



Antonella Ferrara's Curriculum Vitae

University of Pavia

November 2018

Antonella Ferrara, Ph.D.

Full Professor of Automatic Control (Professore Ordinario di Automatica)

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Short Bio:

Antonella Ferrara was born in Genova, Italy, in 1963. As a student at the Faculty of Engineering of the University of Genova, she got the "IEEE North Italy Section Electrical Engineering Student Award" in 1986. She received the Laurea Degree in Electronic Engineering (cum Laude) in 1987 and the Ph.D. in Computer Science and Electronics in 1992 from the University of Genova. She was Assistant Professor in the Department of Communication, Computer and System Sciences of the University of Genova (1992-1998). In November 1998 she became Associate Professor of Automatic Control at the University of Pavia. Since January 2005 she is Full Professor of Automatic Control, first in the Department of Computer Engineering and Systems Science of the University of Pavia (2005-2011), and then in the newborn Department of Electrical, Computer and Biomedical Engineering (ECBE) of the same university.

At the University of Pavia, she is Reference Person for International Mobility of Computer Engineering and Computer Science students and member of several committees. She teaches "Process Control and Robotics" and "Advanced Automation and Control" (both in English) in the Master Degree Programs in Computer Engineering and Industrial Automation Engineering. She also teaches "Control of Vehicle Dynamics" (in English) in the Post-Bachelor Program on Design and Development of Vehicle Dynamics. She was invited to give 3 Plenary lectures and one Semi-plenary. She is frequently invited to give lectures in International Schools for Ph.D. students. She was Visiting Professor at Graz University of Technology, and Invited Lecturer at Harvard University, University of Minnesota, University of California at Los Angeles (UCLA), University of Stuttgart, Technical University of Delft, INRIA Grenoble, King Abdullah University of Science and Technology (KAUST), Jeddah, Hanyang University, Seoul, and Universidade Federal do Rio de Janeiro, Brazil.

Her research activities are mainly in the area of advanced automatic control of complex systems, with application to mechanical systems, automotive control, robotics, power systems control, process control, and vehicular traffic control.

She was and still is a coordinator and member of several research units in national and European research projects. In particular, she was the UNIPV coordinator in the PRIN project "Control of Advanced Transmission, Suspension, Steering and Braking Systems for the Management of Vehicle Dynamics" (2006-2007), and in the European Project PROTECTOR (Preventive safety for un-protected road user) ended in 2003. At present, she is coordinator of the Italian research team in the European Projects ITEAM (Interdisciplinary Training Network in Multi-Actuated Ground Vehicles, Marie Skłodowska-Curie Action) started on January 1st, 2016.

She was scientific leader of several research projects funded or co-funded by companies.

She has authored or co-authored more than 370 scientific papers, with 115 international journal papers, 2 published scientific books and a third book to appear soon. Moreover, she contributed, with invited chapters, to 23 edited books. From 2000 to 2004 she was *Associate Editor* of the *IEEE Transactions on Control Systems Technology*. From 2007 to 2012 she was *Associate Editor* of the *IEEE Transactions on Automatic Control*. Since January 2014, she has been *Associate Editor* of the *IEEE Control Systems Magazine*. Since 2017, she has been *Subject Editor* of the *International Journal of Robust and Nonlinear Control*. Since 2018 she has been *Associated Editor* of *Automatica*. She was and currently is member of the International Program Committee of several international conferences and events. She was *Program Vice-Chair* of the European Control Conference ECC14 held in Strasbourg, France, and *Program Vice-Chair* of the 22nd IEEE Mediterranean Conference on Control & Automation Med14 held in Palermo, Italy. She is *Editor* of the IFAC Symposium on Control in Transportation Systems CTS 2018 to be held in Savona, Italy, *Publication Chair* for IEEE Conference on Decision and Control 2019 to be held in Nice, France, and *Editor* of the European Control Conference ECC19 to be held in Naples, Italy.

