

Antonio Sciarretta

Tuck Foundation Chair of Hybrid Vehicles and Energy Management / Expert
IFP Energies nouvelles

Personal data

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Research interests

Current

- ICT-based control of vehicle propulsion systems (Eco-drive)
- Control and optimization of hybrid-electric vehicle powertrains (energy management control, battery modeling and observation, energy harvesting modeling and control, optimization techniques, control-oriented modeling)

Past

- Model-based control of engine systems (air-to-fuel ratio control, lumped-parameter modeling, engine diagnostics, rail pressure and injection control)
- Modeling and analysis of rotary vane compressors
- Lattice-gas modeling of the dispersion of gaseous pollutants in the atmosphere.

Education

- Habilitation (H.D.R.) in Control engineering, Grenoble Inst. of Tech., France, 2009.
- Doctorate (Ph.D.) in Thermal machines, Univ. L'Aquila, Italy, 1999.
- Laurea (M.Sc.) in Mechanical engineering *summa cum laude*, Univ. L'Aquila, 1995.

Positions

- Scientific expert, IFP Energies nouvelles, 2009-present.
- Titular of the Tuck Foundation Chair of Hybrid vehicles and energy management, IFP School, 2009-present.
- Researcher, Technology, computer science, and applied mathematics division, IFP Energies nouvelles, 2006-2009.
- Part-time senior scientist and lecturer, Institute for Dynamic Systems and Control (IDSC), Swiss Federal Institute of Technology (ETH), Zurich, Switzerland, 2003-present.
- Post-doctoral fellow, IDSC, 2001-2003.
- Post-doctoral fellow, Department of mechanical, energetics, and management (DIMEG), Univ. L'Aquila, Italy, 1999-2001 and 2003-2006.
- Doctorate student, DIMEG, 1995-1999.

Teaching coordination

- Coordinator of the teaching unit on advanced control of energy flow in the vehicle, Research master in Vehicles and sustainable transport, IFP School (with ENS Cachan, Supelec, and Ecole Centrale de Paris), 2010-present.
- Coordinator of the teaching unit on powertrain control and mechatronics, Engineering/master program in Powertrain engineering, IFP School, 2007-present.
- IFP Energies nouvelles representative to the Industry partners steering committee of the Centre for IC engines and hydrocarbon utilization, IFP School, 2007-present.

Teaching

- Hybrid energy management (M.Sc.), IFP School, 2008-present.
- Vehicle propulsion systems (B.Sc., M.Sc., Ph.D.), ETH Zurich, 2003-present.
- Industrial energy systems, (B.Sc.), Marche Polytech. Univ., Ancona, Italy, 2005.
- Contributed to several courses as teaching assistant and examiner, Univ. L'Aquila, 1997-2006.
- Various professional continuing education courses, IFP Training, 2008-present.

Supervision

Doctorates

- Djamaledine Maamria (Dynamic optimisation methods for energy efficiency of multi-state systems), IFPEN and Mines ParisTech, with N. Petit and F. Chaplais, 2012-present.
- Johan Pérez (Optimal thermal management of hybrid propulsion systems with heat recovery systems), IFPEN and Univ. Lyon, with P. Dufour and P. Tona, 2011-present.
- Julien Lescot (Optimal thermal management of hybrid propulsion systems with heat recovery systems), IFPEN and Univ. Orléans, with Y. Chamailard, 2009-2010 (retired).
- Riccardo Ceccarelli (Model-based multi-sensor observers for auto-calibration and control of HCCI engines), IFPEN and Grenoble Inst. of Tech., with C. Canudas-de Wit and P. Moulin, 2007-2010.
- Grégory Rousseau (Optimization of control strategies and design parameters for hybrid vehicles), IFPEN and Ecole des Mines de Paris, with P. Rouchon and D. Sinoquet, 2006-2009.
- Christian Dönitz (Modeling and control of a pneumatic hybrid engine), Daniel Ambühl (Optimal control of hybrid powertrains), Olle Sundström (Dynamic optimization techniques in powertrain controls), ETH Zurich, principal advisor L. Guzzella, 2005-2006.
- Silvio Pinamonti (Model-based air loop observers in spark ignition engines), Emanuela Foglia (Modeling of the dispersion of gaseous pollutants in the atmosphere), Univ. L'Aquila, principal advisor R. Cipollone, 2003-2006.
- Momen Sughayyer (Model-based air-to-fuel ratio control in spark ignition engines), Univ. L'Aquila, principal advisor R. Cipollone, 1998-2001.

