Didier MAQUIN

Born on November 22, 1959 in Nancy (54), French citizenship.

Professor at University of Lorraine, in
"Computer sciences, automatic control and signal processing",
Collegium Lorraine INP
Ecole Nationale Supérieure d'Electricité et de Mécanique (ENSEM)
and Ecole Nationale Supérieure des Mines de Nancy (ENSMN).

Researcher at the Research Center for Automatic Control of Nancy (CRAN),
UMR 7039, University of Lorraine – CNRS, since septembre 1983.

Web : http://www.cran.univ-lorraine.fr/didier.maquin

Education and employments

2019	Promotion, by the Université de Lorraine, to the exceptional class of Professors (grade 2).
2014	Promotion, by the National Council of the Universities, to the exceptional class of Professors (grade 1).
2007	Promotion, by the National Council of the Universities, to the first class of Professors.
2003	Appointment as Professor at the National Polytechnic Institute of Lorraine (ENSEM).
1997	French "Habilitation" in Electrical Engineering from the National Polytechnic Institute of Lorraine.
1992	Move to the National Polytechnic Institute of Lorraine (Ecole Nationale Supérieure de Géologie).
1988	Appointment as Assistant Professor at University of Nancy 1, Technology Institute of Longwy, Energy dept.
1987	PhD in Electrical Engineering, University of Nancy 1.

Research topics and PhD supervising

Improving competitiveness in terms of lower production costs and increase operational safety and quality of products produced is a major concern of the industry. My research focuses on the monitoring of technological systems and more particularly concerns the development or improvement of methods for early fault detection and the development of fault-tolerant control laws. The methods developed can be model-based, relying of the knowledge of a behavioural model of the system to supervise or data-driven using only sets of measurements.

Supervising of 31 Phd students since 1988 (mostly in co-supervising with colleagues).

Research facilitation

2014 – 2017	Scientific leader in my lab of the research department "Control, Identification, Diagnosis" ($\sim$ 75 members among which 40 permanent researchers)
2006 – 2013	Head of the axle "Safety, Supervision and Maintenance" of the Automatic Control Research Group [1]
2004 –	Member of the directory staff of the Research Center for Automatic Control of Nancy
2005 – 2012	Scientific leader in my lab of the research group "Dependability and System Diagnosis" ($\sim$ 20 permanent researchers)
2001 – 2005	Co-leader of the french working group "Safety, dependability and supervision" of the Automatic Control Research Group [2]

Expertises

— Member of 94 PhD or Habilitation assessment committees.
— Regular reviewer for peer reviewed journal or international/national conferences.
— Member of visiting committees of the Research and Education Evaluation Agency for the research labs.
— Member of visiting committees of the High Council for Evaluation of Research and Higher Education for the doctoral schools
— Expert of projects for the National Agency of Research and the National Research and Technology Association.
— Member of the editorial boards of *Intelligent Industrial Systems* (Springer, ISSN 2363-6912) from 2014 to 2017, of *Nonlinear Analysis : Hybrid System*, (Elsevier, ISSN 1751-570X, IF : 3.963) from 2015 to 2019, of *Mathematical Problems in Engineering* (Hindawi, ISSN 1024-123X, IF : 0.802) since 2014 and of *Complexity* (ISSN : 1076-2787, IF : 2.591) since July 2016.

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1. National Research Group "Modelling, Analysis and Control of Dynamical Systems", national facilitation structure depending on CNRS (http://www.univ-valenciennes.fr/GDR-MACS/) gathering the french research labs in this area (more than 100 entities).

2. For more information on the functionning and the activities of the group, consult the WEB pages http://gt-s3.cran.univ-lorraine.fr/

Admin and community activities

2017 –	Director of the doctoral school IAEM Lorraine [4] (360 ongoing PhD in Computer Sciences, Automatic Control, Electrical Engineering et Mathematics).
2012 –	Elected member of the council of the scientific center in Automatic Control, Mathematics, Computer sciences and their Interactions (AMII) of the University of Lorraine (reappointed in 2017).
2010 – 2017	Head of the Department of Doctoral Education in Automatic Control of the Doctoral School IAEM Lorraine (about 90 PhD in progress).
2010 –	Member of recruitment committees (Nancy (8 positions), Grenoble (1), Bordeaux (1)).
2009 – 2011	Member of the jury delivering the best automatic control PhD award (GdR MACS & Club EEA).
2006 – 2013	Member of the directorate staff of the French Automatic Control Research Group [1].
2005 – 2009	Elected member of the governing board of the Research Center for Automatic Control of Nancy.
2004 – 2013	Elected member of the council of the Ecole Nationale Supérieure d'Electricité et de Mécanique.
2000 – 2003	Member of the finance committee of the National Polytechnic Institute of Nancy.
2000 – 2003	Member of the ARTEM [3] committee of the National Polytechnic Institute of Nancy.
1997 –	Head of the committee "Scientific and Technical Information" in charge of the management of the scientific production of the Research Center for Automatic Control of Nancy.
1995 – 2008	Nominated member of the automatic control specialist committee (INPL and University of Lille).
1995 – 2003	Elected member of the Governing Council of the National Polytechnic Institute of Nancy.
1994 – 1996	Studies Deputy Director of the Ecole Nationale Supérieure de Géologie.
1992 – 2003	Elected member of the council of the Ecole Nationale Supérieure de Géologie.