She is *Senior Member* of the *IEEE Control Systems Society*, member of the *IEEE Technical Committee on Variable Structure and Sliding Mode Control*, member of the *IEEE Technical Committee on Automotive Control* and member of the *IFAC Technical Committee on Transportation Systems*. She was "appointed member" of the Board of Governors of the IEEE Control Systems Society for year 2012. She was Chair of the Women in Control Committee of the IEEE Control Systems Society (July 2013-December 2016) and, at present, she is member of the Advisory Board of that committee. She is "elected member" of the Board of Governors of the IEEE Control Systems Society for the the triennium 2016-2018. Since July 2015 she has been serving as Member of the European Control Association (EUCA) Council.

Since June 2018 she has been Series Editor of the book series "Advances in Industrial Control" published by Springer.

Since 2017 she has been member of the "Consiglio Scientifico del Working Group Trasporti" of the CNR Foresight Project, and member of IEEE Control System Society Outreach Task Force.

Teaching at the University of Pavia:

- At present:
 - Process Control and Robotics (in English, 12 CFU, 92 hours).
 - Process Control (in English, 6 CFU, 46 hours).
 - Robot Control (in English, 6 CFU, 46 hours).
 - Advanced Automation and Control (part on Nonlinear Control, in English, 30 hours)
 - Control of Vehicle Dynamics (Post-Bachelor Program on Design and Development of Vehicle Dynamics, in English, 10 hours)
- In the past: Automatic Control, Fundamentals of Automatic Control, Automatica, Industrial Automation (in Italian).

Teaching in other Institutions:

- International High Level Graduate Course on Control and Automation, João Pessoa, PB, Brazil, 9 September 2018
- Summer School on Sliding Mode Control: Theory and Applications, organized by TU Graz, Graz, Austria. 4-8/09/2017.
- Course on Robotics at TU Graz, Austria, September-October 2016
- Course on Elements of Sliding Mode Control, Institute for Mathematics and its Applications (IMA), University of Minnesota, Minneapolis, MN, September 2015.
- Spring School on Sliding Mode Control: Theory and Applications, organized by INRIA, Aussois, France. 08-12/06/2015.
- Robotics (25 hours) at IUSS (Istituto Universitario di Studi Superiori), Pavia, October-December 2015.
- Ph.D. School on Sliding Mode Control, Politecnico di Milano, Italy, January 2018.
- Ph.D. School on Sliding Mode Control, Politecnico di Milano, Italy, January 2016.
- Ph.D. School on Sliding Mode Control, Politecnico di Milano, Italy, January 2014.

Ph.D and Postdoc Supervision:

- Member of the University of Pavia PhD School Scientific Board since 2007.
- Supervisor of the Ph.D students: Claudio Vecchio, Matteo Rubagotti, Luca Capisani, Alberto Nai Oleari, Gian Paolo Incremona, Michele Cucuzzella, Enrico Regolin, Gianmario Rinaldi, Massimo Zambelli, Bianca Sangiovanni, Giulia Piacentini.
- Supervisor of the Postdoc student: Luca Capisani, Gian Paolo Incremona
- Co-Supervisor of the Ph.D student at INRIA, Grenoble, France: Wenjie Lu
- Co-Supervisor of the Ph.D visiting students: Alfredo Nunez, Antonio Estrada, Alejandra Ferreira, Qudrat Khan, Sebastian Trip, Manuel Acosta, Weitao Chen, Michael Hartmann.

- Co-Supervisor of the Postdoc visiting student: Domenico Bianchi

Visits as Visiting Professor, Visiting Scholar and Guest Lecturer in other Institutions:

- Visit to Universidade Federal do Rio de Janeiro, Brazil, September 2018 (Guest Lecturer)
- Visit to Universidade Federal da Paraíba, Brazil Brazil, September 2018 (Visiting Scholar)
- Visit to Hanyang University, Seoul, October 2017 (Guest Lecturer)
- Visit to Seoul National University, Seoul, October 2017 (Visiting Scholar)
- Visit to KAUST (King Abdullah University of Science and Technology), Jeddah, Saudi Arabia, February 2017 (Guest Lecturer)
- Visit to the Technical University of Graz, Austria, September 18-October 15 2016 (Visiting Professor, Course on Robot Control)
- Visit Harvard, Cambridge, MA, 4-24 July 2016 (Guest Lecturer)
- Visit to the Institute of Pure and Applied Mathematics (IPAM), University of California, Los Angeles (UCLA), October 2015 (Guest Lecturer)
- Visit to the Institute for Mathematics and its Applications (IMA), University of Minnesota, Minneapolis, MN, one month, September 2015 (Visiting Professor)
- Visit to the Institute for Systems Theory and Automatic Control, University of Stuttgart, Stuttgart, Germany. June 2013 (Guest Lecturer)
- Visit to the Technical University of Delft, NL, October 2011 (Guest Lecturer)
- Several visits as Visting Scholar and Guest Lecturer to INRIA, Grenoble, in a collaborative research framework since 2010, all financially supported by INRIA.

Plenary Lectures, Guest Lectures and Key Note Addresses:

She was invited to give:

- **Plenary Lecture** “From Single Vehicle Control to Platoons of Automated Vehicles and Their Impact on Traffic”, XII Brazilian Conference on Automatic Control (CBA 2018), João Pessoa, Brazil, 12 September 2018
- **Plenary Lecture** “Modern Sliding Mode Control with Application to Automotive Systems”, ICCAS 2017, South Korea, October, 2017
- **Plenary Lecture** “Sliding Modes Observation and Control in Automotive Design”, at the 11th IEEE Workshop on Variable Structure Systems, Nanjing, China, June 1-4, 2016
- **Semi-plenary Lecture** “Second Order Sliding Modes to Control and Supervise Industrial Robot Manipulators”, at the 11th IEEE Workshop on Variable Structure Systems, Mexico City, June 26-28, 2010
- **Invited Lecture** “Modern Sliding Mode Control with Applications”, Universidade Federal do Rio de Janeiro, September 2018
- **Invited Lecture** “From single vehicle control to platoons of automated vehicles and their impact on traffic”, UNIMORE, Modena, Italy, May 2018
- **Invited Lecture** “Modern Control Concepts in Freeway Traffic Systems”, INdAM Workshop on Transport Modeling and Managemen, Roma, March 2017
- **Invited Lecture**, “Sliding mode control for Automotive Systems”, Hanyang University, Seoul, October 2017
- **Invited Lecture** “New trends in vehicle dynamics control: the ITEAM EU project perspective” in the Workshop on Open Problems and Challenges in Automotive Control organized by the IEEE Tech.

Com. on Automotive Control at the 55th Conference on Decision and Control, Las Vegas, USA, December 12-14, 2016

- **Invited Lecture** “Event-Triggered Control of Freeway Traffic Systems” in the Workshop on Traffic Control, Institute of Pure and Applied Mathematics (IPAM), University of California, Los Angeles (UCLA), October 2015
- **Key Note Address** in the HYCON2 Workshop “Control of large-scale distributed and cooperating systems: Recent achievements within the Network of Excellence HYCON2”, at ECC2014, Strasbourg, France, June 2014.
- **Key Note Address** at the Open Day of the HYCON2 Traffic Show Case, Grenoble, France, May 2013.
- **Key Note Address** at the South America Women in Control Meeting, João Pessoa, Brazil, September 2018.
- **Key Note Address** at the DELL EMC Women in Action Meeting, Milano, Italy September 2018.

Moreover, she was invited to give Guest Lectures in many other international institutions. During the last years, for instance, she has been invited to give Guest Lectures at:

- KAUST (King Abdullah University of Science and Technology), Saudi Arabia, February 2017.
- Harvard University, Cambridge, MA, July 2016.
- Technical University of Graz, Austria, November 2015
- University of Minnesota, Minneapolis, MN, USA, at the University of California, September 2015.
- University of Stuttgart, Germany, June 2013.
- Technical University of Delft, NL, Ottobre 2011.

Leadership in Projects:

Antonella Ferrara is Scientific Leader and Local Coordinator of the UNIPV team in:

- the European Project **ITEAM** (2016-2019).

