



Curriculum Vitae et Studiorum

Alessandro Borri

PhD, Electrical and Information Engineering, 2011

MSc, Computer and Control Systems Engineering, 2007

BSc, Computer and Control Systems Engineering, 2004

Current position

Researcher

Institute for Systems Analysis and Computer Science (IASI) “Antonio Ruberti”
Italian National Research Council (CNR)

Work Address 1:

CNR-IASI Biomathematics Laboratory (BioMatLab)

c.o. Catholic University of the Sacred Heart (UCSC)

Largo A. Gemelli 8, 00168 Rome, Italy

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Work Address 2:

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Personal web page: www.alessandroborri.it

Other appointments

➤ **Adjunct professor** – Graduate Course in **Systems Biology**

➤ **Research affiliate** – Centre of Excellence for Research DEWS

University of L’Aquila (UnivAQ)

Via G. Gronchi 18

67100 L’Aquila, Italy

Research Interests

Theory: Biomathematics, Formal Methods and Symbolic Control, Cyber-Physical Systems, Nonlinear and Hybrid Control Systems, Randomized Algorithms, Filtering, Game Theory.

Applications: Pathophysiological models, Systems Biology, Vehicle Control and Coordination, Control over Sensor and Actuator Networks, Meteorology.

Research Experience

➤ **April 2012 – present**

Researcher (previously Research Engineer) at IASI-CNR, Rome, Italy.

Main research topics:

- Mathematic modeling and control in biomedicine and pathophysiology
- Systems/Synthetic Biology
- Formal methods for Cyber-Physical Systems
- Automotive control systems

➤ **March 2011 – January 2012**

Post-doctoral Researcher in Electrical and Information Engineering, University of L'Aquila, Italy.

Research topic: Formal methods for analysis and control of networked systems

➤ **November 2007 – March 2011**

PhD in Electrical and Information Engineering, University of L'Aquila, Italy.

Main research topics:

- Symbolic and embedded control
- Hybrid modeling and control for wireless networks
- Randomized algorithms for game theory
- Vehicle control

Education

➤ **June 21, 2012**

Achievement of the International Curriculum Option of Doctoral Studies in Networked, Embedded, and Hybrid Control Systems for Complex, Distributed and Heterogeneous Systems (ICO-NEH).

➤ **2007-2011**

PhD in Electrical and Information Engineering, University of L'Aquila, Italy.

- Thesis: *Hybrid Control of Cyber-Physical Systems*
- Advisor: Prof. Maria Domenica Di Benedetto
- Co-Advisor: Dr. Giordano Pola
- PhD Review Committee: Prof. Patrizio Colaneri, Prof. Alfredo Germani, Prof. Luca Benvenuti, Prof. Karl Henrik Johansson.
- Grade: *Excellent*

➤ **2004-2007**

Master of Engineering in Control Systems and Computer Science, Department of Electrical and Information Engineering, University of L'Aquila, Italy.

Full marks (110/110 *magna cum laude*).

- Thesis: *Integrated Vehicle Control using Active Front Steering and Active Differential*
- Advisor: Prof. Maria Domenica Di Benedetto
- Co-Advisor: Mr. Gilberto Burgio

➤ **2001-2004**

Bachelor of Engineering in Control Systems and Computer Science, Department of Electrical and Information Engineering, University of L'Aquila, Italy.

Full marks (110/110 *magna cum laude*).

- Thesis: *Polynomial Extended Kalman Filter for simultaneous state-parameter estimation*
- Advisor: Prof. Alfredo Germani
- Co-Advisor: Prof. Costanzo Manes

➤ **1996-2001**

High School, "Liceo Scientifico E. Fermi", Sulmona (AQ), Italy. Full marks (100/100).

Visiting Positions

➤ **November 2nd, 2011 – January 31st, 2012**

Visiting Researcher at the Royal Institute of Technology (KTH), Stockholm (Sweden), ACCESS Linnaeus Center.

➤ **September 15th, 2009 – June 15th, 2010**

Visiting Research Scholar at the University of California, Santa Barbara, ECE Department.

➤ **April 13th – 26th, 2009**

November 7th – December 15th, 2008

Short time visitor at the University of California, Berkeley, EECS Department, in the Team for Research in Ubiquitous Secure Technology (TRUST).

