of the managing editors from 1981 to 1994. In addition, he also acted as editor-in-chief of the SIAM Journal on Control and Optimization from 1989 to 1993.

In 1998 Jan received the prestigious IEEE Control Systems Award. In the same year he was awarded the IEEE Control Systems Magazine Outstanding Paper Award for his paper "300 years of optimal control, from the brachystochrone to the maximum principle" (co-authored with Hector Sussmann).

During his time in Groningen, Jan has been of major importance to the systems and control community within the Dutch universities. Using his natural charm and skills in diplomacy and persuasion, he was one of the founders and chairperson (from 1986 to 1996) of the Dutch Network of Systems and Control. The main aim was to organize a national graduate school that offered courses in systems and control theory, one of Jan's ambitions that came true. The network was the precursor of the Dutch Institute of Systems and Control (DISC) that was founded in 1995. From 1995 to 1999 Jan was the chairperson of the Board of the Dutch Institute of Systems and Control (DISC).

In 1993 Jan held the general chair of the European Control Conference that was held in Groningen, and acted as president of the European Union Control Association from 1994 to 1996. He was also the president of the Dutch Mathematical Society from 1994 to 1996. These are just the highlights; he was also very active in shaping policies in teaching and research at the Mathematics Institute in Groningen.

In 2003, Jan Willems became emeritus professor from the University of Groningen. Two years before, in 2001, he and Doke had already moved to Antwerpen in Belgium. There he was warmly welcomed as guest professor at the Department of Electrical Engineering, within the research group

on Signals, Identification, System Theory and Automation (SISTA) at the K.U. Leuven (Belgium.) It is hard to imagine a world without Jan Willems. The products of his scientific activity, the way he shaped the field of systems and control, and his influence on the scientific taste and thinking of his students will however remain.

Material was condensed from the original from Professor Harry Trentelman, University of Groningen, Netherlands

<http://www.math.rug.nl/~trentelman/>

Some material originally appeared in Automatica, volume 49, number 12, December 2013. Used with permission by Automatica Editor-in-chief Tamer Basar.

IFAC Fellow John C. Doyle

John C. Doyle is the John G Braun Professor of Control and Dynamical Systems, Electrical Engineer, and Bio Engineering at Caltech (California Institute of Technology, Pasadena, CA, USA.) He received his BS and MS EE from MIT (Cambridge, MA, USA) in 1977, and his PhD, in Math, from the University of California-Berkeley (USA) in 1984.

Doyle's current research interests are in theoretical foundations for complex networks in engineering and biology, unifying controls, computing, communications, and physics. His emphasis on architecture, dynamics, feedback, layering, tradeoffs, evolvability. Case studies drawn from throughout technology plus cell biology, physiology, ecology, multiscale physics, neuroscience, and fashion. His early work was in the mathematics of robust control, including extensions to nonlinear and networked systems, with applications in aerospace and process control. His group contributed to the Matlab Robust Control Toolbox (for decades the premier control design software), SOSTOOLS (Nonlinear systems analysis), SBML (Systems Biology Markup Language), and FAST (Fast AQM, Scalable TCP) internet protocols.



Doyle's paper prizes include IEEE Baker, IEEE Automatic Control Transactions (twice), and best conference papers in ACM Sigcomm and AACC's American Control Conference. Individual awards include the IFAC Fellow Award, as well as the AACC Eckman and IEEE Control Systems Field and Centennial Outstanding Young Engineer Awards.

Introducing the 2014 IFAC Major Medal Winners

Quazza Medal Winner 2014
David Mayne

Nichols Medal Winner 2014
Reza Moheimani

Industrial Achievement Award 2014
Giovanni Cherubini, Jens Jelitto, Mark Lantz and Angeliki Pantazi (IBM Zurich)

High Impact Paper Award Winner 2014
Alberto Bemporad and Manfred Morari (co-authors)

The winners of these four awards will be presented with their honors at the opening ceremony of the 2014 IFAC World Congress, which will take place in Cape Town, South Africa.

Quazza Medal **David Mayne**



David Mayne obtained the B.Sc.(Eng) and M.Sc. (Eng) degrees from the University of Witwatersrand, Johannesburg, the Ph.D and D.Sc (Eng) degrees from the University of London and the degree of Doctor of Technology, *honoris causa*, from Lund University. His first appointment was as at the University of the Witwatersrand.

