

Born 09/02/78

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Sorin Oлару

Prof. CentraleSupélec

(Last update: December 19, 2020.)

Education and Qualifications

- 2020 **Head of the RTE Chair at CentraleSupélec.**
- 2013 **University Professor - Qualification French CNU (National University Council).**
- 2012 **Habilitation (HDR), Univ. Paris Sud 11, France.**
Control of constrained dynamical systems. Interaction optimisation-geometry-control.
- 2005 **Doctorate, Univ. Paris Sud 11 - Supélec, France.**
Contribution to the study of predictive control with constraints. A geometrical approach.
- 2010 **Doctorate (cum laude), University Politehnica Bucharest, Romania.**
Novel approaches in Model Predictive Control and multisensor control systems

Academic positions

- 2018-present **Full Professor, CentraleSupélec, France.**
- 2012-2018 **Professor, CentraleSupélec, France.**
- 2010-2012 **Associate Professor, Supélec, Automatic Control Department, France.**
- 2010-present **Associate research position, INRIA Saclay, DISCO Team, France.**
- 2005-2010 **Assistant Professor, Supélec, Automatic Control Department, France.**
- 2001-2002 **Research&development engineer, INRIA/IRISA Rennes, France.**
- 2001-2002 **Teaching assistant, University Politehnica Bucharest, Romania.**

Scientific visits or stays abroad

- March 2006 **NTNU, Trondheim - Norway, Collaboration Prof. Morten Hovd, 1 month.**
Reachability and feasibility in predictive control design
- May - June 2007; **The University of Newcastle, Australia, Collaboration with Profs. J. De Dona, M. Seron, 2 months.**
- Nov.-Dec. 2019 **Set theoretic analysis of dynamical systems; Multisensor Systems; Fault Detection and Isolation; Fault Tolerant Control**
- April 2009 **Bernoulli Center : Ecole Polytechnique Fédérale de Lausanne (EPFL), Swiss, Invited researcher in the program Advances in the Theory of Control Signals and Systems with Physical Modeling, 1 week.**
- May 2010 **Lund Center for Control of Complex Engineering Systems, Sweden, Invited researcher in the framework of the program "Distributed model predictive control and supply chains", 2 weeks.**
- May&August 2011 **NTNU, Trondheim - Norway, Invited researcher in the framework of the program Yggdrasil - "young guest and doctoral researchers' annual scholarships for investigation and learning" (ISMOBIL), Collaboration with Prof. Morten Hovd and Prof. Tor Arne Johansen, 2 months.**
- October 2015 **Univ. Patras, Greece, Collaboration with Prof. Georges Bitsoris, 2 weeks, ERASMUS+.**
Set invariance for constrained dynamical systems

- June-September 2016 **Kyushu Institute of Technology, Japan**, *Collaboration Prof. Hiroshi Ito, Matsumae Foundation fellowship, 3 months.*
 Analysis of dynamical systems affected by state-dependent bounds
- April 2017 **Universitat Politecnica de Catalunya (UPC), Barcelona, Spain**, *Collaboration with Prof. Vicenc Puig and Prof. Carlos Ocampo Martinez, 1 week, ERASMUS+.*
- August 2019 **Frankfurt Institute for Advanced Studies, Germany**, *Collaboration with Prof. Esteban Vargas, 1 month, DAAD.*
- November-December 2019 **The University of Newcastle, Australia**, *Collaboration with Profs. M. Seron and J. De Dona, 1 months.*
 Uncertain dynamical systems

Memberships and Honors

- 2012 **Senior Member – IEEE.**
- 2016 **Member – International Society of Difference Equations.**
- 2002 **Member – International Federation of Automatic Control (via French NMO).**

Fellowships

- 2019 **Fellow of DAAD (German Academic Exchange Service), Germany.**
- 2016 **Fellow of the Matsumae International Foundation, Japan.**
- 2005 **Fellowship - European Research Consortium on Informatics and Mathematics.**

Awards

- 2002 **Archimedes prize**, *Theme "Water resources modelling and management",*
<ftp://ftp.cordis.europa.eu/pub/improving/docs/archimede-brochure.pdf>.
- 1998 **Kvaerner - IMGB award, excellence in undergraduate studies.**

Recognition

- 2019 **IFAC France Prize**, *for the service as Registration Chair for the IFAC World Congress 2017.*
- 2018 **IEEE Control Systems Letters**, *Outstanding Service as Associate Editor.*