Industrial Experience

➤ **December 2010 - February 2011**

Editorial Collaboration, Alicubi srl, Torino (Italy).

Topic: writing entries about Information Engineering for Piccola Treccani Encyclopedia 2011.

➤ **December 18th, 2006 – June 22nd, 2007**

Internship at the Ford European Research Center, Aachen (Germany).

Topic: modeling, design and implementation of a vehicle attitude control system.

Attended Graduate and Doctoral Courses

- **EECI International Graduate School on Control 2019 – Hybrid Control Design** (Prof. R. Sanfelice) – L’Aquila, Italy, May 2019.
- **EECI International Graduate School on Control 2018 – Time-Delay and Sampled-Data Systems** (Prof. E. Fridman, Prof. P. Pepe) – L’Aquila, Italy, February 2018.
- **EECI International Graduate School on Control 2016 - Tools for nonlinear control, Lyapunov function, positivity, applications** (Prof. F. Mazenc) – L’Aquila, Italy, March 2016.
- **EECI International Graduate School on Control 2014 - Convergence theory for observers: Necessary and Sufficient conditions** (Prof. L. Praly) – L’Aquila, Italy, April 2014.
- **SIDRA Summer School 2013 (Part 2) – Vehicle Dynamics Control** (Prof. P. Falcone, Prof. L. Glielmo, Prof. S. Savaresi, Prof. M. Tanelli) - Bertinoro (FC), Italy, July 2013.
- **SIDRA Summer School 2013 (Part 1) – Systems Biology** (Prof. C. Altafini, Prof. F. Blanchini, Prof. E. Cinquemani, Prof. C. Cosentino, Prof. G. De Nicolao) - Bertinoro (FC), Italy, July 2013.
- **EECI-HYCON2 Graduate School on Control 2013 - Optimality, Stabilization, and Feedback in Nonlinear Control** (Prof. F. Clarke) – L’Aquila, Italy, May 2013.
- **EECI-HYCON2 Graduate School on Control 2012 – Specification, design and verification of distributed control systems** (Prof. R. M. Murray) – L’Aquila, Italy, May 2012.
- **Time-Delay Systems** (Prof. P. Pepe) – University of Rome “La Sapienza”, Rome, Italy, May 2012.
- **EECI-HYCON2 Graduate School on Control 2011 – Robust Hybrid Control Systems** (Prof. R. G. Sanfelice) – SUPELEC - Gif-sur-Yvette, France, May 2011.
- **HYCON-EECI Graduate School on Control 2010 - Optimality, Stabilization, and Feedback in Nonlinear Control** (Prof. F. Clarke) – SUPELEC - Gif-sur-Yvette, France, March 2010.
- **Nonlinear Control Systems** (Prof. A. Teel) – University of California, Santa Barbara (CA), U.S.A., Winter 2010.
- **Noncooperative Game Theory** (Prof. J. P. Hespanha) – University of California, Santa Barbara (CA), U.S.A., Fall 2009.
- **Cooperative Control of Robotic Networks** (Prof. F. Bullo) – University of California, Santa Barbara (CA), U.S.A., Fall 2009.

- **SIDRA Summer school 2009 - Lyapunov methods for constrained and robust control of dynamic systems** (Prof. F. Blanchini, Prof. P. Colaneri, Prof. A. Garulli, Prof. S. Miani, Prof. R. Scattolini, Prof. A. Tesi, Prof. L. Zaccarian) - Bertinoro (FC), Italy, July 2009.
- **WSN School: An introduction to wireless sensor network programming using Contiki** (Prof. Fredrik Osterlind) - Siena (SI), Italy, July 2009.
- **3rd WIDE PhD School on Networked Control Systems** (Prof. A. Bemporad, Prof. P. R. Kumar, Prof. L. Schenato, Prof. F. Bullo, Prof. A. Cervin, Prof. M. Johansson, Prof. S. Lall, Prof. M. Heemels, Prof. H. Ishii, Prof. M. Lemmon) - Siena (SI), Italy, July 2009.
- **SIDRA Summer School 2008 – Introduction to Nonlinear Control** (Prof. A. Isidori, Prof. L. Marconi, Prof. A. Astolfi, Prof. F. Celani, Prof. A. Serrani) – Bertinoro (FC), Italy, July 2008.
- **HYCON-EECI Graduate School on Control 2008 - Introduction to Networked Control Systems** (Prof. R. M. Murray) – SUPELEC - Gif-sur-Yvette, France, March 2008.
- **Graduate School on Technologies, Applications and Services in Heterogeneous Radio Networks** - University of L’Aquila, L’Aquila, Italy, December 2007 – June 2008.

