CURRICULUM VITAE ET STUDIORUM - GIORDANO POLA

Surname: Pola
Name: Giordano
Place of birth: Chieti, Italy
Date of birth: July 22nd 1975

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- Address: Dipartimento di Ingegneria e Scienze dell'Informazione e Matematica, Università degli Studi dell'Aquila, 67100 L'Aquila, Italy
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PRESENT AND PAST POSITIONS

Present position:

- **Professore Associato (Associate Professor)**
  University of L'Aquila
  From November 2nd 2018

Past positions:

- **Ricercatore a Tempo Determinato (Assistant Professor with Tenure Track)**
  ai sensi dell'art. 24, comma 3, lettera b) della Legge 240 del 30.12.2010
  University of L'Aquila
  Three years contract: from 02.11.2015 to 01.11.2018

- **Assegnista di Ricerca (Postdoctoral Researcher)**
  ai sensi delle Leggi 09.05.1989 n.168, 30.12.2010 n. 240 art. 22
  Dipartimento di Ingegneria e Scienze dell'Informazione e Matematica
  University of L'Aquila
  Contract from 02.01.2015 to 11.01.2015

- **Ricercatore a Tempo Determinato (Assistant Professor without Tenure Track)**
  ai sensi della Legge n. 230 del 2005, commi 14 e 20, art. 1
  Center of Excellence DEWS
  University of L'Aquila
  Six years contract: from 01.10.2008 to 12.20.2014

- **Ricercatore a Tempo Determinato (Assistant Professor without Tenure Track)**
  ai sensi della Legge n. 230 del 2005, commi 14 e 20, art. 1
  Center of Excellence DEWS
  University of L'Aquila
  One year contract: from 12.01.2011 to 11.30.2012

- **Ricercatore a Tempo Determinato (Assistant Professor without Tenure Track)**
  ai sensi della Legge n. 230 del 2005, commi 14 e 20, art. 1
  Center of Excellence DEWS
  University of L'Aquila
  One year contract: from 10.21.2010 to 10.20.2011

- **Ricercatore a Tempo Determinato (Assistant Professor without Tenure Track)**
  ai sensi della Legge n. 230 del 2005, commi 14 e 20, art. 1
  Center of Excellence DEWS
  University of L'Aquila
  Two years contract: from 10.01.2008 to 09.30.2010

- **Assegnista di Ricerca (Postdoctoral Researcher)**
  ai sensi della Legge 27.12.1997 n. 449 art. 51 comma 6
  Dipartimento di Ingegneria Elettrica e dell'Informazione
  University of L'Aquila
  One year contract: from 02.01.2008 to 09.30.2008

- **Postdoctoral Researcher**
  Department of Electrical Engineering,
  University of California at Los Angeles, USA
  Contract from 10.10.2006 to 10.30.2007 and extended from 11.01.2007 to 12.31.2007

- **Assegnista di Ricerca (Postdoctoral Researcher)**
  ai sensi della Legge 27.12.1997 n. 449 art. 51 comma 6
  Dipartimento di Ingegneria Elettrica e dell'Informazione
  University of L'Aquila
  One year contract from 04.01.2006 to 09.30.2006

- **Assegnista di Ricerca (Postdoctoral Researcher)**
  ai sensi della Legge 27.12.1997 n. 449 art. 51 comma 6
  Dipartimento di Ingegneria Elettrica e dell'Informazione
  University of L'Aquila
  One year contract from 04.01.2005 to 03.30.2006

- **Collaborazione di prestazione d'opera professionale (Research consultant)**
  "Collaborazione per lo sviluppo di una metodologia di progettazione di sistemi embedded basata su modellistica ibrida"
  Dipartimento di Ingegneria Elettrica e dell'Informazione
  University of L'Aquila
  Contract from 05.25.2004 to 09.24.2004

- **Research Fellow**
  Department of Applied Mathematics
  University of Twente, The Netherlands
  Contract from 09.06.2004 to 12.11.2004

- **Assistant Researcher**
  University of Twente, The Netherlands
  Contract from 10.20.2003 to 12.20.2003

- **Collaborazione di prestazione d'opera intellettuale (Research consultant)**
  "Supporto al coordinamento delle attività dei diversi Work Package nei progetti europei afferenti al centro – Studio delle problematiche industriali legati al controllo del traffico aereo"
  Center of Excellence DEWS
  University of L'Aquila
  One year contract from 09.01.2002 to 08.31.2003

EDUCATION

- **PhD Degree in Electrical and Information Engineering**
  Dipartimento di Ingegneria Elettrica e dell'Informazione,
  University of L'Aquila, Italy
  June 11st 2004
  Title of the thesis: Switching Systems: Analysis and Control
  Advisor: Maria D. Di Benedetto
  Co-Advisor: Elena De Santis

- **Laurea Degree in Electronic Engineering, 110/110 cum laude**
  Dipartimento di Ingegneria Elettrica e dell'Informazione,
  University of L'Aquila, Italy
  July 21st 2000
  Title of the thesis: Controllo di sistemi a commutazione: approssimazione di insiemi invarianti
  Advisor: Maria D. Di Benedetto
  Co-Advisor: Elena De Santis

AWARDS

- January 2020: "Abilitazione Scientifica Nazionale" for full professors in automatic control
  settore concorsuale 09/G1 – settore scientifico disciplinare ING-INF/04
  Call 2012 (DD n. 222/2019)

- Finanziamento delle Attività di base di ricerca FFABR (MIUR),
  Admitted to funding for Researchers, 2017 (legge 232/2016)

- February 19th 2015: Elevated to IEEE Senior member

- January 2014: "Abilitazione Scientifica Nazionale" for associate professors in automatic control
  settore concorsuale 09/G1 – settore scientifico disciplinare ING-INF/04
  Call 2012 (DD n. 222/2012)

- Plenary Lecturer:
  First International Conference on Systems and Computer Science,
  August 29th - 31th 2012, Lille, France,
  Title: "Networked Embedded Control Systems: from Modelling to Implementation"

- A.A. 2000/2001: Winner of studentship "Fondazione Filauro" for studies abroad,
  Faculty of Engineering, University of L'Aquila, Italy

- Winner of five studentships from Diritto allo Studio Universitario of University of L'Aquila, in A.Y.
  1994/1995, 1995/1996, 1996/1997, 1997/1998 and 1998/1999

- 1988/1989: Winner with Gianni Pola and Gianguglielmo Calvi of National Competition "Concorso Einstein" for middle schools, held by Ministry of Education and Olivetti Company

RESEARCH INTERESTS

My research activities are mostly concerned with the study of networked and distributed cyber-physical systems and their applications.

In particular, they are centered around the following methodological topics:

  (i) Analysis and control of cyber-physical systems via discrete abstractions

 (ii) Analysis and control of stochastic linear systems

(iii) Modeling, analysis and control of discrete-event systems and switching linear systems

Application domains of interest include:

(iv) Air Traffic Management systems

(v) Quantitative finance

(vi) Vehicular platoon

My contribution in the research topics mentioned above is as follows:

(i) Discrete abstractions are becoming more and more popular in the research community working on formal verification and control design of hybrid or purely continuous systems. Discrete abstractions offer a systematic approach to solve control problems where software and hardware constraints at the implementation level can be considered from the early beginning of the design process. Moreover, this approach allows solving control problems with specifications that are difficult to enforce by using traditional control design techniques; examples of these specifications are those expressed in terms of automata or logics. A key step in this approach is the construction of the so-called symbolic models. Symbolic models are abstract descriptions of control systems where a state corresponds to an aggregate of continuous state and a label to an aggregate of continuous inputs. In this research line, the first goal was to develop a theory towards the construction of symbolic models for continuous-time nonlinear control systems. We found two key ingredients to achieve this goal: the notion of approximate bisimulation as introduced in the paper

> Antoine Girard and George J. Pappas, Approximation metrics for discrete and continuous systems, IEEE Transactions on Automatic Control, 52(5), 782–798, 2007

and the notion of incremental input-to-state stability as introduced in the paper

> David Angeli, A Lyapunov approach to incremental stability properties, IEEE Transactions on Automatic Control, 47(3), 410–421, 2002

