



International Federation of Automatic Control

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Newsletter



2014 IFAC World Congress

**24 - 29 August 2014, Cape Town, South Africa:
An Update from the International Program Committee**

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2014 IFAC World Congress Update

By the time you read this, the final paper selections for the 19th IFAC World Congress will have been made. The total number of papers submitted was 2666 (with 2114 regular papers and 552 invited session papers) and there has been a sterling effort from the editors, associated editors and reviewers to get the reviews and selection done. Because of the quality of the submissions, the IPC is confident that we will be offering an IFAC World Congress that meets the high standards that have been established by IFAC over many decades and which you have come to expect from the event. We will leave other statistics for the conference itself but of interest is that the highest number of submissions came from China; the highest number of submissions per capita from Sweden; and the highest number of papers per GDP from Slovakia!

The IFAC President, Prof. Ian Craig had a positive dilemma when inviting plenary and semi-plenary speakers. There were many excellent potential candidates and his selection also had to take the huge scope of automatic control, geography and other factors into account. The final list of invited plenary and semi-plenary speakers is as follows:

- **Hajime Asama, The University of Tokyo**
- **Lei Guo, Chinese Academy of Sciences**
- **Thomas Jones, Stellenbosch University**
- **Pierre Kabamba, University of Michigan**
- **Mustafa Khammash, Swiss Federal Institute of Technology-Zurich**
- **Naomi Leonard, Princeton University**
- **Jack Little, MathWorks**
- **Joseph Lu, Honeywell Process Solutions**
- **Richard Murray, California Institute of Technology**
- **Ernst Scholtz, ABB Corporate Research**
- **David Vos, Tebogo LLC**

The venue for the congress is the Cape Town Convention Centre which is a modern, world-class convention centre conveniently situated within walking distance of the city centre and the waterfront. Cape Town has been ranked as the top holiday destination for the 2014 by both the British *Guardian* and the US's *New York Times* newspapers. This is great news for South Africa but as it may result in an increase in tourism, we recommend that you book your trip early. Other information and up-to-date news can be found on the Congress website, www.IFAC2014.org.

Ed Boje and Xiaohua Xia, IPC Co-Chairs

Introducing the IFAC Fellows



Jan Willems

Jan C. Willems was an assistant professor in the Department of Electrical Engineering at MIT from 1968 to 1973, with a one year leave of absence at DAMPT, the Department of Applied Mathematics and Theoretical Physics, at the University of Cambridge (United Kingdom.) On February 1, 1973, he was appointed Professor of Systems and Control in the Mathematics Department of the University of Groningen where he has been until his retirement in 2003 when Professor Willems became emeritus professor. He gave his farewell lecture on January 13, 2004. He was then been appointed guest professor at the Department of Electrical Engineering, with the research group on Signals, Identification, System Theory and Automation (SISTA), at the K.U. Leuven (Belgium.) During the academic year 2003-2004, he held the Chaire Francqui at the faculty of Applied Sciences of the Université Catholique de Louvain (Belgium).

In addition to being an IFAC Fellow, Professor Willems was a fellow of the IEEE, the Society for Industrial and Applied Mathematics (SIAM), and the American Mathematical Society. He served terms as chairperson of the European Union Control Association and of the Dutch Mathematical Society (Wiskundig Genootschap). He has been on the editorial board of a number of journals, in particular, as managing editor of the SIAM Journal of Control and Optimization and as founding and managing editor of Systems & Control Letters.

In 1998, he received the IEEE Control Systems award. In 2010, he became doctor honoris causa from the Université de Liège (Belgium).

Jan Willems has been one of the great figures in our field. His work has set the foundations and shaped large parts of system and control theory as it is known today. He started wor-

king on input/output stability in his dissertation which was initially limited to input/output system descriptions. This work has been, with the introduction of state-space models, the starting point for a grand unification of Lyapunov stability and optimal control. This is now known as the theory of *dissipative systems*. Here certain classes of optimal control problems are seen as a method to construct state functions which act like a stored energy in the system. The idea of storage and supply function introduced in this way bring up a deep connection between Lyapunov and optimal value functions.

The concepts introduced by Jan in this context have an enormous range of applications. Most classical stability criteria for feedback systems (Popov, circle criterion etc) can be seen as criteria for dissipativity. Dissipativity led to a generalization of the standard LQ theory to problems with indefinite cost, a special case of which are encountered in the H-infinity control problem and in stochastic realization. In this context Jan Willems has unveiled in very general terms the structure of all solutions of the algebraic Riccati equation. The linear matrix inequality (LMI), a term introduced by him in his 1971 Transactions paper, has emerged as one of the main analysis and synthesis tools in control. In the 1980's and 90's the LMI came to play a central role in the synthesis of robust controllers.