He spent two years as a Research and Development Engineer at the British Thomson Houston Company, Rugby, England. In 1959 he joined a very talented and active research group led by John Westcott at Imperial College London. From 1989-1996 he was a Professor in the Department of Electrical and Computer Engineering, the University of California, Davis. He returned to Imperial College London as a Senior Research Investigator in 1997.

The revolution in control in the early 1960's enabled David Mayne to contribute to estimation theory (for adaptive control), canonical forms, smoothing (forward-backward

algorithm), differential dynamic programming and Monte-Carlo methods for stochastic control and for nonlinear filtering (much later known as particle filtering).

David Jacobson's contribution to differential dynamic programming motivated David Mayne to invite Lucien Polak to help establish convergence of strong variation algorithms for optimal control. This marked the start of a fruitful and very productive collaboration, lasting nearly two decades, in, inter alia, finite dimensional optimization, semi-infinite optimization for optimization based design and optimal control algorithms.

Almost simultaneously David Mayne commenced another very rewarding and enjoyable collaboration with Graham Goodwin. One of their most interesting and influential contributions was a parameter estimation perspective of continuous time model reference adaptive control. Another contribution, first aired in their paper on design issues in adaptive control and then developed with Steve Morse, dealt with the use of hysteresis switching in adaptive control.

A suggestion by Karl Astrom encouraged David Mayne to take an interest in model predictive control. Collaboration with Jim Rawlings and with former students Hannah Michalska and Sasa Rakovic resulted in many contributions to this area of research such as the highly cited paper "Constrained model predictive control: stability and optimality."

David Mayne's research has been published in two books, *Differential Dynamic Programming*, coauthored with David Jacobson, and *Model Predictive Control; Theory and Design*, coauthored with Jim Rawlings and in about 300 papers. He twice received the Heaviside Premium for papers in the *Proceedings of Institution of Electrical Engineers*. He received the Sir Harold Hartley Medal from the Institute of Measurement and Control.

In addition Mayne is a Fellow of the IEE (now IET) and a Fellow of the IEEE. He was elected a Fellow of the Royal Society and a Fellow of the Royal Academy of Engineers. He is a Fellow of the International Federation of Automatic Control (IFAC). He received the IEEE Control Systems Award in 2009. In 2011 his paper *Constrained model predictive control: stability and optimality* with Rawlings and co-authors received the inaugural IFAC High Impact Paper Award.

Nichols Medal **Reza Moheimani**



Reza Moheimani received his undergraduate degree in Electrical and Electronics Engineering from Shiraz University, Iran in 1990. He then moved to Australia and completed a MEngSc and a Ph.D. in electrical engineering at the University of New South Wales in 1993 (at UNSW's Kensington Campus, in Sydney) and 1996 (at UNSW's Australian Defence Force Academy Campus in Canberra), respectively. Following completion of his Ph.D. he was a postdoctoral research fellow at the Australian Defence Force Academy.

In 1997 he took up an academic position at the University of Newcastle, where he is currently a professor and an Australian Research Council Future Fellow in the School of Electrical Engineering and Computer Science. He is the founder, and director, of the Laboratory for Dynamics and Control of Nanosystems, a multi-million-dollar state-of-the-art research facility dedicated to the advancement of nanotechnology through innovations in systems theory, control engineering and mechatronics. From 2003 - 2010 he served as the Associate Director of the Centre for Complex Dynamic Systems and Control (CDSC), an Australian Research Council Centre of Excellence.

His research has ranged across many areas including robust control theory and robust state estimation of uncertain dynamic systems, applications of control and estimation in nanoscale positioning systems for high-speed scanning probe microscopy, smart structures, active control of noise and vibration and applications of control in microelectromechanical systems (MEMS) and in emerging data storage systems, in which he has published over 250 refereed articles in scientific journals and conference proceedings, as well as several books and edited volumes.

Professor Moheimani has served on the editorial boards of a number of journals, including IEEE Transactions on Control Systems Technology, IEEE/ASME Transactions on Mechatronics, Control Engineering Practice and International Journal of Control, Automation and Systems. He has contributed to the organization of and has chaired several international conferences and workshops. He is a recipient of the IEEE Control Systems Technology Award (2009) and the IEEE Transactions on Control Systems Technology Outstanding Paper Award (2007). He is a Fellow of IEEE, a Fellow of IFAC and a Fellow of the Institute of Physics (UK).