Antonella Ferrara was Scientific Leader and Local Coordinator of the UNIPV team in:

- the International Europe-Mexico Project **FONCICYT** (2009-2011).
- the National Project **PRIN05** "Control of Advanced Transmission, Suspension, Steering and Braking Systems for the Management of Vehicle Dynamics" (2006-2007).
- The European Project **IST-1999-10107 PROTECTOR** (Preventive safety for un-protected road user) January 2000-March 2003.

Antonella Ferrara was member of the Pavia Research Unit in

- European Network of Excellence HYCON2, Highly-complex and networked control systems, (2010-2014).
- National Projects PRIN (2001-2007).
- National Projects ASI on Robotics for Aerospace applications (1998-1999).
- National Project MURST “Identification and Control of Industrial Systems” (1998-2000).
- National Project on Transportation Systems (Progetto Finalizzato Trasporti, Sottoprogetto 3 “Sistemi Telematici di Supporto”) supported by CNR (1995-1998).

- European Project AMADEUS (II), “Advanced manipulator for deep underwater systems”, under the Program MAST, “Marine Sciences and Technology”, (1996-1998).
- European Project AMADEUS (I), “Advanced manipulator for deep underwater systems”, under the Program MAST, “Marine Sciences and Technology”, (1993-1995).
- National Project MURST “Identification of models, systems control, signal processing” (1994-1996).
- National Project on Transportation Systems (Progetto Finalizzato Trasporti, Sottoprogetto 3 “Sistemi Telematici di Supporto”) supported by CNR (1992-1994).

Editorial Activity:

- **Associate Editor** of *Automatica* (since 2018)
- **Associate Editor** of *IEEE Transactions on Intelligent Vehicles* (since 2018)
- **Subject Editor** of the *International Journal of Robust and Nonlinear Control* (since March 2017)
- **Associate Editor** of the *IEEE Control Systems Magazine* (2014-present).
- **Associate Editor** of the *IEEE Transactions on Automatic Control* (2007-2012).
- **Associate Editor** of the *IEEE Transactions on Control Systems Technology* (2001-2004).
- **Guest Editor** with S. Sacone and S. Siri (Università di Genova) of the Special Issue “Freeway Traffic Modelling and Control”, *International Journal of Robust and Nonlinear Control*, 2016.
- **Guest Editor** with G. Bartolini (Università di Cagliari) and S. Spurgeon (Leicester University) of the Special Issue “New trends in Sliding Mode Control” *International Journal of Robust and Nonlinear Control*, vol. 7, 1997.
- **Guest Editor** with V. I. Utkin (Ohio State University) of the Special Issue “Sliding Mode Control”, *Control Theory and Advanced Technology*, vol 10, December 1994.

Moreover, starting from June 2018 she will be Series Editor of the book series “Advances in Industrial Control” published by Springer.

Participation in International Program Committees:

Antonella Ferrara was

- *Publication Chair (Editor)* of the IFAC Symposium on Control in Transportation Systems CTS 2018 to be held in Savona, Italy, June 2018 and *Member of the National Organization Committee*.
- *Program Vice Chair* (specifically, Vice-chair for tutorial sessions) of the European Control Conference, ECC2014, Strasbourg, France, in 8-11 July 2014.
- *Program Vice Chair* of the 22nd Mediterranean Conference on Control & Automation, Palermo, Italy, June 24-27 2014.

Moreover, she is

- *Publication Chair* of IEEE CDC 2019 to be held in Nice, France, December 2019.
- *Conference Editorial Board Chair* of the European Control Conference ECC 2019 to be held in Naples, Italy, June 2018 (in her role of EUCA Conference Editorial Board Chair).
- *Technical Program Co-Chair* of the IEEE IES International Conference on Mechatronics (ICM) 2019, Ilmenau, German, March 18-20, 2019.

- *Technical Program Co-Chair* of the 8th IEEE International Conference on Connected Vehicles and Expo (ICCVE), Graz, Austria, November 4-8, 2019.
- *Member of the Technical Program Committee (Associate Editor for Contributed Papers)* for 2018 IEEE Conference on Control Technology and Applications (CCTA2018) to be held in The Scandic Hotel Copenhagen, Copenhagen, Denmark, August 21-24, 2018.
- *Member of the Technical Program Committee (Associate Editor)* of the 21st IEEE International Conference on Intelligent Transportation Systems (IEEE ITSC 2018), Maui, Hawaii, November 4-7, 2018.
- *Member of the International Program Committee* of the 15th International Workshop on Variable Structure Systems and Sliding Mode Control, Graz University of Technology, July, 9-11, 2018.
- *Member of the International Program Committee* of the 5th European Workshop on Advanced Control and Diagnosis ACD 2019, Bologna, Italy, November 21-22, 2019.