Postdoctoral fellows

- Lorenzo Serrao (Optimal control of propulsion systems), IFPEN, 2010.
- Nuraj Rajapakse (Model-based state-of-charge estimation of batteries for hybrid vehicle propulsion), IFPEN, 2008.

Masters' thesis

- Four M.Sc. students, IFPEN, 2009-present.
- Three post-graduate apprentices, IFP School and IFPEN, 2008-present.
- Several M.Sc. students, Univ. L'Aquila and ETH, 1999-2006.

Scientific and organizational activities

Editorial boards

- Editor and Associate editor, Control Engineering Practice, Elsevier, 2008-present.
- Manuscript evaluator, Springer and Elsevier, 2013-present.
- Reviewer, several journals (Elsevier Applied Energy, Elsevier Int. Journal of Hydrogen Energy, Elsevier Energy Conversion and Management, IEEE Control Systems Magazine, IEEE Trans. on Control Systems Technology, IEEE Trans. on Intelligent Transportation Systems, IEEE Trans. on Vehicular Technology, IMechE J. of Automobile Engineering, J. of the Franklin Institute, Atmospheric Environment, Energies) and conferences, 2002-present.

Evaluation

- Industrial chairs program advisor, French National Science Foundation (ANR), 2013.
- Research project proposal reviewer, French National Science Foundation (ANR) and Environment and Energy Management Agency (ADEME), 2008, 2012, 2013.

Conference program organization

- IFAC world congress, Cape Town, 2014 (invited session organizer).
- Int. conference on engines and vehicles, Capri, September 15-19, 2013 (session organizer).
- IFAC workshop on engine and powertrain control, simulation and modeling, Rueil Malmaison, October 23-25, 2012 (scientific correspondent and editor).
- Int. conference on hybrid and electric vehicles, Rueil-Malmaison, December 6-7, 2011 (scientific correspondent and editor).
- Vehicle power and propulsion conference, Lille, September 1-3, 2010 (chairman).
- IFAC workshop on engine and powertrain control, simulation and modeling, Rueil Malmaison, November 30-December 2, 2009 (scientific correspondent and editor).
- Int. conference on engines and vehicles, Capri, September 13-18, 2009 (session organizer).
- Int. conference on advances in hybrid powertrains, Rueil-Malmaison, November 25-26, 2008 (scientific correspondent and editor).
- Int. conference on engine control, simulation, and modeling, Rueil-Malmaison, October 2-4, 2006 (chairman).

IFPEN "expert" mission

- Besides traditional academic activities (lecturing, scientific organizational activities, editing, see above), this mission implies:
 - preparing new research activities and issuing technical reports,
 - organizing internal seminars or courses
 - press communication of selected research project results,
 - professional training via the subsidiary IFP Training
 - participation to IFPEN organizational working groups
 - participation to formal joint committees or working groups with scientific and industrial partners
 - participation to the establishment and formalization of IFPEN scientific policy, also in preparation to scientific audits
- IFPEN representative in the industrial advisory group of the EU Green Cars Initiative (EGCI), 2013-present.
- IFPEN representative in the European Automotive Research Partners Association (EARPA), 2007-present.
- IFPEN representative in the doctoral school (école doctorale) Sciences et Technologies de l'Information des Télécommunications et des Systèmes (STITS), 2013-present.
- Member of the technical committee on automotive control of the International Federation of Automatic Control (IFAC), 2013-present.

IFPEN "project leader" mission

- Project coordinator, collaborative project (PIME), 2010-2011.
- Management and research unit coordinator, collaborative project (eMECA), 2011-present.
- Research unit coordinator, collaborative project (VME), 20xx.
- Management, internal research projects, 2009-2013.
- Participant, several collaborative projects, 2006-present.

Awards

- 2013 Asian Control Conference (AsCC) best application paper award.
- Top25 Hottest articles, Control Engineering Practice:
 - Rodatz P, Paganelli G, Sciarretta A, Guzzella L (2005), 13(1):41-53, from Jul 2004 to Dec 2012, topped no. 1.
 - Chasse A, Sciarretta A (2011), 19(11):1253-1265, from Oct to Dec 2011, topped no. 25.
- IEEE Control Systems Popular Articles:
 - Sciarretta A, Guzzella L (2007), Control Systems Magazine, 27(2):60-70, Dec 2013, topped no. 2.
- Recipient of the Italian Automotive Technical Association (ATA) Award for Master's thesis of automotive interest, 1995.
- Recipient of a competitive ENEL scholarship, 1993.