Best papers

- 2013 **Best paper award**, *17th Int. Conference on System Theory, Control and Computing.*
 Sinaia - Romania,
- 2005 **"Best papers list"**, *International Conference on Informatics in Control, Automation and Robotics (ICINCO).*
- 2004 **Best paper**, *5th Asian Control Conference.*
 Melbourne–Australia

Plenaries and invited talks

- 2020 **Keynote speaker**, *From Control Invariant sets to an Inverse Optimality Perspective on the Constrained Control Design.*
 Stability and Control Processes Conference, Saint Petersburg
- 2018 **Invited talk**, *Convex liftings and inverse optimality: why any continuous piecewise affine control law can be obtained by linear parametric optimization.*
 Universitat Politecnica de Catalunya (UPC), Barcelona
- 2017 **Invited talk**, *Positive Invariant Sets for Time-Delay Systems.*
 Oxford University–UK
- 2017 **Invited talk**, *Model-based predictive energy management and model-based fault detection.*
 Chulalongkorn University, Bangkok–Thailand

- 2016 **Invited talk**, *Any continuous piecewise affine control law can be obtained by linear parametric optimization corresponding to a MPC with the control horizon of 2 prediction steps.*
Hokkaido University, Japan
- 2016 **IEEE talk**, *Commande de Systèmes avec Contraintes : une approche basée sur l'interpolation.*
Amiens-France, <https://www.ieee-france.org/index.php/213-seminaire-pour-doctorants-a-amiens>
- 2015 **IEEE talk**, *Set-theoretic methods for fault detection and isolation in feedback control schemes,*
Montreal, Canada, <https://meetings.vtools.ieee.org/m/34673> .
- 2012 **Semi-plenary lecture**, *Control of linear systems with non-convex constraints. Mixed integer formulations, MPC design and interpolation alternatives.* .
IFAC workshop on Nonlinear Model Predictive Control. Noordwijkerhout, The Netherlands.
- 2012 **Plenary lecture**, *Control of Multi-Agent Dynamical Systems.*
Automatics and Informatics Conference, Sofia-Bulgaria

Professional Activities

- From 2015 **Member of the IEEE Technical Committee on Hybrid Systems.**
IEEE Control Systems Society
- From 2012 **Member of IFAC Technical Committee on Robust Control.**
<http://tc.ifac-control.org/2/5/members>
- From 2017 **Member of IFAC Technical Committee on Optimal Control.**
<http://tc.ifac-control.org/2/4/members>
- 2006 - 2011 **Chair of the research group on "Nonlinear Model Predictive Control", GDR-MACS.**
- 2020 **Reviewer, ERC Starting Grants.**
- 2020 **Expert, INNOVIRIS (Belgium).**
- 2018-2019 **Reviewer, European Science Foundation.**
- 2010-2018 **Reviewer, ANR (Agence Nationale de la Recherche) France;**
- 2010-2013 **Reviewer, RCN (Research Council) Norway;**
- 2010-2013 **Reviewer, ISF (Israeli Science Foundation);**
- 2010-2013 **Reviewer, FWO (Research Foundation Flanders);**
- 2012-2017 **Reviewer, UEFISCDI (Romanian national research agency);**
- 2017-2018 **Reviewer, ZBMath.**
- 2017-2018 **Reviewer, American Mathematical Society.**
- 2012-2016 **Participation in European research networks, Delsys (time-delay systems).**
- 2017 **Reviewer for 1 Habilitation thesis, U. Paul Sabatier - LAAS, Toulouse.**
- 2006-2018 **Reviewer for 10 PhD thesis.**
U. of Newcastle, Australia; U. Joseph Fourier - GIPSA Lab, Grenoble; U. Paul Sabatier - LAAS, Toulouse; Polytechnic University of Catalunya - Barcelona
- 2006-2018 **Member of PhD defense committees, Polytechnic University of Catalunya - Barcelona, ESIGELEC Rouen, Supélec, University of Lyon, University of Grenoble.**
- 2002-2015 **Coordinator or national representative in 3 European research projects.**
- 2014-2018 **National Representative for the International Training Network TEMPO ,**
<http://www.itk.ntnu.no/tempo/start>.
- 2014-2016 **Scientist in charge: Marie Curie IEF (FP7) project – Futurism.**
- 2019-2020 **Coordinator of iCode project: "Control and optimization of zinc-air flow battery integrated with zinc regenerative system".**
- 2019-2022 **Participant in the EU project: CPS4EU "Cyber-physical systems for EU",**
<https://cps4eu.eu/>.