In addition, she was member of the

- International Program Committee of the 2017 IEEE Conference on Control Technology and Applications, (CCTA 2017), Kohala Coast, Hawaii, USA.
- International Program Committee of the 2015 International IEEE Conference on Intelligent Transportation Systems (IEEE ITSC 2017), Yokohama, Japan, October 16-19, 2017
- International Program Committee of the “14th International Conference on Informatics in Control, Automation and Robotics” - ICINCO 2017
- International Program Committee of the 2017 IEEE International Conference on Vehicular Electronics and Safety (IEEE ICVES’17) Vienna, Austria, June 27-29, 2017.
- International Program Committee of the IEEE International Smart Cities Conference 2016 (ISC2), September 12-15, 2016, Trento, Italy.
- International Program Committee and Track Chair of the 2016 International IEEE Conference on Intelligent Transportation Systems (IEEE ITSC 2016), Rio de Janeiro, November 1-4, 2016.
- International Program Committee (IPC) 14th IFAC Symposium on Control in Transportation Systems (CTS 2016), Istanbul, Turkey, 18-20 May 2016.
- International Program Committee (IPC) International Conference on Advances in Intelligent Control and Automation (ICAICA 2016), Doddaballapur, Bengaluru, Karnataka, India , March 10-12, 2016.
- International Program Committee of the IEEE International Workshop on Variable Structure Systems VSS’16, Nanjing, Jiangsu, China, 2016.
- International Program Committee (IPC) ICVES2015 (2015 IEEE International Conference on Vehicular Electronics and Safety), Yokohama, JAPAN, November 5-7, 2015.
- International Program Committee and Track Chair of the 2015 International IEEE Conference on Intelligent Transportation Systems (IEEE ITSC 2015), Grand Canaria, Canary Islands, September 15-18, 2015.
- International Program Committee of the 2014 International IEEE Conference on Intelligent Transportation Systems (IEEE ITSC 2014), Qingdao, China, October 8-11, 2014.
- International Program Committee of the IEEE International Workshop on Variable Structure Systems VSS’14, IRCCyN, Ecole Centrale de Nantes, France, 2014.
- International Program Committee of the 16th International IEEE Annual Conference on Intelligent Transportation Systems ITSC 2013, The Hague, The Netherlands, October 2013.
- International Program Committee of the 3rd IFAC International Conference on Intelligent Control and Automation Science (ICONS 2013), Chengdu, China, 2-4 September 2013.