Participation in funded projects

- **PACIB** (2018-2020): Acquisition, Analysis and Classification Platform of Biomedical Images for the Early Diagnostics of Neurodegenerative Diseases (with CNR-IASI, Rome, Italy).
- **CISAS** (2017-2020): International Centre of Advanced Studies in Environment, Ecosystem and Human Health, funded by the Italian Ministry for Education, University and Research, MIUR (with CNR-IASI, Rome, Italy).
- **MOSES** (2017-2019): Modeling Shock in the Experimental Setting (with CNR-IASI, Rome, Italy), funded by the Italian Ministry of Defence.
- EU FP7 **IMPRESS** (2014-2017): Improving Preparedness and Response of Health Services in Major Crises (with CNR-IASI, Rome, Italy).
- EU FP7 **PULSE** (2014-2017): Platform for European medical support during major emergencies (with Catholic University of the Sacred Heart, Rome, Italy).
- EU FP7 **EDEN** (2013-2017): End-user driven demo for CBRNE (with Catholic University of the Sacred Heart, Rome, Italy).
- EU FP7 **COMMODITY12** (2011-2015): Continuous Multi-parametric and Multi-layered analysis Of Diabetes TYpe 1 & 2 (with CNR-IASI, Rome, Italy).
- EU FP7 NoE **HYCON2** (2010-2014): Highly-complex and networked control systems (with University of L’Aquila, Italy).