We showed in [J03, C22] that these two notions can be combined in a way so that for any nonlinear control system enjoying the above mentioned stability property and with bounded state and input spaces, it is possible to effectively construct symbolic models approximating the given system with any desired accuracy in the sense of approximate bisimulation. By extending the concept of approximate bisimulation to the concept of approximate and alternating bisimulation, we generalized the results of [J03, C22] to nonlinear control systems with disturbance in [J05, J10, C31, C23, C21]. By extending the theory of global incremental stability of nonlinear systems, we generalized the results of [J03, C22] to nonlinear switching systems. By extending the theory of global incremental stability and of incremental input to state stability of nonlinear systems and by using functional analysis techniques, we generalized the results of [J03, C22] to nonlinear systems with constant and known delay in [J08, C24] and with variable and unknown delay in [J15, C29]. Necessary and sufficient conditions for discrete-time nonlinear systems with time-varying delays to fulfill the global asymptotic stability

and the input-to-state stability properties have been studied in [J20, C43], which is also useful to construct symbolic models for this class of systems. Symbolic models for networked control systems have been studied in [J23, C34, C35, M01]. In particular, networked control systems considered are rather general and comprises most relevant nonidealities, as bounded time-varying computation time of computing units, and nonidealities in the communication network infrastructure as quantization errors, bounded time-varying network access time, bounded time-varying network delays introduced by the network, bounded packets loss (i.e. number of packets bounded over a time unit) and limited bandwidth. Preliminary studies on networked control systems were addressed in [C15]. Decentralized control architectures for spatially distributed nonlinear systems were investigated in [J22, J16, C39]. Above mentioned results are all based on an incremental stability assumption of the control system considered. This assumption has been relaxed to the notion of incremental forward completeness introduced in [J13, C26]; results of [J13, C26] then hold under milder assumptions than those in [J03, C22] but propose symbolic models that are approximate (and alternating) simulations of the original nonlinear system and not approximate bisimulations as instead those in e.g. [J03, C22] for incrementally stable nonlinear systems. Symbolic models and control design of piecewise affine systems have been proposed in [J14, C32]. Efficient algorithms for the design of controllers for nonlinear systems with logic specifications have been proposed in [J12, C28] and [S01, C52]. All mentioned above results assume exact knowledge of the full state of the system which may be restrictive in some applications. Symbolic models and control design with logic specifications for nonlinear control systems with quantized measurements of the state have been studied in [C42] and with quantized measurements of the output in [J28, C46]. In [C53, S02] we propose a data-driven approach to the control of general and unknown abstract systems with regular language specifications. Application of some of these results to the Boost DC-DC converter, a benchmark selected within the Network of Excellence HyCON, has been studied in [J07, B06], to vehicle platooning in [C36], to the artifical pancreas in [C50, S04] and [C53, S02], and to chemical processes in [J27]. In [B09] we review some of the results mentioned above. In [J26] we present a tutorial on the use of formal methods for the control of Cyber-Physical Systems.

(ii) My contribution in the research topic of analysis and control of stochastic linear systems was first focused on studying a theory of bisimulation for stochastic linear systems in both discrete-time and continuous-time domains. In this regard, we first proposed a new definition of stochastic bisimulation and a geometric characterization of it; we then developed model reduction techniques preserving stochastic bisimulation equivalence and studied connections with stochastic optimal control and the notion of equivalence of stochastic external behavior, see [J21, C45, C44, C41]. These results establish for the first time, necessary and sufficient conditions for the study of stochastic bisimulations of systems with an infinite number of states. We then studied control via bisimulation in [J25] and via equivalence of stochastic external behavior in [C47].

(iii) My contributions in the research topic of analysis of discrete-event systems are on efficient design of decentralized critical observers for networks of finite state machines, see [J17, C40, C30], approximate diagnosability for metric systems [J18, B10], approximate predictability for pseudo-metric systems [J29, C49]. Given the generality of the systems considered in [J18, B10, J29, C49], the proposed results can be applied not only to finite state machines but also to nonlinear and hybrid dynamical systems (with an infinite number of states) as also illustrated in the examples proposed in [J18, J29]. In the regard of modeling, analysis and control of linear systems, my contributions are on observability and detectability [J6, J9, B07, B02, C20, C19, C16, C08, C06], stabilizability [J04, B04, C17, C10, C09], control and problems with safety specifications [J02, B01, C12, C07, C03, C02, C01], bisimulation theory [J01, C21] and positive switching systems [B03]. In particular, the results in [C06] offered necessary and sufficient testable conditions for the study of observability for linear switching systems with continuous input. Control via bisimulation of abstract state systems has been addressed in [C13]. Deadlocks and livelocks of hybrid systems have been studied in [B05] e stochastic hybrid systems in [C05]. Applications of some of these results to digital idle-speed control of automotive engines are reported in [J02, C04]. Hybrid controllers for chemical processes have been explored in [J24, J19, C48].

(iv) In the European projects Hybridge, iFly and MAREA on air traffic management (ATM) systems, we developed a compositional hybrid systems framework to model and analyse procedures of ATM systems under study at Eurocontrol and in particular, in the SESAR 2020 concept of operation. Impact of human errors and devises malfunctioning in large-scale ATM systems have been studied by using notions of observability and

bisimulation theory for hybrid systems, see papers [M02, C38, C37, C33, C27, C25] and technical reports [R07-R01].

(v) In quantitative finance, in collaboration with Dr. Gianni Pola (Amundi, Milano) we developed a novel investment strategy, called *Optimal Dynamic Asset Allocation (ODAA)*, that has been effectively implemented as a sole financial product in a financial fund from 2008 to 2013 (25.000.000 € average financial volume handled) and as strategy supporting other financial products. This collaboration has also lead to publications [J11, C18]. Methodologies employed are based on optimal control for stochastic reachability as studied in [C14].

(vi) We started working on the control of vehicular platoon in [C54, C51, S03] with an approach that is based on macroscopic variables allowing improving traffic flow in terms of energy saving and etc. Moreover, as already mentioned above control of vehicular platoon was also addressed in [C36] by means of the use of symbolic models.

COLLABORATIONS WITH UNIVERSITIES AND COMPANIES

- **Amundi SGR s.p.a. Milan (Italy)**
  Collaborator: Gianni Pola

- **Crédit Agricole Asset Management (CAAM) SGR s.p.a. Milan (Italy)**
  Collaborator: Gianni Pola

- **Istituto di Analisi dei Sistemi ed Informatica "A. Ruberti", Consiglio Nazionale delle Ricerche (Italy)**
  Collaborator: Alessandro Borri

- **KTH Royal Institute of Technology, Stockholm (Sweden)**
  Collaborators: Karl H. Johansson, Dimos V. Dimarogonas

- **National Aerospace Laboratory NLR (The Netherlands)**
  Collaborator: Mariken Everdij

- **PARADES, Rome (Italy)**
  Collaborators: Andrea Balluchi, Luca Benvenuti

- **Politecnico di Milano (Italy)**
  Collaborator: Sina Lessanibahri

- **University of California at Berkeley (USA)**
  Collaborators: Shankar Sastry, Alessandro Abate

- **University of California at Los Angeles (USA)**
  Collaborators: Paulo Tabuada, Majid Zamani, Manuel Mazo

- **University of Cambridge (UK)**
  Collaborators: John Lygeros, Manuela L. Bujorianu

- **University of Grenoble (France)**
  Collaborator: Antoine Girard

- **University of Groningen (The Netherlands)**
  Collaborator: Arjan J. van der Schaft

- **University of Patras (Greece)**
  Collaborator: John Lygeros

- **University of Tehran (Iran)**
  Collaborator: Mohammad Fakhroleslam

- **University of Twente (The Netherlands)**
  Collaborators: Arjan J. van der Schaft, Jan Willem Polderman

VISITING POSITIONS

- Resilient Control of Infrastructure Networks Workshop
  Politecnico di Torino
  September 23rd - 27th 2019
  Visiting Scholar

- Institute of Mathematics and Computing Science
  University of Groningen (The Netherlands)
  April 26th – May 7th 2010
  Visiting Scholar

- Department of Electrical Engineering
  University of California at Los Angeles (USA)
  February 22nd – April 25th 2009
  Visiting Scholar

- EECS Department
  University of California Berkeley (USA)
  November 28th – December 9th 2005
  Visiting Scholar

- Department of Applied Mathematics
  University of Twente (The Netherlands)
  September 6th – December 11th 2004
  Research Fellow

- Engineering Department,
  University of Cambridge (Regno Unito)
  October – November 2002 and February 2003
  Visiting Scholar

PROFESSIONAL AND EDITORIAL ACTIVITIES

- **'Trésorier' de l'Association European Embedded Control Institute**
  From November 5th 2020