- International Program Committee (Associate Editor at Large) of the 52nd IEEE Conference on Decision and Control, Florence, Italy, December 2013.
- International Program Committee of the First International Conference on Control, Decision and Information Technologies (CoDIT'13), Hammamet, Tunisia for April 11-13, 2013.
- International Program Committee of the IEEE International Conference on Vehicular Electronics and Safety (ICVES'12), Istanbul, July 24-27, 2012.
- International Program Committee of the IEEE International Workshop on Variable Structure Systems VSS'12, Mumbai, India, 2012.
- International Program Committee of the 14th International IEEE Annual Conference on Intelligent Transportation Systems ITSC 2011, Washington DC, USA, October 2011.
- International Program Committee of the International Workshop on Intelligent Transportation Systems and Applications ITSA 2011, (<http://www.ftrai.org/itsa2011>), to be held with the FutureTech 2011, (<http://www.ftrai.org/futuretech2011>) at Crete, Greece, June 28-30, 2011.
- International Program Committee of the IEEE DSDE International Conference on Computer Control and Automation, 1st-3rd, May 2011 Jeju Island, South Korea.
- International Program Committee of the Intelligent Vehicles Symposium IV'10 June 21-24, 2010, University of California, San Diego, CA, USA.
- International Program Committee of the 13th International IEEE Conference on Intelligent Transportation Systems 2010 ITSC 2010, Madeira Island, Portugal, on September 19 – 22, 2010.
- International Program Committee of the IEEE International Workshop on Variable Structure Systems VSS'10, Mexico City, Mexico, 2010.
- International Program Committee of the 48th IEEE Conference on Decision and Control, Shanghai 2009, December 16 – 18, 2009.
- International Program Committee of the IEEE Conference on Intelligent Transportation Systems ITSC-2009, October 3-7, 2009, St. Louis, MO, USA.
- International Program Committee of the 21st Chinese Control and Decision Conference (2009 CCDC) sponsored by IEEE Control Systems Society and IEEE Industrial Electronics Society, Guilin, China, 17-19 June 2009
- International Program Committee of the IEEE Conference on Intelligent Transportation Systems ITSC 2008, Beijing, China, Oct 12-15, 2008.
- International Program Committee of the 20th Chinese Control and Decision Conference (2008 CCDC) sponsored by IEEE Control Systems Society and IEEE Industrial Electronics Society, Yantai, Shandong Province of China, 2 -4 Luglio 2008
- International Program Committee of the IEEE Intelligent Vehicles Symposium, Eindhoven University of Technology, Eindhoven, The Netherlands, June 4-6, 2008.
- International Program Committee of the IEEE International Workshop on Variable Structure Systems VSS'08, Antalya, Turkey Giugno 8-10, 2008.
- International Program Committee of the ICNPAA 2008 - Seventh International Conference on "Mathematical Problems in Engineering, Aerospace and Sciences," University of Genoa, Genoa, Italy, Giugno 25-27, 2008.
- International Program Committee of the IEEE Conference on Intelligent Transportation Systems ITSC 2007, Seattle, Washington, USA, 30 Settembre-3 Ottobre 2007.
- International Program Committee of the IEEE Intelligent Vehicles Symposium IV'07, Istanbul, Turkey, Giugno 13-15, 2007.

- International Program Committee of the IEEE Conference on Intelligent Transportation Systems – “ITSC ‘06”, Toronto, Canada, Settembre 17-20, 2006.
- International Program Committee of the 11th IFAC International Conference on Transportation Systems, Delft, The Netherlands, Agosto 29-31, 2006.
- International Program Committee of the IFAC International Conference on Analysis and Design of Hybrid Systems ADHS06, Alghero, Italy, Giugno 7-9, 2006.
- International Program Committee of the IEEE International Workshop on Variable Structure Systems VSS’06, Alghero, Italy, Giugno 5-7, 2006.
- International Program Committee of the 8th International IEEE Conference on Intelligent Transportation Systems – “ITSC ‘05”, Vienna, Austria, Settembre 13-16, 2005.
- International Program Committee of the Conference “ISATA 2000”, Dublino, Ireland, Ottobre 2000.

Other Appointments:

- **Member of EUCA Council** (since July 2015)
- **Chair of the EUCA Conference Editorial Board (CEB)** (since March 2018)
- **Elected Member of the Board of Governors** of the IEEE Control Systems Society (2016-2018)
- **Member of IEEE CSS Outreach Task Force** (since 2017)
- **Chair of the Women in Control Standing Committee** of the IEEE Control Systems Society (2013-2016).
- **Member of the Advisory Board of the Women in Control Standing Committee** of the IEEE Control Systems Society (2013-present).
- **Member** of the “Consiglio Scientifico del Working Group Trasporti” of the CNR Foresight Project.
- **Appointed Member of the Board of Governors** of the IEEE Control Systems Society (2012)
- **Member of the committee to assign the IEEE CDC Best Student Paper Award** (2015)
- **Member of the committee to assign the ACC 2018 Best Student Paper Award** (2018)
- **Organizer of the Second Workshop for Women in Control: "After Graduation: Women in Control Around the Globe Take Leadership Roles" A Workshop Dedicated to Honor Maria Elena Valcher, 2015 IEEE CSS President**
Co-Organizers: Linda Bushnell and Bozenna Pasik-Duncan, Members of the Advisory Board for CSS Women in Control, US **Sponsors:** IEEE CSS, CSS MAB, CDC2015, IEEE CSS Standing Committee on Women in Control, and by IEEE WIE **Wednesday, Dec 16, 2015 10:00-12:10**. This workshop was included as a Special Session in the CDC 2015 Program.
- **Organizer of the Special session at ACC 2016 in Boston: “Empowering Your Potential”**
Co-Organizers: Prof. Bozenna Pasik-Duncan, Kansas State University; Prof. Linda Bushnell, University of Washington; Prof. Sandra Hirsche, Technische Universitat Munchen
Presenter: Dr. Karen Panetta, Tufts University
Time: 12:00 pm – 12:30 pm (lunch); 12:30 pm – 1:30 pm (lecture), Wednesday, July 6, 2016.