Peer-reviewed International Journal and Magazine Papers

- [J18] **A. Borri**, P. Palumbo, A. Singh, *Time delays in a genetic positive-feedback circuit*, IEEE Control Systems Letters, vol. 4 (1), pp. 163-168, 2020.
- [J17] G. Pola, M. D. Di Benedetto, **A. Borri**, *Symbolic Control Design of Nonlinear Systems with Outputs*, Automatica, 109, 108511, 2019.
- [J16] A. M. Bersani, **A. Borri**, A. Milanese, G. Tomassetti, P. Vellucci, *A study case for the analysis of asymptotic expansions beyond the tQSSA for inhibitory mechanisms in enzyme kinetics*, Communications in Applied and Industrial Mathematics, 10(1), pp. 162-181, 2019.
- [J15] **A. Borri**, G. Pola, M. D. Di Benedetto, *Design of Symbolic Controllers for Networked Control Systems*, IEEE Transactions on Automatic Control, 64(3), pp- 1034-1046, 2019.
- [J14] A. M. Bersani, **A. Borri**, A. Milanese, P. Vellucci, *Tihonov theory and center manifolds for inhibitory mechanisms in enzyme kinetics*, Communications in Applied and Industrial Mathematics, vol. 8, pp. 81-102, 2017.
- [J13] **A. Borri**, *A Nonlinear Sampled-Data Observer of Vehicle Lateral Velocity*, IEEE Control Systems Letters, Vol. 1 (2), pp. 244-249, 2017.
- [J12] **A. Borri**, F. Cacace, A. De Gaetano, A. Germani, C. Manes, P. Palumbo, S. Panunzi, P. Pepe, *Luenberger-like Observers for Nonlinear Time-Delay Systems with Application to the Artificial Pancreas*, IEEE Control Systems Magazine, 37(4), pp. 33-49, 2017.
- [J11] **A. Borri**, P. Palumbo, C. Manes, S. Panunzi, A. De Gaetano, *Sampled-data Observer-based Glucose Control for the Artificial Pancreas*, Acta Polytechnica Hungarica, vol. 14, p. 79-94, 2017.
- [J10] **A. Borri**, F. Carravetta, L. B. White, *Optimal smoothing for spherical Gauss–Markov Random Fields with application to weather data estimation*, European Journal of Control, no. 33, pp. 43-51, 2017.
- [J9] **A. Borri**, D. Bianchi, M. D. Di Benedetto, S. Di Gennaro, *Optimal Workload Actuator Balancing and Dynamic Reference Generation in Active Vehicle Control*, Journal of the Franklin Institute, Vol. 354 (4), pp. 1722-1740, 2017.
- [J8] **A. Borri**, S. Panunzi, D. Brancaloni, D. Gui, S. Magalini, C. R. Gaz, A. De Gaetano, *Simulation of trauma incidents - Modelling the evolution of patients and resources*, Journal of Medical Systems, Vol. 40 (11): 234, Springer US, 2016.
- [J7] **A. Borri**, P. Palumbo, A. Singh, *The impact of negative feedback in metabolic noise propagation*, IET Systems Biology (Special Issue “Synthetic Biology”), Vol. 10 (5), pp. 179-186, 2016. Recipient of the **Premium Award 2018 for Best Paper in IET Systems Biology**.
- [J6] **A. Borri**, F. Carravetta, G. Mavelli, and P. Palumbo, *Block-tridiagonal state-space realization of Chemical Master Equations: a tool to compute explicit solutions*, Journal of Computational and Applied Mathematics, Vol. 296, pp. 410–426, 2016.
- [J5] **A. Borri**, S. Panunzi, A. De Gaetano, *A glycemia-structured population model*, Journal of Mathematical Biology, 73(1): 39-62, 2016.
- [J4] S. D. Bopardikar, **A. Borri**, J. P. Hespanha, M. Prandini, and M. D. Di Benedetto, *Randomized Sampling for Large Zero-Sum Games*, Automatica, 49(5): 1184-1194, 2013.
- [J3] **A. Borri**, G. Pola, and M. D. Di Benedetto, *Symbolic models for nonlinear control systems affected by disturbances*, International Journal of Control, Vol. 85, No. 10, pp. 1422-1432, 2012.
- [J2] G. Pola, **A. Borri**, and M. D. Di Benedetto, *Integrated design of symbolic controllers for nonlinear systems*, IEEE Transactions on Automatic Control, 57(2): 534–539, 2012.
- [J1] D. Bianchi, **A. Borri**, G. Burgio, M. D. Di Benedetto, and S. Di Gennaro, *Adaptive Integrated Vehicle Control using Active Front Steering and Rear Torque Vectoring*, International Journal of Vehicle Autonomous Systems (IJVAS), Special Issue on

Autonomous and Semi-Autonomous Control for Safe Driving of Ground Vehicles, Vol. 8, No.2/3/4, pp. 85-105, 2010.