More recently he has been actively advocating what is called the *behavioral approach*, in which a dynamical system is simply viewed as a family of trajectories. This work emphasizes, among other aspects, the importance in object oriented modeling, of latent variables in addition to the manifest variables by which the model interacts with the external world. The three-part article: From time series to linear system - Part I. Finite dimensional linear time invariant systems, Part II. Exact modelling Part III. Approximate modelling, published in Automatica 1986-87 Volumes 22, 23, is inspired by this philosophy.

It received the Automatica Paper Prize at the 10th triennial IFAC World Congress in Munich, July 1987. The award committee's citation reads: "These papers present a fresh theoretical view of systems modelling in a fundamental, precise, and elegant way. The first part condenses everything that has been learned about systems theory in the last twenty years in a most beautiful way. In the second and third part innovative ideas in identification are presented and worked out. They are considered to be the best theoretical papers that have been published anywhere during the past three years."

Besides his technical achievements Jan has been a genuine intellectual, with a vast

culture and an original view of many philosophical, scientific and political issues. Discussing with him has always been an enriching intellectual experience. As a close friend said "He was a great man in the true sense of the word and in every possible way, and we all miss him greatly and feel this sense of unrecoverable loss".

Submitted by Prof. Giorgio Picci



Lucy Pao

Lucy Pao is currently the Richard and Joy Dorf Professor in the Electrical, Computer, and Energy Engineering Department at the University of Colorado- Boulder (Boulder, CO. USA), and she is also a Fellow of the Renewable and Sustainable Energy Institute. She has made basic research contributions to the areas of control systems (with applications to flexible structures, atomic force microscopes, disk drives, tape systems, power converters, and wind turbines and wind farms), multisensor data fusion (with applications to unmanned autonomous vehicles, satellites, and automotive active safety systems), and haptic and multimodal visual/haptic/audio interfaces (with applications to scientific visualization and spatial communication).

Pao earned her B.S., M.S., and Ph.D. degrees in Electrical Engineering from Stanford University. She has been a Visiting Scholar at Harvard University, a Visiting Miller Professor at the University of California at Berkeley, and a Visiting Researcher at the US National Renewable Energy Laboratory, all in the USA.

Pao has received a number of awards and has been active in many professional society committees and positions. Recent and current activities include being General Chair for the 2013 American Control Conference, an IEEE Control Systems Society (CSS) Distinguished Lecturer, and a member of the IEEE CSS Board of Governors.

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In addition to being elected as an IFAC Fellow Pao was elevated to IEEE Fellow in 2012 and was a recipient of the 2012 IEEE Control Systems Magazine Outstanding Paper Award.

Past honors include a US National Science Foundation CAREER Award, a US Office of Naval Research Young Investigator Award, an IFAC World Congress Young Author Prize in San Francisco in 1996, and a World Haptics Conference Best Paper Award.

Pao was a member of the 2010-2011 US Defense Science Study Group, and she was also the founding Scientific Director (2007-2011) for the Center for Research and Education in Wind, a multi-institutional wind energy center involving the University of Colorado Boulder, the US National Renewable Energy Laboratory, Colorado School of Mines, and Colorado State University, in partnership with the US National Center for Atmospheric Research and the US National Oceanic and Atmospheric Administration.

13th IFAC Symposium on Large Scale Complex Systems (LSS 2013)

Shanghai, China
7 – 10 July 2013

The 13th IFAC Symposium on Large Scale Complex Systems: Theory and Applications (IFAC LSS 2013) was held at Shanghai Jiao Tong University (China) from 7-10 July 2013. It was sponsored by IFAC TC 5.4 (Large Scale Complex Systems), and co-sponsored by seven other IFAC TCs, as well as IFORS, IMACS, and IFIP. The local organizers were Shanghai Jiao Tong University (SJTU), East China University of Science and Technology (ECUST), Key Laboratory of System Control and Information Processing, Chinese Ministry of Education (SCIP), and Shanghai Association of Automation (SAA).

About 120 full papers were submitted from over 16 countries. After peer review, 97 papers were finally accepted and included in the final proceedings. The final program includes six plenary lectures, three invited sessions and 16 regular sessions. More than 80 people from 15 countries participated in the symposium to present papers and exchange research experiences. All the information for this symposium can be found by visiting its WWW-site: <http://lss2013.sjtu.edu.cn/>

Six distinguished scholars gave plenary lectures in this symposium, focusing on some

front research areas as well as the challenging problems of practical large scale complex systems, i.e. "Modelling and Control for Smart Grids" by IFAC vice-president/ Technical Board Chair Iven Mareels (University of Melbourne, Australia), "Optimal Operational Control for Complex Industrial Processes" by Tianyou Chai (Northeastern University, China), "Integrated Monitoring, Control and Security of Critical Infrastructure Systems" by Mietek A. Brdys (University of Birmingham, UK), "Decentralized Control: Status and Outlook" by Lubomir Bakule (Academy of Sciences of the Czech Republic, Czech Rep.), "Large Scale System and Fuzzy Cognitive Maps: A Critical Overview of Challenges and Research Opportunities" by Peter Groumpos (Laboratory for Automation and Robotics, Greece), "Pinned Control of Complex Networks: A Decade and Beyond" by Xiaofan Wang (Shanghai Jiao Tong University, China). In the technical sessions, aside from the classical LSS theory and methodologies which were widely addressed in the past symposiums, attentions were also paid to practical large scale complex systems which are closely connected with human daily life, such as "Water Supply and Distribution Systems", "Communication Systems", "Transportation Systems", "Power Systems", "Intelligent Manufacturing Systems" etc.