Member of Ph.D. Evaluation Committees at:

KTH Stockholm,

TU Graz (3 times)

INRIA Grenoble

University of Genova (3 times)

Politecnico di Milano (2 times)

Politecnico di Torino (2 times)

She was also **Reviewer** of several PhD Thesis and member of the corresponding evaluation committees.

Professor Promotion Committee at:

KTH Stockholm

Many Italian University

Research Activity, main topics:

1. Sliding mode control and sliding mode observers.
2. Robotics (mobile robotics, industrial robotics, robotics and A.I.).
3. Control of vehicles dynamics (cars and motorcycles, connected vehicles and autonomous driving)
4. Modeling, identification, observation and control of traffic systems.
5. Fault Detection, Isolation and identification in mechanical systems.
6. Control and observation in power systems even of micro-grid type.

Major Scientific Achievements:

- Antonella Ferrara contributed to the development of the concept of second order sliding modes proposing the so-called ***Second Order Sliding Mode Suboptimal Algorithm*** (1997, 1998), which, together with the Twisting and the Super-twisting algorithms (by Arie Levant), is one of the more widely used and recognized sliding mode control algorithms.
- Together with her student Francesco Dinuzzo, she has authored the formulation of a novel family of Higher Order Sliding Mode Control Algorithms which guarantee optimal control properties (2009), inaugurating the new research path called ***Optimality based Higher Order Sliding Mode Control***.
- Together with her scholar Mara Tanelli (Politecnico di Milano, Italy), she has authored another new family of sliding mode control algorithms, named ***Switched Suboptimal Sliding Mode Control Algorithms*** (2013), which produce performance comparable with those of conventional sliding mode laws with a reduced control effort, making them even more appropriate for application to mechanical systems.
- She has also demonstrated the **possibility of applying sliding mode techniques to robotics**, proposing, together with her Ph.D. students, efficient algorithms with chattering alleviation.

- Her **automotive applications of sliding mode control** to traction and brake control, stability systems, and torque-vectoring control of fully electric vehicles are also appreciated and widely used in practice in several European projects. Four Master Theses on automotive control she has supervised have been awarded with the ATA (Associazione Tecnica dell'Automobile) Award. She has edited and co-authored the book: Sliding Mode Control of Vehicle Dynamics, IET Digital Library, 2017.
- She has also demonstrated the **possibility of applying sliding mode techniques to micro-grids and power networks**, even of large scale type, proposing, together with her Ph.D. students, efficient algorithms with distributed observation capabilities. Experimental tests made in collaboration with RSE S.p.A. (Ricerca sul Sistema Energetico) have confirmed the validity of the strategies even in field implementations.

Citations and H-Index:

- According to **Scopus**: number of citations 4708 (on the basis of 289 documents), H-Index: 33 (150 co-authors)
- According to **Google Scholar**: number of citations 6858, H-Index: 37, Most cited paper: 1063 citations
- According to **ResearchGate**: number of citations 5314 (on the basis of 315 documents), Reads: 14429, RG Score: 38,77 (higher than 95% of Research Gate members), H-index: 33.

Awards:

- “*Outstanding Reviewer for Automatica*”, 2006.
- “*IEEE Electrical Engineering Student Award*” North Italy Section, 1996.