International Conference Proceedings Papers

- [C33] **A. Borri**, S. Panunzi, A. De Gaetano, *Rapid and ultra-rapid insulin in glycemic control*, Proceedings of the IEEE International Conference on Systems, Man and Cybernetics (IEEE SMC 2019), Bari, Italy, pp. 336-341, 2019.
- [C34] **A. Borri**, F. Carravetta, L. B. White, *A Smoother-Predictor of 3D Hidden Gauss-Markov Random Fields for Weather Forecast*, Proceedings of the IEEE International Conference on Systems, Man and Cybernetics (IEEE SMC 2019), Bari, Italy, pp. 3331-3336, 2019.
- [C35] L. D'Orsi, M. Mameli, **A. Borri**, A. De Gaetano, *Assisted ventilation control based on phase and frequency estimation of respiratory drift*, Proceedings of the IEEE International Conference on Systems, Man and Cybernetics (IEEE SMC 2019), Bari, Italy, pp. 879-885, 2019.
- [C36] D. Bianchi, **A. Borri**, M. D. Di Benedetto, A. Ferrara, *Decentralized Model Predictive Control of Freeway Traffic Systems over Lossy Communication Networks*, Proceedings of the IEEE International Conference on Systems, Man and Cybernetics (IEEE SMC 2019), Bari, Italy, pp. 1074-1079, 2019.
- [C31] G. Pola, **A. Borri**, P. Pepe, P. Palumbo and M. D. Di Benedetto, *Symbolic models approximating possibly unstable time-delay systems with application to the artificial pancreas*, Proceedings of the European Control Conference (ECC 2019), Naples, Italy, pp. 275-280, 2019.
- [C30] **A. Borri**, V. Cusimano, S. Panunzi, A. De Gaetano, *Multi-agent system modeling of advection-diffusion-reaction equations*, Proceedings of the European Control Conference (ECC 2019), Naples, Italy, pp. 2430-2435, 2019.
- [C29] **A. Borri**, P. Palumbo, A. Singh, *Noise propagation in feedback coupling between cell growth and metabolic activity*, Proceedings of the 57th IEEE Conference on Decision and Control (CDC 2018), Miami Beach, FL, USA, pp. 2679-2684, 2018.
- [C28] **A. Borri**, F. Carravetta, L. B. White, *Smoothing of Spherical Markov Fields: Application to Climatic Data Processing*, Proceedings of the 56th IEEE Conference on Decision and Control (CDC 2017), Melbourne, Australia, pp. 4908-4913, 2017.
- [C27] L. D'Orsi, **A. Borri**, A. De Gaetano, *Modelling the ventilator-patient interaction: a pressure-cycled control strategy*, Proceedings of the 56th IEEE Conference on Decision and Control (CDC 2017), Melbourne, Australia, pp. 5032-5037, 2017.
- [C26] **A. Borri**, P. Palumbo, A. Singh, *Noise propagation in a class of metabolic networks*, Proceedings of the 56th IEEE Conference on Decision and Control (CDC 2017), Melbourne, Australia, pp. 447-452, 2017.
- [C25] C. R. Gaz, A. De Gaetano, C. Manes, P. Palumbo, **A. Borri**, S. Panunzi, *Effective Control of Glycemia using a Simple Discrete-delay Model*, Proceedings of the 20th IFAC World Congress (IFAC 2017), Toulouse, France, IFAC Papers on line pp. 13526-13531, 2017.
- [C24] J.G. Pires, **A. Borri**, A. De Gaetano, C. Manes, P. Palumbo, *A short-term dynamical model for ghrelin*, Proceedings of the 20th IFAC World Congress (IFAC 2017), Toulouse, France, IFAC Papers on line pp. 11011-11016, 2017.
- [C23] **A. Borri**, F. Carravetta, P. Palumbo, *Cubification of Nonlinear Stochastic Differential Equations and Approximate Moments Calculation of the Langevin Equation*, Proceedings of the 55th IEEE Conference on Decision and Control (CDC 2016), Las Vegas, USA, pp. 4540-4545, 2016.
- [C22] G. Pola, **A. Borri**, M. D. Di Benedetto, *On Symbolic Control Design of Nonlinear Systems with State Quantized Measurements*, Proceedings of the 55th IEEE Conference on Decision and Control (CDC 2016), Las Vegas, USA, pp. 6571 - 6576, 2016.