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 Aitz 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, o.Univ.-Prof. Dipl.-Ing. Dr.techn. Kurt Schlacher. Die Zeitschrift dient der Information über die Aktivitäten der IFAC. Wie wird kostenlos an Abonnenten in 50+ Länder versandt. Die Kosten werden von der IFAC aus Beiträgen der derzeit 48 Mitgliedsländer getragen.

Präsident der IFAC für 2011-2014 ist Prof. Ian K. Craig (Südafrika), Vizepräsidenten sind Prof. Iven Mareels (Australien) und Prof. Roger Goodall (Grossbritannien). Alle Funktionen werden ehrenamtlich ausgeübt.

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

Some recently highly developed new topics, such as complex network, also attracted attention. For early career researchers, the symposium provided a great chance to get to know the current status and future development of large scale complex systems. During the symposium, the IFAC TC 5.4 meeting was held and some topics for future development of LSS were discussed. The IFAC LSS 2013 was successfully held. The participants appreciated the technical program and were very happy with the quality of the presentations and the friendly atmosphere.

Mietek A. Brdys/University of Birmingham, IPC Chair and Shaoyuan Li/Shanghai Jiao Tong University, NOC Chair.

The Tables of Contents of the IFAC Journals can be found respectively at

Automatica

<http://elsevier.com/locate/automatica>

Control Engineering Practice

<http://elsevier.com/locate/conengprac>

Engineering Applications of Artificial Intelligence

<http://elsevier.com/locate/engappai>

Journal of Process Control

<http://elsevier.com/locate/jprocont>

Annual Reviews in Control

<http://www.elsevier.com/locate/arcontrol>

Journal on Mechatronics

<http://elsevier.com/locate/mechatronics>

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Bundesministerium
für Verkehr,
Innovation und Technologie



FORTHCOMING EVENTS

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Title	2013	Place	Further Information
3rd ACDOS/IFAC/IEEE Conference on Automatic Control and Optimization of Dynamical Systems ACODS 2014	March 13 – 15	Kanpur India	http://www.iitk.ac.in/acods2014/Home_ACODS-2014.html e-mail: acods2014@gmail.com
12th IFAC/IEEE Workshop on Discrete Event Systems WODES 2014	May 14 – 16	Paris France	http://wodes2014.lurpa.ens-cachan.fr/ e-mail: jean-marc.faure@lurpa.ens-cachan.fr
American Control Conference (ACC) - in cooperation with IFAC	June 04 – 06	Portland, OR USA	http://a2c2.org/conferences/acc2014/ e-mail: tilbury@umich.edu
19th IFAC World Congress	August 24 – 29	Cape Town South Africa	http://www.ifac2014.org/ email: info@ifac2014.org
Title	2015	Place	Further Information
15th IFAC IEEE/IFIP/IFORS Symposium on Information Control Problems in Manufacturing INCOM 2015	May 11 – 13	Ottawa Canada	http://incom2015.org/ e-mail: not yet available
2nd IFAC Workshop on Automatic Control in Offshore Oil and Gas Production OOGP 2015	May 27 – 29	Florianopolis Brazil	http://www.ifac-oilfield.ufsc.br/ e-mail: not yet available
9th IFAC Symposium on Advanced Control of Chemical Processes ADCHEM 2015	June 07 – 10	Whistler Canada	http://www.adchem2015.ca/ e-mail: not yet available
12nd IFAC Workshop on Time Delay Systems TDS 2015	June 28 – 30	Ann Arbor, MI USA	http://me.engin.umich.edu/dirifac/ e-mail: not yet available
8th IFAC Symposium on Robust Control Design ROCOND 2015	July 08 – 11	Bratislava Slovakia	http://www.rocond15.sk e-mail: info@rocond15.sk
9th IFAC Symposium on Fault Detection, Supervision and Safety of Technical Processes SAFEPROCESS 2015	September 02 – 04	Paris France	http://not yet available e-mail: not yet available
16th IFAC Conference on Technology, Culture and International Stability TECIS 2015 - Bulgaria	September 24 – 27	Sozopol Bulgaria	http://not yet available e-mail: not yet available
17th IFAC/IEEE/CSS Symposium on System Identification SYSID 2015 - China	October 19 – 21	Beijing China	http://not yet available e-mail: not yet available
9th IFAC Symposium on Control of Power and Energy Systems CPES 2015	December 09 – 11	New Delhi India	http://not yet available e-mail: not yet available