- **Co-editor** of Proceedings
  "Third International Workshop on Hybrid Autonomous Systems (HAS)",
  Rome, 17th March 2013,
  Electronic Proceedings in Theoretical Computer Science (EPTCS) no. 124,
  Luca Bortolussi, Manuela L. Bujorianu and Giordano Pola Eds.,
  Published: 22nd August 2013, DOI: 10.4204/EPTCS.124, ISSN: 2075-2180

- **Co-Chair** of the Third International Workshop on Hybrid Autonomous Systems 2013 (HAS 2013), Rome (Italy) April 2013, with Manuela Bujorianu and Luca Bortolussi

- **Member of Technical Committee** in:
  - IEEE CSS Technical Committee on Hybrid Systems

- **Associate Editor for**:
  - European Journal of Control, since February 11th 2019
  - 19th European Control Conference (ECC), Rotterdam, The Netherlands, June 29 - July 2, 2021

- **Member of the International Program Committee** in:
  - 29th IEEE Mediterranean Conference on Control and Automation (MED 2021)
  - 24th ACM International Conference on Hybrid Systems: Computation and Control, Nashville, Tennessee, US, May 19-21, 2021
  - 28th IEEE Mediterranean Conference on Control and Automation (MED 2020)
  - 24th International Symposium on Mathematical Theory of Networks and Systems (MTNS 2020)
  - 27th IEEE Mediterranean Conference on Control and Automation (MED 2019)
  - 26th IEEE Mediterranean Conference on Control and Automation (MED 2018)
  - 25th IEEE Mediterranean Conference on Control and Automation (MED 2017)
  - 24th IEEE Mediterranean Conference on Control and Automation (MED 2016)
  - 22nd International Symposium on Mathematical Theory of Networks and Systems (MTNS 2016)
  - 23rd IEEE Mediterranean Conference on Control and Automation (MED 2015)
  - 4th Workshop Hybrid Autonomous Systems 2004 (HAS 2014)
  - 21st International Symposium on Mathematical Theory of Networks and Systems (MTNS 2014)
  - 3rd Workshop Hybrid Autonomous Systems 2004 (HAS 2013)
  - 20th IEEE Mediterranean Conference on Control and Automation (MED 2012)
  - 19th IEEE Mediterranean Conference on Control and Automation (MED 2011)
  - 13th International Conference on Hybrid Systems: Computation and Control 2010 (HSCC 2010)

- **Coordinator and speaker of the S.I.D.R.A. PhD Summer School 2017 "Formal methods for the control of large-scale networked nonlinear systems with logic specifications"**
  Coordinators: Maria Domenica Di Benedetto, Giordano Pola
  Speakers: Alessandro Borri, Maria Domenica Di Benedetto, Pierdomenico Pepe, Giordano Pola

- **Co-Organizer of the Workshop "Correct-by-Design Embedded Control Software Synthesis"**
  Conferenza 49th IEEE Conference on Decision and Control 2010,
  Co-organizers: Antoine Girard, Giordano Pola and Paulo Tabuada

- **Chair/Co-chair** in the following sessions in the international conferences and workshops:
  - Learning and Control, Conferenza SIDRA 2020 (Chair)
  - Data based and data driven control, IFAC World Congress 2020 (Chair)
  - Hybrid systems II – CDC 2017 (Co-Chair)
  - Differential algebraic systems – CDC 2017 (Co-Chair)
  - 5 Hybrid and Discrete-event Systems - European Control Conference 2015 (Chair)
  - Networked Control Systems III – 51th IEEE Conference on Decision and Control 2012 (Chair)
  - Supervisory control and automata – 18th IFAC World Congress 2011 (Co-Chair)
  - Network and Control - 13th International Conference on Hybrid Systems: Computation and Control 2010 (Chair)

- Modeling and Control of Hybrid Systems – 46th IEEE Conference on Decision and Control 2007 (Co-Chair)
- Stochastic Optimal Control I - 45th IEEE Conference on Decision and Control 2006 (Chair)

- **Reviewers for the following archival journals:** IEEE Transaction on Automatic Control, SIAM Journal on Control and Optimization, Automatica, Systems & Control Letters, International Journal of Robust and Nonlinear Control, International Journal of Control, Nonlinear Analysis, Journal on Discrete Event Systems, IEEE Transactions on Control Systems Technology

- **Reviewers for the following international conferences and workshops:** Hybrid Systems: Computation and Control, IEEE Conference on Decision and Control, IEEE American Control Conference, IEEE European Control Conference, IEEE Mediterranean Control Conference, IFAC World Congress, IFAC Analysis and Design of Hybrid Systems, Mathematical Theory of Networks and Systems, Hybrid Autonomous Systems

RESPONSIBLE AND RESEARCHER IN NATIONAL AND EUROPEAN PROJECTS:

Local responsible for the University of L'Aquila in the following projects:

- **Mathematical approach towards resilience engineering in ATM (MAREA)**
  EU WP-E Research Projects
  2011-2013 (30 months)
  Total funding: 649.658 €
  Funding for the Center of Excellence DEWS: 182.000 €
  Funding from the EU: 163.800 €

- **Safety, Complexity and Responsibility based design and validation of highly automated Air Traffic Management (iFly)**
  EU FP6 STREP, 2007-2011 (51 months)
  Total funding: 3.309.000 €
  Funding for the Center of Excellence DEWS: 330.000 €
  Funding from the EU: 166.500 €
  Local responsible from month M25 to month M51 (27 months)

- **Algoritmi Sistemi e diSpositivI per mOnitoraggio e diagnostica di Macchine per le fabbriche Intelligenti (ASSIOMI)**
  Programme "PON R&I 2014-2020" - "Fabbrica intelligente" of MIUR
  Total funding: 2.008.334,39 €
  Funding for the University of L'Aquila: 450.000 €
  Local responsible and coordinator of the work package "Modeling for diagnosis and prediction"

Responsible for the University of L'Aquila for the RIA funds:

- **Analisi e controllo di sistemi complessi**, A.Y. 2019/2020
  Funding from MIUR 15.854 €

- **Analisi e controllo di sistemi complessi**, A.Y. 2018/2019
  Funding from MIUR 10.920 euro

Researcher for the following projects:

- **Safety, Complexity and Responsibility based design and validation of highly automated Air Traffic Management (iFly)**
  EU FP6 STREP, 2007-2011 (51 months)
  Total funding: 3.309.000 €
  Funding for the Center of Excellence DEWS: 330.000 €
  Funding from the EU: 166.500 €
  Researcher from month M1 to month M24 (24 months)

- **SMart In home LIviNG: Tecnologie innovative per la sensoristica e l'automazione dedicate alla Domotica (SMILING)**
  Call RIDITT 2009, 2012-2014 (21 months)
  Total funding: 1.999.687 €
  Funding for the Center of Excellence DEWS: 501.250 €
  Funding from MIUR: 250.625 €

- **Network of Excellence- Highly-complex and networked control systems (HyCON2)**
  EU FP7 Network of Excellence, 2011-2014 (48 months)
  Total funding: 4.905.855 €
  Funding for the Center of Excellence DEWS: 332.926 €
  Funding from the EU: 273.000 €

- **Automated Synthesis of Embedded Control Software**
  National Science Foundation CAREER award 717188, 2006 -2010 (48 months)
  Funding: 308.331 $

- **Metodologie avanzate per il controllo di sistemi ibridi (MACSI)**
  Progetto PRIN 2005, 2006-2007 (24 months)

- **Network of Excellence - Hybrid Control: Taming Heterogeneity and Complexity of Networked Embedded Systems (HyCON)**
  EU FP6 Network of Excellence, 2004-2008 (48 months)
  Total funding: 5.608.166 €
  Funding for the Center of Excellence DEWS: 236.000 €
  Funding from the EU: 236.000 €

- **Metodologie di progetto di controllori immersi per sistemi ibridi**
  Progetto PRIN 2002, 2003-2004 (24 months)
  Total funding: 171.000 €
  Funding for the Center of Excellence DEWS: 96.900 €
  Funding from MIUR: 67.800 €

- **Distributed Control and Stochastic Analysis of Hybrid Systems Supporting Safety Critical Real-Time Systems Design (HYBRIDGE)**
  EU FP5 STREP, 2002-2005 (36 months)
  Total funding: 3.991.156 €
  Funding for the Center of Excellence DEWS: 453.697 €
  Funding from the EU: 226.848 €