- [C21] **A. Borri**, P. Palumbo, A. Singh, *Noise reduction for enzymatic reactions a case study for stochastic product clearance*, *Proceedings of the 55th IEEE Conference on Decision and Control (CDC 2016)*, Las Vegas, USA, pp. 5851 - 5856, 2016.
- [C20] **A. Borri**, S. Panunzi, P. Palumbo, C. Manes, A. De Gaetano, *Glucose Control with Incomplete Information*, *Proceedings of the 2016 IEEE International Conference on Systems, Man, and Cybernetics (SMC 2016)*, Budapest, Hungary, pp. 1780-1784, 2016.
- [C19] **A. Borri**, C. Dimopoulos, S. Panunzi, D. Brancaloni, C. R. Gaz, D. Gui, S. Magalini, A. De Gaetano, *Modelling Trauma Physiology for Large Crisis Management*, 15th International Conference on Modeling and Applied Simulation (MAS 2016), Larnaca, Cyprus, September 2016.
- [C18] **A. Borri**, P. Palumbo, and A. Singh, *Metabolic noise reduction for enzymatic reactions: the role of a negative feedback*, *Proceedings of the 54th IEEE Conference on Decision and Control (CDC 2015)*, Osaka, Japan, pp. 2537–2542, 2015.
- [C17] E. Pacciani, **A. Borri**, P. M. Soave, D. Gui, S. Magalini, S. Panunzi, C. R. Gaz, P. Gaudio, A. Malizia, A. De Gaetano, *Modelling and Simulation for Major Incidents*, *Proceedings of the 2015 9th International Conference on Pervasive Computing Technologies for Healthcare, PervasiveHealth 2015*, p. 297-303, also published on the EAI Endorsed Transactions on Pervasive Health and Technology 15(4): e3, 2015.
- [C16] A. M. Bersani, **A. Borri**, F. Carravetta, G. Mavelli, and P. Palumbo, *Quasi-Steady-State Approximations of the Chemical Master Equation in Enzyme Kinetics - Application to the Double Phosphorylation/Dephosphorylation Cycle*, *Proceedings of the 53rd IEEE Conference on Decision and Control (CDC 2014)*, Los Angeles, CA, USA, pp. 3053-3058, 2014.
- [C15] S. Panunzi, **A. Borri**, P. Palumbo, L. Kovács, and A. De Gaetano, *Simulation of insulin regimen and glucose profiles in Type 1 Diabetic Patient*, *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics (SMC 2014)*, San Diego, CA, USA, pp. 2464-2469, 2014.
- [C14] **A. Borri**, D. Bianchi, M. D. Di Benedetto, and S. Di Gennaro, *Vehicle Attitude Control with Saturating Actuators: Workload Balancing and Reference Adaptation*, *Proceedings of the 52nd IEEE Conference on Decision and Control (CDC 2013)*, Florence, Italy, pp. 1558-1563, 2013.
- [C13] **A. Borri**, D. V. Dimarogonas, K. H. Johansson, M. D. Di Benedetto, and G. Pola, *Decentralized symbolic control of interconnected systems with application to vehicle platooning*, *Proceedings of the 4th IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys 2013)*, Koblenz, Germany, pp. 285-292, 2013.
- [C12] **A. Borri**, F. Carravetta, G. Mavelli, and P. Palumbo, *Chemical Master Equations: a mathematical scheme for the multi-site phosphorylation case*, *Proceedings of the 3rd International Conference on Simulation and Modeling Methodologies, Technologies and Applications (SIMULTECH 2013)*, Special Session on Modelling and Simulation in Biology and Medicine (BIOMED 2013), Reykjavik, Iceland, pp. 681-688, 2013.
- [C11] **A. Borri**, F. Carravetta, G. Mavelli, and P. Palumbo, *Some results on the structural properties and the solution of the Chemical Master Equation*, *Proceedings of the 2013 American Control Conference (ACC 2013)*, Washington, DC, USA, pp. 3777-3782, 2013.
- [C10] **A. Borri**, G. Pola, and M. D. Di Benedetto, *Integrated Symbolic Design of Unstable Nonlinear Networked Control Systems*, *Proceedings of the 51st IEEE Conference on Decision and Control (CDC 2012)*, Maui, HI, USA, pp. 1374-1379, 2012.
- [C9] **A. Borri**, G. Pola, and M. D. Di Benedetto, *A symbolic approach to the design of nonlinear networked control systems*, *Proceedings of the 15th ACM international conference on Hybrid Systems: Computation and Control*, ser. HSCC '12, I. Mitchell and T. Dang Eds., New York, NY, USA, pp. 255–264, 2012.
- [C8] D. Bianchi, **A. Borri**, B. Castillo–Toledo, M. D. Di Benedetto, and S. Di Gennaro, *Smart Management of Actuator Saturation in Integrated Vehicle Control*, *Proceedings of the 50th*