Awards assigned to papers she co-authored:

- “*IEEE CSS Italy Chapter Best Young Author Paper Award*” to Gian Paolo Incremona for paper G. P. Incremona, A. Ferrara, L. Magni, “Asynchronous Networked MPC With ISM for Uncertain Nonlinear Systems”, IEEE TRANSACTIONS ON AUTOMATIC CONTROL, Vol. 62, No. 9, pp. 4305- 4317, September 2017
- “*IEEE CSS Italy Chapter Best Young Author Paper Award*” to Mara Tanelli for paper M. Tanelli, A. Ferrara. "Enhancing Robustness and Performance via Switched Second Order Sliding Mode Control", IEEE TRANSACTIONS ON AUTOMATIC CONTROL (ISSN: 0018-9286), Vol. 58, No. 4, pp. 962-974, April 2013.

Awards assigned to Thesis she supervised:

- 2018 Best PhD Thesis Award on New Challenges for Energy and Industry from the IEEE Italy Section (Sponsored by ABB) (Student: Michele Cucuzzella; Supervisor: Prof. A. Ferrara).
- SIDRA 2018 Award for the best Ph.D thesis in Automatica, (Student: Michele Cucuzzella; Supervisor: Prof. A. Ferrara).

- ETIC 2015/2016 Award: promoted by AICA (Associazione italiana per l'Informatica e il Calcolo Automatico) and Rotary International (Student: G.P. Incremona; Supervisor: Prof. A. Ferrara).
- *ATA 2003/2004 Award* for Master Thesis on Automotive Control (Student: J. Paderno; Supervisor: Prof. A. Ferrara).
- *ATA 2003/2004 Award* for Master Thesis on Automotive Control (Student: A. Ghiro; Supervisor: Prof. A. Ferrara)
- *ATA 2000/2001 Award* for Master Thesis on Automotive Control (Student: A. Colombo Supervisor: Prof. A. Ferrara)
- *ATA 2000/2001 Award* for Master Thesis on Automotive Control (Student: A. Rovida; Supervisor: Prof. A. Ferrara)

ATA - Associazione Tecnica dell'Automobile created in 1948 is part of FISITA (Fédération Internationale des Sociétés d'Ingénieurs des Techniques de l'Automobile) and of EAEC (European Automobile Engineers Co-operation).

Scientific International and National Cooperations (testified by publications in co-authorship) **with:**

International:

INRIA Grenoble, France

INRIA, Sophia Antipolis-Méditerranée, France

University of Exeter, UK

University of Surrey, UK

University of Leicester, UK

University of Seville, Spain

Tech. University of Ilmenau, Germany

Eindhoven University of Technology

University of Groningen

TU Delft Technical University of Technology, Delft, The Netherlands

ETH, Zurich, Swiss

Tu Graz, Graz, Austria

Ohio State University, Columbus, Ohio, USA.

Nazarbayev University, Astana, Republic of Kazakhstan

UNAM Universidad Nacional Autónoma de México, Mexico City

Instituto Politécnico Nacional, Mexico City

Autonomous University of Nuevo Leon, Mexico

Clemson University, Clemson, South Carolina, USA

Heriot-Watt University, Edinburgh, UK

University of Sheffield, Sheffield, UK

Current cooperations with publications still to be submitted:

KTH, Stockholm, Sweden

MIT, Boston, USA

Universidade Federal do Rio de Janeiro, Brazil

Universidade Federal da Paraíba, Brazil

National:

Politecnico di Milano

Politecnico di Torino

Università degli Studi di Genova

Università degli Studi di Cagliari

Università degli Studi dell'Aquila

Istituto di Studi sui Sistemi Intelligenti per l'Automazione CNR, Genova, Italy.

Seconda Università degli Studi di Napoli

Scientific Collaborations with Companies:

Antonella Ferrara is and was scientific leader in research projects with several companies:

RSE S.p.A. (Ricerca sul Sistema Energetico), Fedegari, Centro Ricerche FIAT, Ferrari F1, Ansaldo, Whirlpool, Logic, Riso Scotti, Iritecna, Autostrade S.p.A., among others.

Publications by Antonella Ferrara

BOOKS

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