- **Design of Embedded Controllers for Safety Critical Systems (COLUMBUS)**
  EU FP5 STREP, 2002-2004 (24 months)
  Total funding: 1.919.154 €
  Funding for the Center of Excellence DEWS: 600.141 €
  Funding from the EU: 300.070 €

Projects not funded:

- **(DS)2: Diagnosi e sicurezza nei sistemi distribuiti: il punto di vista della teoria del controllo su Virtual Power Plants**
  FONDO INTEGRATIVO SPECIALE PER LA RICERCA (FISR) D.D. 11 79 del 18.6.2019
  Partners: Università degli Studi di CAGLIARI, Università degli Studi de L'AQUILA, Politecnico di BARI
  Total proposed and approved funding: 1.269.000 €
  Funding proposed for the University of L'Aquila: 435.000 €
  Overall Score: 52 over 60
  Overall Evaluation: Cost of the project proposal more than reasonable and consisting mainly of cost of the staff
  Note: Project proposal passed elibigility in all items of the evaluation form.
  Local Responsible for the University of L'Aquila

PLENARY LECTURE AND SEMINARS:

Plenary Lecture:

- **Networked Embedded Control Systems: from Modelling to Implementation**
  First International Conference on Systems and Computer Science, August 29th - 31th 2012, Lille, France

Invited talks for workshops and symposia:

- **Control of Cyber-Physical Systems with Logic Specifications**
  Resilient Control of Infrastructure Networks Workshop, Politecnico di Torino, Italy, September 26th 2019

- **Arenas of Finite State Machines and their application to the Modelling and Analysis of Air Traffic Management Systems**
  Second Edition of the Hybrid Autonomous Systems (HAS2012), Tallinn, Estonia, March 31th 2012

- **Arenas of Finite State Machines and their application to the Modelling and Analysis of Air Traffic Management Systems**
  Second Edition of the Hybrid Autonomous Systems (HAS2012), Tallinn, Estonia, March 31th 2012

- **Symbolic Controller Design for Continuous Systems**
  Second International Symposium on Interdisciplinary Modelling of Cyber-Physical Systems, University of Manchester, UK, May 25th-28th 2011

Seminars:

- **Formal Methods for the Control of Cyber-Physical Systems with Logic Specifications**
  Politecnico di Torino, Italy, October 1st 2019

- **Formal methods for the control of Cyber-Physical Systems with logic specifications**
  Gran Sasso Science Institute, L'Aquila, Italy, January 30th 2018

- **A symbolic approach to the control design of cyber-physical systems**

Dipartimento di Informatica, Università di Verona, Italy, May 14th 2013

- **Arenas of Finite State Machines**
  Istituto di Analisi dei Sistemi ed Informatica, CNR, Rome, Italy, January 18th 2012

- **Symbolic models for nonlinear control systems**
  Istituto di Analisi dei Sistemi ed Informatica, CNR, Rome, Italy, May 19th 2008
  IASI Seminar Series 2008

- **Symbolic models for nonlinear control systems**
  European Embedded Control Institute (EECI) Seminars Series 2008
  University of L'Aquila, Italy, January 24th 2008

- **Symbolic models for nonlinear control systems**
  UCLA Systems, Dynamics and Control (SyDyc) Seminars Series 2007
  University of California at Los Angeles, USA, October 19th 2007

- **On-the-fly synthesis of correct-by-design embedded control software**
  Electrical Engineering Annual Research Review
  University of California at Los Angeles, USA, February 16th 2007

- **Structural Properties in Analysis and Control of Hybrid Systems**
  University of Notre Dame, Indiana, USA, April 3rd 2006

- **Achievable bisimilar behaviour of abstract state systems**
  University of California at Berkeley, USA, December 6th 2005

- **Equivalence of Switching Linear Systems by Bisimulation**
  CWI, Amsterdam, The Netherlands, November 17th 2004

TEACHING ACTIVITIES

Lecturer of the following courses:

- **Hybrid Systems Modeling**
  Corso di Laurea Magistrale in Ingegneria Informatica e Automatica (Master Degree in Information and Automatic Control Engineering)

Academic Year	Crediti Formativi Universitari
2020/2021	6 CFU
2019/2020	6 CFU

Note: This course is taught in English

- **Analisi e Controllo dei Sistemi Ibridi (Analysis and Control of Hybrid Systems)**
  Corso di Laurea Magistrale in Ingegneria Informatica e Automatica (Master Degree in Information and Automatic Control Engineering)

Academic Year	Crediti Formativi Universitari
2018/2019	6 CFU
2017/2018	6 CFU

- **Modeling and control of networked distributed systems**
  Corso di Laurea Magistrale in Ingegneria Matematica e Erasmus Mundus Programme (Master Degree in Mathematical Engineering and Erasmus Mundus Programme)

Academic Year	Crediti Formativi Universitari
2020/2021	6 CFU
2019/2020	6 CFU
2018/2019	6 CFU
2017/2018	6 CFU
2016/2017	6 CFU
2015/2016	6 CFU
2014/2015	6 CFU
2013/2014	6 CFU

Notes: This course is taught in English. This course in the A.Y. 2019/2020 and 2020/2021 is the same as Hybrid Systems Modeling but offered for the Master Degree in Mathematical Engineering and Erasmus Mundus Programme

- **Automazione industriale (Industrial Automation)**
  Corso di Laurea Triennale in Ingegneria dell'Informazione (Bachelor Degree in Information Engineering)

Academic Year	Crediti Formativi Universitari
2020/2021 (*)	6 CFU
2019/2020	6 CFU
2018/2019	6 CFU
2017/2018	6 CFU
2016/2017	6 CFU
2015/2016	6 CFU
2014/2015	6 CFU
2013/2014	6 CFU
2012/2013	6 CFU

(*) This course will be given in the second semester of the A.Y. 2020-2021

- **Control systems**
  Corso di Laurea Magistrale in Ingegneria Matematica e Erasmus Mundus Programme (Master Degree in Mathematical Engineering and Erasmus Mundus Programme)

Academic Year	Crediti Formativi Universitari
2012/2013	3 CFU
2011/2012	3 CFU

Note: This course is taught in English. I taught half of the whole course consisting of 6 CFU

- **Fondamenti di automatica (Elements of control theory)**
  Corsi di Laurea Magistrale in Ingegneria Meccanica e Lauree Triennali in Ingegneria Elettrica e in Ingegneria Industriale (Master Degree in Mechanical Engineering and Bachelor Degrees in Electrical and Industrial Engineering)

Academic Year	Crediti Formativi Universitari
2012/2013	3 CFU

2011/2012	6 CFU
2010/2011	9 CFU
2009/2010	9 CFU
2008/2009	9 CFU

Notes: In A.Y. 2012-2013, I lectured half of the course consisting of 6 CFU

Lecturer in the Master:

- Second level master "Tecnologie, Applicazioni e Servizi in Reti Eterogenee" (Technologies, Applications and Services in Heterogeneous Networks) in A.Y. 2008/2009 for module "Networked Embedded Control", 18 hours lectures given on "Correct-by-Design embedded control software"

Teaching assistant in:

- Sistemi Embedded (Embedded Systems) in A.Y. 2008/2009, 2009/2010, 2010/2011, 2011/2012

- Analisi e controllo di sistemi ibridi (Analysis and Control of Hybird Systems) in A.Y. 2004/2005, 2008/2009, 2009/2010, 2010/2011, 2011/2012, 2012/2013, 2013/2014, 2014/2015

- Controlli Automatici II (Automatic Control - part two) in A.Y. 2003/2004, 2005/2006, 2006/2007

- Controlli Automatici I (Automatic Control - part one) in A.Y. 2002/2003

Advisor and Co-advisor of the following PhD and postdoctoral students:

- Tommaso Masciulli, Doctoral student, A.Y. 2018/2021 (Advisor: Giordano Pola, Co-advisor: Luigi Pomante)

- Alessandro Borri, Postodoctoral researcher, A.Y. 2011/2012 (Advisor: Maria Domenica Di Benedetto, Co-advisor: Giordano Pola)

- Davide Pezzuti, Doctoral student, A.Y. 2012/2014 (Advisor: Maria Domenica Di Benedetto, Co-advisor: Giordano Pola)

- Alessandro Petriccone, Doctoral student, A.Y. 2009/2011 (Advisor: Maria Domenica Di Benedetto, Co-advisor: Giordano Pola)