- IEEE Conference on Decision and Control and European Control Conference (CDC-ECC 2011), Orlando, FL, USA, pp. 2529-2534, 2011.
- [C7] **A. Borri**, G. Pola, and M. D. Di Benedetto, *Alternating Approximately Bisimilar Symbolic Models for Nonlinear Control Systems affected by Disturbances*, Proceedings of the 50th IEEE Conference on Decision and Control and European Control Conference (CDC-ECC 2011), Orlando, FL, USA, pp. 552-557, 2011.
- [C6] D. Bianchi, **A. Borri**, B. Castillo-Toledo, M. D. Di Benedetto, and S. Di Gennaro, *Active Control of Vehicle Attitude with Roll Dynamics*, Proceedings of the 18th IFAC World Congress, Milan, Italy, pp. 7174-7179, 2011.
- [C5] **A. Borri**, S. D. Bopardikar, J. P. Hespanha, and M. D. Di Benedetto, *Hide-and-Seek with Directional Sensing*, Proceedings of the 18th IFAC World Congress, Milan, Italy, pp. 9343-9348, 2011.
- [C4] S. D. Bopardikar, **A. Borri**, J. P. Hespanha, M. Prandini, and M. D. Di Benedetto, *Randomized Sampling for Large Zero-Sum Games*, Proceedings of the 49th IEEE Conference on Decision and Control (CDC 2010), Atlanta, GA, USA, pp. 7675-7680, 2010.
- [C3] **A. Borri**, G. Pola, and M. D. Di Benedetto, *An integrated approach to the symbolic control design of nonlinear systems with infinite states specifications*, Proceedings of the 49th IEEE Conference on Decision and Control (CDC 2010), Atlanta, GA, USA, pp. 1528-1533, 2010.
- [C2] D. Bianchi, **A. Borri**, G. Burgio, M. D. Di Benedetto, and S. Di Gennaro, *Adaptive Integrated Vehicle Control using Active Front Steering and Rear Torque Vectoring*, Proceedings of the joint 48th IEEE Conference on Decision and Control and 28th Chinese Control Conference (CDC-CCC 2009), Shanghai, China, pp. 3557-3562, 2009.
- [C1] R. Bajcsy, **A. Borri**, A. Giani, M. D. Di Benedetto, and C. Tomlin, *Classification of Physical Interactions between Two Subjects*, Proceedings of the 6th International Workshop on Wearable and Implantable Body Sensor Networks (BSN 2009), Berkeley, CA, USA, pp. 187-192, 2009.

Book Chapters

- [B1] **A. Borri**, M. D. Di Benedetto, and M.-G. Di Benedetto, *Hybrid Modelling, Power Management and Stabilization of Cognitive Radio Networks*, Hybrid Systems: Computation and Control 2009, P. Tabuada and R. Majumdar Eds., Lecture Notes in Computer Science (LNCS) 5469, pp. 76-89, Springer-Verlag, Berlin Heidelberg, 2009.

Abstracts in Journals

- [A1] **A. Borri**, M. D. Di Benedetto, G. Pola, *Towards a Unified Theory for the Control of CPS: A Symbolic Approach*, ERCIM News No. 97, pp. 27-28, 2014.

Technical Reports

- [R4] G. Pola, **A. Borri**, and M. D. Di Benedetto, *A study on Symbolic Control Design with Quantized State Measurements*, IASI Research Report n. 16-03, 2016.
- [R3] **A. Borri**, S. Panunzi, P. Palumbo, C. Manes, and A. De Gaetano, *Preliminary results on glucose control with sampled information*, IASI Research Report n. 16-02, 2016.
- [R2] **A. Borri**, F. Carravetta, and P. Palumbo, *A Cubification Approach for the Approximate Moments Computation in Stochastic Differential Equations: Application to the Chemical Langevin Equation*, IASI Research Report n. 16-01, 2016.
- [R1] **A. Borri**, F. Carravetta, G. Mavelli, and P. Palumbo, *A study on the Structural Properties and the solution of the Chemical Master Equation*, IASI Research Report n. 12-10, 2012.

Theses

- [T3] **A. Borri**, *Hybrid Control of Cyber-Physical Systems*, Doctoral Thesis, Department of Electrical and Information Engineering, University of L'Aquila, Italy, 2011.
- [T2] **A. Borri**, *Integrated Vehicle Control using Active Front Steering and Active Differential*, Master Thesis, Department of Electrical and Information Engineering, University of L'Aquila, Italy, 2007.
- [T1] **A. Borri**, *Polynomial Extended Kalman Filter for simultaneous state-parameter estimation*, Bachelor Thesis, Department of Electrical and Information Engineering, University of L'Aquila, Italy, 2004 (in Italian).