Teaching activities

My successive positions lead me to teach to various level (bachelor to doctorat) and various public (university, engineering schools, vocational training).

I always wished to diversify my public for being able to compare their reactions and to constantly evolve my teaching methods. Currently, I teach in three engineering schools (Ecole Nationale Supérieure d'Electricité et de Mécanique, Ecole Nationale Supérieure des Mines de Nancy (civil engineers and technical engineers in the industry) and Ecole Nationale Supérieure en Génie des Systèmes Industriels) as well as in the Master in Complex Systems Engineering at the University of Lorraine. Having taught more than ten years at the Ecole Nationale Supérieure de Géologie and the Ecole Européenne d'Ingénieurs en Génie des Matériaux, I have a very good knowledge of engineering students.

The lessons provided include signal processing, industrial computing, automation, control and regulation, industrial instrumentation, applied mathematics, operations research, graph theory, modeling methods and data validation, system surveillance and statistical methods of data analysis.

Industrial relations and contractual activities

During my PhD thesis, I was involved in the development of a data validation software which was next deployed on industrial sites (styrene unity production on the petro-chemical platform of Carling in Moselle). Since that first experience, I was a partner of research contracts with different industrial groups or engineering consulting society. Without being exhaustive, the following list identifies the key collaborations (the 3-year contracts match funding theses):

— CdF Chimie - Norsolor (1988-1989)
— Rhône-Poulenc (1988)
— Edf R&D (1988-1991)
— Total Compagnie Minière France (1988-1991)
— Société Nationale Elf Aquitaine (1989-1992)
— Mines de Potasse d'Alsace (1991-1993)
— Société Nationale Elf Aquitaine (1993-1996)
— ESIA Euriware (1993-1996)
— Communauté Urbaine du Grand Nancy (1996-1999)
— PSA Peugeot Citroën (2001)
— ArcelorMittal Research (2007-2010)
— ArcelorMittal Research (2011-2014)
— Institut de Soudure (2015-2018)
— ArcelorMittal Research (2018)
— ArcelorMittal Research (2019-2022)

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3. ARTEM (Art, Technology, Management) is an alliance of three schools in Nancy : École Nationale Supérieure d'Art de Nancy, École Nationale Supérieure des Mines de Nancy and ICN Business School, École de Management. The committee was in charge to conduct prospective studies on the proposed alliance. The architectural project is nearing completion and the campus opened its doors in September 2012 (http://www.alliance-artem.fr/).

4. Doctoral school IAEM Lorraine (http://doctorat.univ-lorraine.fr/fr/les-ecoles-doctorales/iaem/presentation).

Influence

During my career, I was IPC or organizing member of many national and international scientific events. Particularly, on the national point of view, I was regularly involved in recurrent conferences (Congrès International Pluridisciplinaire Qualité et Sûreté de Fonctionnement), CIFA (Conférence Internationale Francophone d'Automatique) and JD-JN-MACS (Journées Doctorales / Journées Nationales MACS) and, on an international point of wiew, ACD (Workshop on Advanced Control and Diagnosis) and MED (Mediterranean Conference on Control and Automation).

I was involved as program committee member in 41 international conferences and 19 national conferences or *workshop*. The most important responsabilities were :

— Vice-chair of the program committee 16th IEEE Mediterranean Conference on Control and Automation, MED'08, Ajaccio, France, 25-27 juin 2008 (473 submitted papers, 311 communications in the final program, more than 300 attendees) ;

— General chair of the *Conference on Control and Fault Tolerant Systems*, SysTol'10, Nice, France, October 6-8, 2010 (208 submitted papers, 143 communications in the final program, 160 attendees) ;

— Co-chair of the program committee of *IEEE Conference on Control Applications*, CCA'14, Nice, France, October 1-3, 2014 (475 submitted papers, 304 communications in the final program, more than 300 attendees) ;