- Alessandro Borri, Doctoral student, A.Y. 2008/2010 (Advisor: Maria Domenica Di Benedetto, Co-advisor: Giordano Pola)

Supervisor/co-supervisor for the following bachelor and master students:

- Shanj Raul Ken Zaccaretti, Laurea Magistrale in Ingegneria Informatica-Automatica, A.Y. 2019-2020

- Pietro Matteo Morgillo, Laurea Magistrale in Ingegneria Informatica-Automatica, A.Y. 2019-2020

- Stefano Moscardelli, Laurea Triennale in Ingegneria dell'Informazione, A.Y. 2018/2019

- Rajan Kumar, Laurea Triennale in Ingegneria dell'Informazione, A.Y. 2018/2019

- Gino Ventura, Laurea Triennale in Ingegneria dell'Informazione, A.Y. 2018/2019

- Antonio De Cristofaris, Laurea Triennale in Ingegneria dell'Informazione, A.Y. 2018/2019

- Andrea Strappato, Laurea Triennale in Ingegneria dell'Informazione, A.Y. 2018/2019

- Massimo Morelli, Laurea Triennale in Ingegneria dell'Informazione, A.Y. 2018/2019

- Andrea Di Tomasso, Laurea Triennale in Ingegneria dell'Informazione, A.Y. 2018/2019

- Andrea Clivio, Laurea Triennale in Ingegneria dell'Informazione, A.Y. 2018/2019

- Stanislav Fedorov, Laurea Magistrale in Ingegneria Matematica, A.Y. 2017/2018

- Yan Brodskyi, Laurea Magistrale in Ingegneria Matematica, A.Y. 2017/2018

- Morgillo Matteo Pietro, Laurea triennale in Ingegneria dell'Informazione, A.Y. 2017/2018

- Damiano Fazio, Laurea triennale in Ingegneria dell'Informazione, A.Y. 2017/2018

- Tommaso Masciulli, Laurea Magistrale in Ingegneria Informatica e Automatica, A.Y. 2017/2018

- Graziano Battisti, Laurea in Ingegneria Elettronica V.O., A.Y. 2015/2016

- Stefano Di Giovacchino, Laurea triennale in Ingegneria dell'Informazione, A.Y. 2015/2016

- Marco Lella, Laurea triennale in Ingegneria dell'Informazione, A.Y. 2015/2016

- Stefania Cicchini, Laurea Magistrale in Ingegneria Matematica, A.Y. 2013/2014

- Fabrizio Battista, Laurea triennale in Ingegneria dell'Informazione, A.Y. 2015/2016

- Tommaso Masciulli, Laurea triennale in Ingegneria dell'Informazione, A.Y. 2015/2016

- Sina Lessanibahri, Laurea Magistrale in Ingegneria Matematica, A.Y. 2013/2014

- Luca Scarciolla, Laurea Magistrale in Ingegneria Informatica Automatica, A.Y. 2013/2014

- Stefano Perrotti, Laurea Magistrale in Ingegneria Informatica Automatica, A.Y. 2012/2013

- Davide Pezzuti, Laurea Magistrale in Ingegneria Informatica Automatica, A.Y. 2011/2012

- Francesca Perilli, Laurea Magistrale in Ingegneria Informatica Automatica, A.Y. 2008/2009

- Lorenzo Cantelmi, Laurea Magistrale in Ingegneria Informatica Automatica, A.Y. 2008/2009

- Pasquale Visconti, Laurea Magistrale in Ingegneria Informatica Automatica, A.Y. 2007/2008

- Nicola Caruso, Laurea Triennale in Ingegneria dell'Informazione, A.Y. 2004/2005

ACTIVITIES IN SUPPORT OF THE UNIVERSITY OF L'AQUILA

- Responsible of the task "High Education" for the Center of Excellence "Design Methodologies for Embedded controllers, Wireless interconnect and System-on-chip" (DEWS) from April 2020 at present

- Responsible of the research line "Analysis and control with guaranteed performance" with Prof. Pepe for the Center of Excellence DEWS from April 2020 at present

- Responsible of the EECI (European Embedded Control Institute) Laboratory of DEWS with Prof. Pepe from October 2020 at present

- Secretary of the PhD Program in Information and Communication Technologies in the cycles XXVIII, XXIX, XXX, XXXII, XXXIII, XXXIV

- Member of the PhD Program in Information and Communication Technologies in the cycles XXVIII, XXIX, XXX, XXXII, XXXIII, XXXIV, XXXV, XXXVI, XXXV

- Member of the Teaching Area committee for the Bachelor Degree in Information Engineering from November 2012 to December 2014 and from January 2019 at present

- Member of "Gruppo Assicurazione Qualità" for the Bachelor Degree in Information Engineering from January 2019 at present

- Member of the committee "Fattibilità Didattica" of the DISIM Department (with the aim of planning didactical activitiets during COVID-19) from June 2020 at present

- Member of the committee of the DISIM Department for Internationalization Issues, from November 2012 to December 2014

PUBLICATIONS

Number and type of publications:

- Numer of proceedings edited: 1
- Number of papers in archival journals: 29
- Number of book chapters: 10
- Numero di papers on magazines: 2
- Number of conference papers: 54 of which 8 invited
- Number di theses: 2
- Number of submitted papers: 4 on archival journals
- Number of technical reports for European projects: 7

Archival Journals papers:

[J30] String Stability of a Vehicular Platoon with the use of Macroscopic Information,
Mirabilio, M., Iovine, A., De Santis, E., Di Benedetto, M.D., Pola, G.
IEEE Transactions on Intelligent Transportation Systems
Accepted as Regular Paper, 2021

[J29] Approximate Predictability of Pseudo-Metric Systems
De Santis, E., Di Benedetto, M.D., Fiore, G., Pola, G.
Nonlinear Analysis: Hybrid Systems, 2020

[J28] Symbolic Control Design of Nonlinear Systems with Outputs
Pola, G., Di Benedetto, M.D., Borri, A.
Automatica, November 2019, Volume 109, Article 108511

[J27] Time-optimal symbolic control of a changeover process based on an approximately bisimilar symbolic model
Fakhroleslam, M., Pola, G., De Santis, E., Di Benedetto, M.D.
Journal of Process Control, 81(2019):126–135

[J26] Control of Cyber–Physical–Systems with Logic Specifications: A Formal Methods Approach
Pola, G., Di Benedetto, M.D.
Annual Reviews in Control, 47(2019):178-192

[J25] Output Feedback Control via Bisimulation of Stochastic Linear Systems
Pola, G., Manes, C., Di Benedetto, M.D.
IEEE Control Systems Letters, 3(1): 25-30, January 2019

[J24] Design of a Hybrid Controller for Pressure Swing Adsorption Processes
Fakhroleslam, M., Fatemi, S., Boozarjomehry, R.B., De Santis, E., Di Benedetto, M.D., Pola, G.
IEEE Transactions on Control Systems Technology 27(5):1878-1892, September 2019

[J23] Design of Symbolic Controllers for Networked Control Systems
Borri, A., Pola, G., Di Benedetto, M.D.
IEEE Transactions on Automatic Control, 63(3):1034-1046, March 2019

[J22] Decentralized Supervisory Control of Networks of Nonlinear Control Systems
Pola, G., Pepe, P., Di Benedetto, M.D.
IEEE Transactions on Automatic Control, 63(9):2803-2817, September 2018

[J21] Bisimulation Equivalence of Discrete-Time Stochastic Linear Control Systems
Pola, G., Manes, C., van der Schaft, A.J., Di Benedetto, M.D.
IEEE Transactions on Automatic Control, 63(7):1897-1912, July 2018

[J20] On Lyapunov–Krasovskii Characterizations of Stability Notions for Discrete-Time Systems with Uncertain Time-Varying Time-Delays
Pepe, P., Pola, G., Di Benedetto, M.D.
IEEE Transactions on Automatic Control, 63(6): 1603-1617, June 2018

[J19] Maximal Safe Set Computation for Pressure Swing Adsorption Processes
Fakhroleslam, M., Fatemi, S., Boozarjomehry, R.B., De Santis, E., Di Benedetto, M.D., Pola, G.
Computers & Chemical Engineering, vol. 109, pp. 179-190, 2018

[J18] Approximate Diagnosis of Metric Systems
Pola, G., De Santis, E., Di Benedetto, M.D.
IEEE Control Systems Letters, 2(1): 115-120, January 2018

