

Didier MAQUIN



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

Emeritus Professor at University of Lorraine, in
"Computer sciences, automatic control and signal processing"

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

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

Education and employments

- 2024 Retired Emeritus Professor at Université de Lorraine
- 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 on the knowledge of a behavioural model of the system to supervise or data-driven using only sets of measurements.

Supervising of 32 Phd students since 1988 (mostly in co-supervising with colleagues).

Research facilitation

- 2021 – 2023 Scientific leader in my lab of the research department "Control, Identification, Diagnosis"
&
2014 – 2017 (~ 75 members among which 40 permanent researchers)
- 2006 – 2013 Head of the axle "Safety, Supervision and Maintenance" of the Automatic Control Research Group¹
- 2004 – 2023 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"
(~ 20 permanent researchers)
- 2001 – 2005 Co-leader of the french working group "Safety, dependability and supervision"
of the Automatic Control Research Group²

Expertises

- Member of 99 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) from 2016 to 2021.

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 functioning and the activities of the group, consult the WEB pages <http://gt-s3.cran.univ-lorraine.fr/>

Admin and community activities

- 2017 – 2023 Director of the doctoral school IAEM Lorraine⁴ (320 ongoing PhD in Computer Sciences, Automatic Control, Electrical Engineering et Mathematics).
- 2012 – 2022 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 – 2023 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 Group¹.
- 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 ARTEM³ committee of the National Polytechnic Institute of Nancy.
- 1997 – 2023 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)

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 view, 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 responsibilities 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 Fault Detection, Supervision and Safety for 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>

- 62 peer-reviewed international journal articles.
- 22 peer-reviewed national journal articles.
- 171 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.ymsp.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>