— Co-chair of the program committee of *23th IEEE Mediterranean Conference on Control and Automation*, MED'15, Torremolinos, Spain, June 16-19, 2015 (259 submitted papers, 193 communications in the final program, 224 attendees) ;

— Co-chair of the program committee of *9th IFAC International Symposium on Faut Detection, Supervision and Safety fo Technical Processes*, Safeprocess,Paris, France, September 2-4, 2015 (326 submitted papers, 233 communications in the final program, 328 attendees – Symposium, Pre-tutorials, Poster session) ;

— General chair of the *28th IEEE Mediterranean Conference on Control and Automation*, MED'2020, St Raphaël, France, September 16-18, 2020 (265 submitted papers, 181 communications in the final program, virtual attendance)

Publications

The complete list of my publications can be consulted on :
http://w3.cran.univ-lorraine.fr/perso/didier.maquin/fr/publications.html

— 60 peer-reviewed international journal articles.
— 22 peer-reviewed national journal articles.
— 169 communications presented in international refereed conferences.
— 89 communications presented in national refereed conferences.
— 14 book chapters et 2 books.

Selected publications

1. B. Marx, D. Ichalal, J. Ragot, D. Maquin, S. Mammar. Unknown input observer for LPV systems. *Automatica*, 100 :67-74, 2019. http://dx.doi.org/10.1016/j.automatica.2018.10.054

2. M. El Mountassir, S. Yaacoubi, G. Mourot, D. Maquin. Sparse estimation based monitoring method for damage detection and localization : A case of study. *Mechanical Systems and Signal Processing*, 112 :61-76, 2018. http://dx.doi.org/10.1016/j.ymssp.2018.04.024

3. D. Ichalal, B. Marx, J. Ragot, S. Mammar, D. Maquin. Sensor fault tolerant control of nonlinear Takagi-Sugeno systems. Application to vehicle lateral dynamics. *International Journal of Robust and Nonlinear Control*, 26(7) :1376-1394, 2016. http://dx.doi.org/10.1002/rnc.3355

4. S. Bezzaoucha, B. Marx, D. Maquin, J. Ragot. State constrained tracking control for nonlinear systems. *Journal of the Franklin Institute*, 352(7) :2866-2886, 2015. http://dx.doi.org/10.1016/j.jfranklin.2015.05.003

5. X. He, G. Mourot, D. Maquin, J. Ragot, P. Beauseroy, A. Smolarz, E. Grall-Maës. Multi-task learning with one-class SVM. *Neurocomputing*, 133 :416-426, 2014. http://dx.doi.org/10.1016/j.neucom.2013.12.022

6. D. Sauter, M.A. Sid, S. Aberkane, D. Maquin. Co-design of safe networked control systems. *Annual Reviews in Control*, 37(2) :321–332, 2013. http://dx.doi.org/10.1016/j.arcontrol.2013.09.010

7. D. Ichalal, B. Marx, J. Ragot, D. Maquin. Fault detection, isolation and estimation for Takagi-Sugeno nonlinear systems. *Journal of The Franklin Institute*. Special Issue on Advances in Analysis and Design of Model-Based Fuzzy Control Systems, 2013. http://dx.doi.org/10.1016/j.jfranklin.2013.04.012

8. R. Romo Vázquez, R. Ranta, V. Louis-Dorr, D. Maquin, L. Maillard. Blind source separation, wavelet denoising and discriminant analysis for EEG artefacts and noise canceling. *Biomedical Signal Processing and Control*, 7(4) :389–400, 2012. http://dx.doi.org/10.1016/j.bspc.2011.06.005

9. D. Ichalal, B. Marx, J. Ragot, D. Maquin. State estimation of Takagi-Sugeno systems with unmeasurable premise variables. *IET Control Theory & Applications*, 4(5) :897–908, 2010. http://dx.doi.org/10.1049/iet-cta.2009.0054

10. E.A. Domlan, B. Huang, J. Ragot, D. Maquin. Robust identification of switched regression models. *IET Control Theory & Applications*, 3(12) :1578–1590, 2009. http://dx.doi.org/10.1049/iet-cta.2008.0274

11. Y. Tharrault, G. Mourot, J. Ragot, D. Maquin. Fault detection and isolation with robust principal component analysis. *International Journal of Applied Mathematics and Computer Science*, 18(4) :429–442, 2008. http://dx.doi.org/10.2478/v10006-008-0038-3

12. M. Alhaj-Dibo, D. Maquin, J. Ragot. Data reconciliation : a robust approach using a contaminated distribution. *Control Engineering Practice*, 16(2) :159–170, 2008. http://dx.doi.org/10.1016/j.conengprac.2007.01.003