[J17] Decentralized Critical Observers of Networks of Finite State Machines and Model Reduction
Pola, G., De Santis, E., Di Benedetto, M.D., Pezzuti, D.
Automatica, 86:174-182, December 2017

[J16] Symbolic Models for Networks of Control Systems
Pola, G., Pepe, P. Di Benedetto, M.D.
IEEE Transactions on Automatic Control, 61(11):3663-3668, November 2016

[J15] Symbolic Models for Time–Varying Time–Delay Systems via Alternating Approximate Bisimulation
Pola, G., Pepe, P. Di Benedetto, M.D.
International Journal of Robust and Nonlinear Control, 25:2328–2347, September 2015

[J14] Symbolic Models and Control of Discrete-Time Piecewise Affine Systems: An Approximate Simulation Approach
Pola, G., Di Benedetto, M.D.
IEEE Transactions on Automatic Control, 59(1):175-180, January 2014

[J13] Symbolic models for nonlinear control systems without stability assumptions
Zamani, M., Pola, G., Mazo, M., Tabuada, P.
IEEE Transactions on Automatic Control, 57(7):1804-1809, July 2012

[J12] Integrated design of symbolic controllers for nonlinear systems
Pola, G., Borri, A., Di Benedetto, M.D.

IEEE Transactions on Automatic Control, 57(2):534-539, February 2012

[J11] A Stochastic Reachability Approach to Portfolio Construction in Finance Industry
Pola, G., Pola, G.
IEEE Transactions of Control Systems Technology, 20(1):189-195, January 2012

[J10] Symbolic models for nonlinear control systems affected by disturbances
Borri, A., Pola, G., Di Benedetto, M.D.
International Journal of Control, 85(10):1422-1432, September 2012

[J09] A complexity reduction approach to detectability of switching systems
De Santis, E., Di Benedetto, M.D., Pola, G.
International Journal of Control, 83(9):1930-1938, September 2010

[J08] Symbolic models for nonlinear time-delay systems using approximate bisimulation
Pola, G., Pepe, P., Di Benedetto, M.D., Tabuada, P.
Systems & Control Letters 59(6): 365-373, June 2010

[J07] Approximately bisimilar symbolic models for incrementally stable switched systems
Girard, A., Pola, G., Tabuada, P.
IEEE Transactions on Automatic Control, 55(1):116-126, January 2010

[J06] A structural approach to detectability for a class of hybrid systems
De Santis, E., Di Benedetto, M.D., Pola, G.
Automatica, 45(5):1202-1206, May 2009

[J05] Symbolic models for nonlinear control systems: Alternating approximate bisimulations
Pola, G., Tabuada, P.
SIAM Journal on Control and Optimization, 48(2):719-733, 2009

[J04] Stabilizability of linear switching systems
De Santis, E., Di Benedetto, M.D., Pola, G.
Nonlinear Analysis, Special Issue Hybrid Systems 2 (2008) 750-764

[J03] Approximately bisimilar symbolic models for nonlinear control systems
Pola, G., Girard A., Tabuada, P.
Automatica, 44(10):2508-2516, October 2008

[J02] Digital Idle Speed Control of Automotive Engine: A Safety Problem for Hybrid Systems
De Santis, E., Di Benedetto, M.D., Pola, G.
Nonlinear Analysis, Special Issue Hybrid Systems and Applications, 65 (2006) 1705-1724

[J01] Equivalence of Switching Linear Systems by Bisimulation
Pola, G., Van der Schaft, A.J., Di Benedetto, M.D.
International Journal of Control, 79(1):74–92, January 2006

Co-editor of the volume

[V01] Third International Workshop on Hybrid Autonomous Systems (HAS), Rome, 17th March 2013
Electronic Proceedings in Theoretical Computer Science (EPTCS) no. 124
Luca Bortolussi, Manuela L. Bujorianu and Giordano Pola Eds.
Published: August 22nd 2013, DOI: 10.4204/EPTCS.124, ISSN: 2075-2180

Book Chapters

[B10] Approximate diagnosability of metric transition systems
Pola, G., De Santis, E., Di Benedetto, M.D.
15th International Conference on Software Engineering and Formal Methods, September 4-8, 2017, Trento (Italy)
A. Cimatti and M. Sirjani Eds.
Lecture Notes in Computer Science, Springer Verlag, vol. no. 10469, pp. 269-283

[B09] Networked Embedded Control Systems: from Modelling to Implementation
Di Benedetto, M.D., Pola, G.
Electronic Proceedings in Theoretical Computer Science (EPTCS) 124, pp. 9-13
Bortolussi L., Bujorianu M.L., Pola G. (Eds.): HAS 2013, doi:10.4204/EPTCS

[B08] Switched and piecewise affine systems
J. Daafouz, M.D. Di Benedetto, V.D.Blondel, G. Ferrari-Trecate, L. Hetel, M. Johansson, A.l. Joluvski, S. Paoletti, G. Pola, E. De Santis, R. Vidal
Handbook of Hybrid Systems Control, Theory, Tools, Application
J. Lunze and F. Lamnabhi-Lararrigue, Eds.
Cambridge University Press, 2009, pp. 87-137

[B07] Observability of linear switched systems
De Santis, E., Di Benedetto, M.D., Pola, G.
Handbook of Hybrid Systems Control, Theory, Tools, Application
J. Lunze and F. Lamnabhi-Lararrigue, Eds.
Cambridge University Press, 2009, pp. 106-112

[B06] Approximately bisimilar symbolic models for Incrementally Stable Switched Systems
Girard, A., Pola, G., Tabuada, P.
Hybrid Systems: Computation and Control 2008
M. Egerstedt and B. Mishra, Eds.
Lecture Notes on Computer Information Sciences, Springer Verlag, vol. no. 4981, pp. 201-214

[B05] The Concepts of Deadlock and Livelock in Hybrid Control Systems
Abate, A., D'Innocenzo, A., Pola, G., Sastry, S., Di Benedetto, M.D.
Hybrid Systems: Computation and Control 2007
A. Bemporad, A. Bicchi and G. Buttazzo Eds.
Lecture Notes on Computer Information Sciences, Springer Verlag, vol. no. 4416, pp. 628-632
(Short Paper)

[B04] Stabilizability of affine switching systems: A Kalman-like approach
De Santis, E., Di Benedetto, M.D., Pola, G.
Taming Heterogeneity and Complexity of Embedded Control
F. Lamnabhi-Lagarrigue, S. Laghrouche, A. Loria and E. Panteley Eds.
International Scientific & Technical Encyclopedia (ISTE), London, 2006, pp. 263-276

[B03] Positive switching systems
De Santis, E., Pola, G.
Positive Systems: Theory and Applications (POSTA 2006)
C. Commault and N. Marchand Eds.
Lecture Notes on Control and Information Sciences, Springer Verlag, vol. no. 341, pp. 49-56

[B02] Critical Observability of a Class of Hybrid Systems and Application to Air Traffic Management
De Santis, E., Di Benedetto, M.D., Di Gennaro, S., D'Innocenzo, A., Pola, G.

Stochastic Hybrid Systems: Theory and Safety Critical Applications
H.A.P. Blom and J. Lygeros Eds.
Lecture Notes on Control and Information Sciences, Springer Verlag, vol. no. 337, pp. 141-170

[B01] Approximations of maximal controlled safe sets for hybrid systems
Berardi, L., De Santis, E., Di Benedetto, M.D., Pola, G.
Nonlinear and Hybrid Systems in Automotive Control
R. Johansson and A. Rantzer Eds.
Springer Verlag, London, 2003, pp. 335–349

Magazines papers

[M02] Safety Criticality Analysis of Multi-Agent Air Traffic Management Systems: A Compositional Hybrid Systems' Approach
De Santis, E., Di Benedetto, M.D., Pola, G.
ERCIM News No. 97, April 2014, Special theme: Cyber-Physical Systems
Guest editors M. D. Di Benedetto, F. L. Lagarrigue, E. Schoitsch

[M01] Towards a Unified Theory for the Control of CPS: A Symbolic Approach
Borri, A., Di Benedetto, M.D., Pola, G.
ERCIM News No. 97, April 2014, Special theme: Cyber-Physical Systems
Guest editors M. D. Di Benedetto, F. L. Lagarrigue, E. Schoitsch