Industrial Achievement Award Giovanni Cherubini



Dr. Giovanni Cherubini received a Laurea degree (summa cum laude) from the University of Padova, Italy, in 1981, and M.S. and Ph.D. degrees from the University of California- San Diego (USA), in 1984 and 1986, respectively, all in Electrical Engineering. Since 1987 he has been with the IBM Research Laboratory in Zurich, Switzerland. His research interests comprise high-speed data transmission, data storage, and control systems. He was co-editor of the 100BASE-T2 Standard for Fast Ethernet transmission over voice-grade cables. More recently, he contributed to the realization of the first fully functional atomic-force-microscope-based data-storage prototype. He is currently focusing on servo-control technologies for tape drives and on storage techniques targeting Big Data applications.

Cherubini holds over 50 patents in the areas of communications, data storage, and control systems, was named Fellow of the IEEE in 2006, and Master Inventor at IBM in 2009. He served as Editor of the IEEE Transactions on Communications in the area of CDMA Systems, Guest Editor of the IEEE Journal on Selected Areas in Communications, and Guest Editor of the special issue of the IEEE Transactions on Control Systems Technology on Advanced Servo Control for Emerging Data Storage Systems. He is

currently Associate Editor of the IEEE Transactions on Control Systems Technology. He was co-recipient of the 2003 IEEE Communications Society Leonard G. Abraham Prize Paper Award, the 2009 IEEE Transactions on Control Systems Technology Outstanding Paper Award, the 2009 IEEE CSS Control Systems Technology Award, and the 2013 IBM Corporate Award for Tape Technology Leadership.

Industrial Achievement Award Jens Jelitto



Dr. Jens Jelitto received the M.Sc./Dipl.-Ing., and PhD. degrees from the Dresden University of Technology, Dresden, Germany, in 1995 and 2001, respectively.

Jelitto began his career in the field of speech recognition. In July 1996, he joined the Mannesmann Mobilfunk Chair for Mobile Communications Systems, Dresden University of Technology, where his main research interests included digital signal processing, smart antennas and spatial dimension reduction problems.

Jelitto is currently Manager of the Storage Techniques for Big Data group at IBM Research - Zurich. He joined the IBM Zurich Research Laboratory, Rueschlikon, Switzerland as a research staff member in 2001. He has worked in the fields of digital signal processing for wireless LANs and for magnetic recording. Currently, his research work is focused on advanced signal processing techniques for the tape read channels and on servo control aspects to improve the storage capacity and reliability of tape systems as well as on technologies for Big Data storage systems.

Jelitto is a Senior Member of the IEEE. He holds more than 30 patents and was a co-recipient of the 2011 IBM Research Pat Goldberg Memorial Paper Award. He was awarded with a 2009 IBM Research Extraordinary Technical Accomplishment for his contributions to Technologies for Linear Tape Open and Enterprise Tape products and with an IBM Corporate Award for Tape Technology Leadership in 2013.

Industrial Achievement Award Mark Lantz



Dr. Mark Lantz received B.Sc. (1991) and M.Sc. (1993) degrees in electrical engineering from the University of Alberta (CA), and a Ph.D. degree in electrical engineering from the University of Cambridge (UK), in 1997 for work in the field of scanning probe microscopy. He spent two years as a post-doctoral researcher at the Joint Research Center for Atom Technology in Japan, investigating the application of scanning probes in biophysics, followed by two years of research in the area of low temperature scanning force microscopy at the Physics Institute at the University of Basel (CH.).

In 2001 Lantz joined the Micro/ Nanomechanics group of the IBM Zurich Research Laboratory as a Research Staff Member. Currently, Dr. Lantz is managing the Advanced Tape Technologies group in the Storage Dept of the IBM Zurich Research Laboratory. His research interests include data storage technologies with an emphasis on magnetic recording and novel solid state memories, control systems, mechatronics, nano-positioning, micro and nanomechanical devices, scanning probe technologies, and nano-tribology. He has published more than 80 papers and holds over 50 patents.

Lantz became a senior member of the IEEE in 2009 and was named IBM Master Inventor in 2011. He was co-recipient of the 2009 IEEE Transactions on Control Systems Technology Outstanding Paper Award, the 2009 IEEE CSS Control Systems Technology Award, and the 2011 IBM Research Pat Goldberg Memorial Best Paper Award.