- 2008-2017 **Coordinator of bi-lateral research projects Hubert Curien (PHC).**
- o PHC Aurora - Norway,
 - o PHC Pavle Savic - Serbia,
 - o PHC Van Gogh - Netherlands,
 - o PHC Brancusi - Romania,
 - o PHC Gallileo - Italy,
 - o PHC Rila - Bulgaria,
 - o PHC Carlos Finlay - Cuba
 - o PHC Siam - Thailand

Teaching and supervision

Courses and tutorials

- 2019- **Coordinator of undergraduate module, *Information Processing for the Resilience of Systems and Infrastructures.***
Institution: CentraleSupélec
- 2001-2019 **Undergraduate courses - more than 2000 hours of teaching - courses, tutorials and laboratory work or projects supervision, *Automatic Control, Signals and Systems, Numerical Methods and Optimization, Hybrid Systems, etc.***
Institutions: Supélec; Ecole Centrale; CentraleSupélec; Ecole Centrale de Nantes; Université Paris XI; ENSTA ParisTech; Univ. of Patras - Greece; Univ. Politehnica Bucarest - Romania
- 2001-2018 **MSc courses, *Predictive control, hybrid systems.***
Institutions: Paris-Saclay University; INSTN; ENSTA-ParisTech; Ecole Centrale de Nantes
- 2009 **Organizer of a 1-day doctoral level tutorial, *Model Predictive Control: control, optimization, geometry, GDRMACS: Anger - France.***
- 2015 **Co-organizer of the 36th International Summer School of Automatic Control, Grenoble, France, <http://www.gipsa-lab.fr/summerschool/Invariant-sets-for-FTC/>.**
- 2006 **Doctoral level course, *Predictive control*, Cologne Univ. of Applied Sciences, Köln - Germany.**
Supervision
- 2006-2019 **PhD supervisor, *Director and main adviser for 9 PhD thesis; co-adviser for 5 PhD thesis.***
5 ongoing PhD thesis
- 2006-2017 **Scientist in charge for 4 postdocs, Dr. Alessio Iovine, Dr. Trung Duc Hoang, Dr. Paola Falugi and Dr. Vassiliki Reppa.**
- 2006-2019 **MSc supervisor, 8 Master projects.**

Editor, IPC member and other positions

- 2020 **Associate Editor, *Automatica.***
- 2017 **Associate Editor, *IEEE Control Systems Letters.***
- 2015 **Associate Editor, *IMA Journal of Mathematical Control and Information*, Oxford Press.**
- 2012 **Associate Editor together with A. Chemori, *Special issue - European Journal of Automation (JESA)*, Advances in Predictive Control and Moving Horizon Estimation.**
- 2022 **Organizer, *International Conference on Difference Equations and Applications (ICDEA).***
- 2021 **IPC member, *10th IFAC Symposium on Robust Control Design - ROCOND.***
- 2020 **IPC member, *IEEE Conference on Control Technology and Applications.***
- 2017 **Registration Co-Chair, *IFAC World Congress.***
- 2020 **IPC member, *IFAC World Congress.***
- 2020 **IPC member, *IEEE MED Conference.***
- 2020 **IPC member, *IVth Stability and Control Processes Conference in memory of Prof. Vladimir Zubov .***
- 2019 **IPC member, *15th IFAC Workshop on Time Delay Systems .***

- 2018 IPC member, *9th IFAC Symposium on Robust Control Design - ROCOND*.
- 2017 IPC member, *IFAC World Congress*.
- 2017-2018 IPC member, *IEEE Mediteranian Control Conference*.
- 2017 IPC member, *International Conference "Automatics and Informatics"*.
- 2014 IPC member, *European Control Conference*.
- 2014 IPC member, *11th IEEE International Conference on Networking, Sensing and Control*.
- 2014 Associate editor for invited session, *ICSTCC 2014*.
- 2010, 2012 IPC member, *Conference Internationale Francophone d'Automatique*.
- 2009 - 2013 IPC member, *Journées Doctorales d'Automatique*.
- 2007 IPC member, *EUROCON*, (International conference on computer as a tool).