Conference papers

[C54] On the utilization of Macroscopic Information for String Stability of a Vehicular Platoon,
Mirabilio, M., Iovine, A., De Santis, E., Di Benedetto, M.D., Pola, G.,
59th IEEE Conference on Decision and Control, Jeju Island, Republic of Korea, December 2020, in press

[C53] On data–driven controller synthesis with regular language specifications,
Pola, G., Masciulli, T., De Santis, E., Di Benedetto, M.D.
IFAC World Congress 2020
(Speaker)

[C52] On symbolic control design of nonlinear systems with dynamic regular language specifications,
Masciulli, T., Pola, G.
IFAC World Congress 2020

[C51] A Microscopic Human-Inspired Adaptive Cruise Control for Eco-Driving,
Mirabilio, M., Iovine, A., De Santis, E., Di Benedetto, M.D., Pola, G.
European Control Conference 2020

[C50] Symbolic models approximating possibly unstable time–delay systems with application to the artificial pancreas,
Pola, G., Borri, A. Pepe, P., Palumbo, P., Di Benedetto, M.D.
European Control Conference 2019, pp. 275-280

[C49] On approximate predictability of metric systems,
Fiore, G. De Santis, E., Pola, G., Di Benedetto, M. D.
6th IFAC Conference on Analysis and Design of Hybrid Systems

[C48] A Hybrid Controller for Purity Control of a Pressure Swing Adsorption Process,
Fakhroleslam, M., Boozarjomehry, R.B., Fatemi, S., Di Benedetto, M.D., De Santis, E., Pola, G.
56th IEEE Conference on Decision and Control, Melbourne, Australia, December 2017, pp. 2372-2377

(Speaker)

[C47] On Achievable Behavior of Stochastic Descriptor Systems,
Pola , G.
56th IEEE Conference on Decision and Control, Melbourne, Australia, December 2017, pp. 3164-3169
(Speaker)

[C46] Approximate Supervisory Control of Nonlinear Systems with Outputs,
Pola , G., Di Benedetto, M.D.
56th IEEE Conference on Decision and Control, Melbourne, Australia, December 2017, pp. 2991-2996
(Speaker)

[C45] On external behavior equivalence of continuous–time stochastic linear control systems,
Pola , G., Manes, C., Di Benedetto, M.D.
55th IEEE Conference on Decision and Control, Las Vegas, USA, December 2016, pp. 6583-6588

[C44] Model reduction of continuous–time stochastic linear control systems via bisimulation equivalence
Pola, G., Manes, C., van der Schaft, A., Di Benedetto, M.D.
55th IEEE Conference on Decision and Control, Las Vegas, USA, December 2016, pp. 6577-6582

[C43] On Lyapunov–Krasovskii Characterizations of Stability Notions for Discrete-Time Systems with Unknown Time-Varying Time-Delays
Pepe, P., Pola, G., Di Benedetto, M.D.
55th IEEE Conference on Decision and Control, Las Vegas, USA, December 2016, pp. 447-452

[C42] On Symbolic Control Design of Discrete–Time Nonlinear Systems with State Quantized Measurements
Pola, G., Borri, A., Di Benedetto, M.D.
55th IEEE Conference on Decision and Control, Las Vegas, USA, December 2016, pp. 6571-6576

[C41] Equivalence Notions for Discrete-Time Stochastic Control Systems
Pola, G., Manes, C., van der Schaft, A.J., Di Benedetto, M.D.
54nd IEEE Conference on Decision and Control, Osaka, Japan, December 2015, pp. 1180-1185

[C40] Critical Observability of Networks of Finite State Machines
Pezzuti, D., Lessanibahri, S., Pola, G., De Santis, E., Di Benedetto, M.D.
European Control Conference, Linz, Austria, July 2015, pp. 1872-1877

[C39] Symbolic Models for Networks of Discrete–Time Nonlinear Control Systems
Pola, G. , Pepe, P., Di Benedetto, M.D.
American Control Conference, Portland, Oregon, USA, June 2014, pp. 1787-1792

[C38] Safety Criticality Analysis of Air Traffic Management Systems: A Compositional Bisimulation Approach
De Santis, E., Di Benedetto, M.D., Everdij M., Pezzuti, D., Pola, G., Scarciolla, L.
SESAR Innovation Days, Stockholm, Sweden, November 2013
(Speaker)

[C37] A Critical Bisimulation Approach to Safety Criticality Analysis of Large–Scale Air Traffic Management Systems
Pezzuti, D., Pola, G., De Santis, E., Di Benedetto, M.D.
52nd IEEE Conference on Decision and Control, Florence, Italy, December 2013, pp. 4424-4429

[C36] Decentralized symbolic control of interconnected systems with application to vehicle platooning
Borri, A., Dimarogonas, D.V., Johansson, K.H., Di Benedetto, M.D., Pola, G.
4th IFAC Workshop on Distributed Estimation and Control in Networked Systems, Koblenz, Germany, September 2013, pp. 285-292

[C35] Integrated Symbolic Design of Unstable Nonlinear Networked Control Systems
Borri, A., Pola, G., Di Benedetto, M.D.
51st IEEE Conference on Decision and Control, Maui, Hawaii, USA, December 2012, pp. 1374-1379

[C34] A symbolic approach to the design of nonlinear networked control systems
Borri, A., Pola, G., Di Benedetto, M.D.
Hybrid Systems: Computation and Control 2012, Bejing, China, April 2012, pp. 255-264
I. Mitchell and T. Dang, Eds.

[C33] Safety criticality analysis of complex Air Traffic Management systems via compositional bisimulation
Petriccone A., Pola, G., Di Benedetto, M.D., De Santis, E.
4th IFAC Conference on Analysis and Design of Hybrid Systems, Eindhoven, The Netherlands, June 2012, pp. 370-375

[C32] Sequences of Discrete Abstractions for Piecewise Affine Systems
Pola, G., Di Benedetto, M.D.
4th IFAC Conference on Analysis and Design of Hybrid Systems, Eindhoven, The Netherlands, June 2012, pp. 147-152
(Invited paper)

[C31] Alternating Approximately Bisimilar Symbolic Models for Nonlinear Control Systems affected by Disturbances
Borri, A., Pola, G., Di Benedetto, M.D.
50th IEEE Conference on Decision and Control and European Control Conference, Orlando, Florida, USA, December 2011, pp. 552-557
(Invited paper)

[C30] A Compositional Approach to Bisimulation of Arenas of Finite State Machines
Pola, G., Di Benedetto, M.D., De Santis, E.
18th IFAC World Congress, Milan, Italy, August-September 2011, pp. 7006-7011

[C29] Alternating Approximately Bisimilar Symbolic Models for Nonlinear Control Systems with Unknown Time–Varying Delays
Pola, G., Pepe, P., Di Benedetto, M.D.
49th IEEE Conference on Decision and Control, Atlanta, Georgia, USA, December 2010, pp. 7649-7654
(Speaker)

[C28] An integrated approach to the symbolic control design of nonlinear systems with infinite states specifications
Borri, A., Pola, G., Di Benedetto, M.D.
49th IEEE Conference on Decision and Control, Atlanta, Georgia, USA, December 2010, pp. 1528-1533
(Speaker)

[C27] A Complexity Reduction Approach to the Detection of Safety Critical Situations in Air Traffic Management Systems

Petriccone, A., Pola, G., Di Benedetto, M.D., De Santis, E.
49th IEEE Conference on Decision and Control, Atlanta, Georgia, USA, December 2010, pp. 2081-2085
(Invited paper, Speaker)

[C26] Symbolic models for unstable nonlinear control systems
Zamani, M., Pola, G., Tabuada, P.
American Control Conference 2010, Baltimore, Maryland, USA, July 2010, pp. 1021-1026

[C25] A Compositional Hybrid System Approach to the Analysis of Air Traffic Management Systems
De Santis, E. Di Benedetto, M.D., Petriccone, A., Pola, G.
8th Innovative Research Workshop & Exhibition, EUROCONTROL, Paris, France, December 2009
(Speaker)

[C24] A symbolic model approach to the digital control of nonlinear time–delay systems
Pola, G., Pepe, P., Di Benedetto, M.D., Tabuada, P.
48th IEEE Conference on Decision and Control and 28th Chinese Control Conference, Shanghai, China, December 2009, pp. 2216-2221
(Invited paper)

[C23] Symbolic models for nonlinear control systems affected by disturbances
Pola, G., Tabuada, P.
47th IEEE Conference on Decision and Control, Cancun, Mexico, December 2008, pp. 251-256
(Invited paper, Speaker)

[C22] Symbolic models for nonlinear control systems using approximate bisimulations
Pola, G., Girard A., Tabuada, P.
46th IEEE Conference on Decision and Control, New Orleans, Louisiana, USA, December 2007, pp. 432-437
(Invited paper, Speaker)

[C21] Symbolic models for linear control systems with disturbances
Pola, G., Tabuada, P.
46th IEEE Conference on Decision and Control, New Orleans, Louisiana, USA, December 2007, pp. 4643-4647
(Speaker)

[C20] Observability of discrete-time linear switching systems
De Santis, E., Di Benedetto, M.D., Pola, G.
IFAC Workshop on Dependable Control of Discrete Systems, June 2007, Cachan, Paris, France

[C19] Observability of Internal Variables in Interconnected Switching Systems
De Santis, E., Di Benedetto, M.D., Pola, G.
45th IEEE Conference on Decision and Control, San Diego, California, USA, December 2006, pp. 4121-4126
(Speaker)

[C18] Optimal Dynamic Asset Allocation: A Stochastic Invariance Approach
Pola, G., Pola, G.
45th IEEE Conference on Decision and Control, San Diego, California, USA, December 2006, pp. 2589-2594
(Speaker)

[C17] Stabilizability based state space reductions for hybrid systems

De Santis, E., Di Benedetto, M.D., Pola, G.
IFAC Conference on Analysis and Design of Hybrid Systems, Alghero, Italy, June 2006, pp. 112-117

[C16] Detectability based state space reductions for hybrid systems
De Santis, E., Di Benedetto, M.D., Pola, G.
17th International symposium on Mathematical Theory of Network and Systems, Kyoto, Japan, July 2006

[C15] A Theoretical Framework for Control over Wireless Networks
Di Benedetto, M.D., D'Innocenzo, A., Pola, G., Rinaldi, C., Santucci, F.
17th International symposium on Mathematical Theory of Network and Systems, Kyoto, Japan, July 2006
(Invited paper, Speaker)

[C14] Invariance in Stochastic Dynamical Control Systems
Pola, G., Lygeros, J., Di Benedetto, M.D.
17th International symposium on Mathematical Theory of Network and Systems, Kyoto, Japan, July 2006
(Speaker)

[C13] Achievable bisimilar behaviour of abstract state systems
Pola, G., Van der Schaft, A.J., Di Benedetto, M.D.
Joint 44th IEEE Conference on Decision and Control and European Control Conference, Seville, Spain, December 2005, pp. 1535-1540
(Speaker)

[C12] Digital control of continuous-time switching systems with safety constraints
De Santis, E., Di Benedetto, M.D., Pola, G.
43rd IEEE Conference on Decision and Control, Paradise Island, Bahamas, USA, December 2004, pp. 1878–1883

[C11] Bisimulation Theory for Switching Linear Systems
Pola, G., Van der Schaft, A.J., Di Benedetto, M.D.
43rd IEEE Conference on Decision and Control, Paradise Island, Bahamas, USA, December 2004, pp. 1406-1411

[C10] Balancing dwell times for switched linear systems
Pola, G., Polderman, J.W., Di Benedetto, M.D.
16th International symposium on Mathematical Theory of Networks and Systems, Leuven, Belgium, July 2004
(Invited paper, Speaker)

[C09] Can linear stabilizability analysis be generalized to switching systems?
De Santis, E., Di Benedetto, M.D., Pola, G.
16th International symposium on Mathematical Theory of Networks and Systems, Leuven, Belgium, July 2004

[C08] Structural discrete state space decompositions for a class of hybrid systems
De Santis, E., Di Benedetto, M.D., Pola, G.
Mediterranean Conference on Control and Automation, Kysadasi, Aydin, Turkey, June 2004

[C07] Safety and stabilizability conditions for switching linear systems
De Santis, E., Di Benedetto, M.D., Pola, G.
International Workshop on Operator Theory and Applications IWOTA03,
Extended Abstract,
Cagliari, Italy, June 24-27, 2003

[C06] On Observability and Detectability of continuous-time Switching Linear Systems
De Santis, E., Di Benedetto, M.D., Pola, G.
42nd IEEE Conference on Decision and Control, Maui, Hawaii, USA, December 2003, pp. 5777–5782

[C05] Stochastic Hybrid Models: An Overview
Pola, G., Bujorianu, M.L., Lygeros, J., Di Benedetto, M.D.
Analysis and Design of Hybrid System, St. Malo, France, June 2003, pp. 45-50

[C04] Engine idle speed control via maximal safe-set computation in the crank-angle domain
Balluchi, A., Benvenuti, L. Berardi, L., De Santis, E., Di Benedetto, M.D., Girasole, G., Pola, G.
IEEE International Symposium of Industrial Electronics, L'Aquila, Italy, July 2002, pp. 618-622

[C03] Equivalence entre stabilisabilité et sécurité pour les systèmes à commutation
De Santis, E., Di Benedetto, M.D., Pola, G.
Proc. of Conference Internationale Francophone d'Automatique, Nantes, France, July 2002, pp. 337–341
(Speaker)

[C02] Inner approximations of domains of attraction for constrained continuous time linear systems
De Santis, E., Di Benedetto, M.D., Pola, G.
Proc. of American Control Conference, Anchorage, Alaska, USA, May 2002, pp. 1216–1221

[C01] Controlled safe sets for continuous time linear systems
Berardi, L., De Santis, E., Di Benedetto, M.D., Pola, G.
Proc. of European Control Conference, Porto, Portugal, September 2001, pp. 803–808

Theses

[T02] Switching Systems: Analysis and Control
PhD Thesis
Advisor: Prof. Maria Domenica Di Benedetto
Co-Advisor: Prof. Elena De Santis
June 11st 2004, University of L'Aquila, Italy

[T01] Controllo di sistemi a commutazione: approssimazione di insiemi invarianti
Master Thesis
Research Advisor: Prof. Maria Domenica Di Benedetto
Research Co-Advisor: Prof. Elena De Santis
July 21st 2000, University of L'Aquila, Italy

Technical Reports for European Projects:

[R07] Final modelling and analysis of SESAR 2020 ConOps
De Santis, E., Di Benedetto, M.D., Everdij, M., Petriccone, A., Pezzuti, D., Pola, G.
Deliverable MAREA D4.4, 31 ottobre 2013

[R06] Initial modelling and analysis of SESAR 2020 ConOps
De Santis, E., Di Benedetto, M.D., Petriccone, A., Pezzuti, D., Pola, G.
Deliverable MAREA D4.3, 17 settembre 2012

[R05] Review of SESAR 2020 Conops
Di Benedetto, M.D., Petriccone, A., Pola, G.
Deliverable MAREA D4.2, 7 ottobre 2011

[R04] Report on Observability Properties of Hybrid-System Composition
Di Benedetto, M.D., Petriccone, A., Pola, G.
Deliverable iFly D4.2, 27 gennaio 2011

[R03] Hybrid Observer Design Methodology
De Santis, E., Di Benedetto, M.D., Di Gennaro, S., Pola, G.
Deliverable Hybridge D7.2, 19 agosto 2003

[R02] A stochastic hybrid system modeling framework
Bujorianu M.L., Lygeros J., Glover W., Pola, G.
Deliverable Hybridge D1.2, 29 maggio 2003

[R01] Inventory of error evolution control problems in air traffic management
Di Benedetto, M.D., Pola, G.
Deliverable Hybridge D7.1, 4 novembre 2002

Submitted Papers:

[S01] Symbolic control design of incrementally stable nonlinear systems with dynamic regular language specifications
Masciulli, T., Pola, G.,
Provisionally accepted as a brief paper in Automatica, 2020

[S02] Data–driven controller synthesis for abstract systems
Pola, G., Masciulli, T., De Santis, E., Di Benedetto, M.D.
Submitted for publication in Automatica (second round of review), 2020

[S03] String Stability of a Vehicular Platoon with the use of Macroscopic Information
Mirabilio, M., Iovine, A., De Santis, E., Di Benedetto, M.D., Pola, G.
Provisionally accepted as paper in the IEEE Transactions on Intelligent Transportation Systems, 2020

[S04] Symbolic control design of an artificial pancreas
Borri, A., Pola, G., Pepe, P., Palumbo, P., Di Benedetto, M.D.
Submitted for publication in the IEEE Transactions on Control Systems Technology, 2020

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