Valorization of the research results

Publications - see complete list below

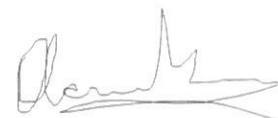
- 2016 **1 edited volume**, *Springer LNCIS*, Developments in Model-Based Optimization and Control, 12 contributed chapters.
- 2015 **1 monography on constrained control and optimization**, *Springer briefs*, Mixed-Integer Representations in Control Design.
- 2013 **1 monography on Fault Detection and Isolation based on set-theoretic methods**, *John Wiley & Sons*, Set-theoretic Fault-tolerant Control in Multisensor Systems.
- 2003-2020 **68 journal publications, 25 book chapters, more then 175 conference papers**.

Impact

- 2020 **H-index 26**, Source: *Google scholar*.
- 2020 **3200 citations**, Source: *Google scholar*.

Transfer to Industry

- 2017 **3 patents on constrained and predictive control in automotive industry, in partnership with Renault**.
 - o Système et procédé de commande des levés de soupape d'un moteur à combustion interne de véhicule automobile (FR2995357)
 - o Dispositif de contrôle de trajectoire d'un véhicule, (FR1751593)
 - o US Patent (US20200001921A1): Device for controlling the trajectory of a vehicle.
 - o Procédé de génération de trajectoires avec contrainte d'anticollision pour véhicule autonome
- 2014 **PhD thesis with EADS Corporate Foundation (Airbus Group)**, Student: *Ionela Prodan*, subject: Control of Multi-Agent Systems in the Presence of Constraints.
Recognition: finalist of the "European PhD Award on Control for Complex and Heterogeneous Systems"
- 2014-2017 **Industrial PhD with Renault**, Student: *Nicoleta Stroe*, Subject: Model-based Predictive Energy Management in Hybrid Electrical Vehicles.
- 2014-2017 **Industrial PhD with Renault**, Student: *Iris Ballesteros-Tolosana*, Subject: Predictive Control for autonomous vehicles.
- 2011-2014 **Co-advisor of an industrial PhD with Renault**, Student: *Jamil EL HadeF*, Subject: Nonlinear Model Predictive Control of the Air Path of a Turbocharged Gasoline Engine.
- 2017-2020 **DGA thesis**, *Motion planning and distributed control for multi-agent dynamical systems*.
- 2017-2020 **RTE industrial thesis**, *Congestion management and decision making in electric grids involving storage*.
- 2017-2020 **Thales industrial thesis**, *Reconfiguration in System Engineering*.
- 2018-2021 **Renault industrial thesis**, *Improvement of the sensory stimuli restitution on driving simulator*.



- 2015-2017 **Industrial contracts (CEI), Predictive Control Application.**
- o SNECMA,
 - o Arcelor Mittal
- 2015-2017 **Industrial contracts (CEI), Fault diagnosis and set-based analysis.**
- o EDF,
 - o MBDA,
 - o SNECMA

Papers in journals related to systems theory and control - 42	
IEEE Transactions on Automatic Control	5
Automatica	12
IFAC Journal of Systems and Control	1
International Journal of Robust and Nonlinear Control	6
International Journal of Control	4
IEEE Control Systems Society Letters	2
Annual Reviews in Control	1
Automation and Remote Control	1
International Journal of Systems Science	4
International Journal of Adaptive Control and Signal Processing	1
Modeling, Identification and Control	2
Int. Journal of Control, Automation and Systems	1
Asian Journal of Control	1
JESA	1
Papers in mathematically oriented journals - 10	
SIAM Journal on Control and Optimization	1
Journal of Optimization Theory and Applications	2
Nonlinear Analysis: Hybrid Systems	1
Nonlinear Dynamics and Systems Theory	1
International Journal of Hybrid Systems	1
International Journal of Applied Mathematics and Computer Science	2
International Journal of Tomography and Statistics	1
Bulletin Mathematique de la Societe des Sciences Mathematiques de Roumanie	1
Papers in application oriented journals - 16	
Scientific Data	1
Frontiers in Energy Research	1
Journal of Process Control	2
IEEE Transactions on Intelligent Vehicles	1
IEEE Transactions on Control Systems Technology	1
Control Engineering Practice	1
IET Control Theory and Applications	1
Journal of Control Engineering and Applied Informatics	2
ISA Transactions	1
Information Technologies and Control	1
Australian Journal of Electrical and Electronics Engineering	1
Cybernetics and Physics	1
IEEE Access	2