Professional and Editorial Activities

- Senior Member of **IEEE** (Institute of Electrical and Electronics Engineers), **IEEE Control Systems Society**, **IEEE Young Professionals** and **IEEE Life Sciences Community**.
- Member of the IEEE-CSS Technical Committees on **Healthcare & Medical Systems**, **Automotive Controls**, **Hybrid Systems**, **Systems Biology**.
- Member of **ESMTB** (European Society of Mathematical and Theoretical Biology).
- Member of **INdAM** (Italian National Institute of High Mathematics), **GNAMPA** (Italian National Group for Mathematical Analysis, Probability and their Applications).
- **ICO-NEH Student** (International Curriculum Option of Doctoral Studies in Networked, Embedded, and Hybrid Control Systems for Complex, Distributed and Heterogeneous Systems) of the NoE HYCON (2008-2012).
- **EECI Student** (European Embedded Control Institute).
- Journal Referee for: IEEE Transactions on Control Systems Technology, IEEE Transactions on Automatic Control, Automatica, International Journal of Robust and Nonlinear Control, IEEE Transactions on Control of Network Systems, IET Control Theory & Applications, Control Engineering Practice, International Journal of Systems Science, Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering, Applied Mathematics and Computation, IEEE Robotics and Automation Letters.
- **Professional degree** in Information Engineering (2007).

Conference Services

- Member of the Scientific committee of the workshop *Mathematical Modelling and Control for Healthcare and Biomedical Systems* (MCHBS 2020), Rome, Italy, September 2020.
- Member of the Local organizing committee of the Biomathematics ESMTB PhD Summer School 2019 *Modelling in Marine Ecology*, Isola delle Femmine, Italy, September 2019.
- Co-organizer of the minisymposium *Recent trends in the modeling and control of the glucose-insulin system*, ECMTB (European Conference on Mathematical and Theoretical Biology),

Lisbon, July 2018.

- Chair of the session *Modeling*, 56th IEEE Conference on Decision and Control (CDC 2017), Melbourne, Australia, December 2017.
- Member of the HSCC 2016 Repeatability Evaluation Committee (REC) for the 19th ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2016), Vienna, Austria, April 2016.
- Co-chair of the session *Motion Planning and Stochastic Modeling* at the SIDRA Congress 2013 Palermo, Italy, September 2013.
- Co-chair of the sessions *Delay Systems III* and *Systems Biology* at the 2013 American Control Conference, Washington, DC, USA, June 2013.
- Chair of the session *Networked Control Systems III* at the 51st IEEE Conference on Decision and Control (CDC 2012), Maui, Hawaii, USA, December 2012.
- Member of the Technical Program Committee for the 5th International Workshop on Wireless Sensor, Actuator and Robot Networks (WiSARN 2012-Spring), Hangzhou, China, May 2012.
- Co-chair of the session *Differential or Dynamic Games* at the IFAC World Congress 2011, Milan, Italy, August 2011.
- Conference Reviewer for: Hybrid Systems Computation and Control (HSCC), IEEE Conference on Decision and Control (CDC), IEEE American Control Conference (ACC), IEEE Mediterranean Conference on Control and Automation (MED), IEEE Multi-conference on Systems and Control (MSC), IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys), European Control Conference (ECC), IEEE International Conference on Robotics and Automation (ICRA), International Symposium on Mathematical Theory of Networks and Systems (MTNS).

Teaching Experience

- Course **Modeling and Simulation** (60 hours, 6 ECTS), Master Degree in Computer and Control Engineering, University of L'Aquila, Italy, 2018.
- Course **Modeling and Simulation** (90 hours, 9 ECTS), Master Degree in Computer and Control Engineering, University of L'Aquila, Italy, 2017.
- SIDRA PhD School 2017 – **Formal Methods for the Control of Large-scale Networked Nonlinear Systems with Logic Specifications** (co-taught with M.D. Di Benedetto, G. Pola, P. Pepe), Bertinoro, Italy, July 2017.
- Course **Systems Biology: an Introduction** (co-taught with P. Palumbo), IASI-CNR, Rome, Italy, March 2014.

Teaching assistant in the following courses at the University of L'Aquila:

- **Systems Biology** (2012-18), held by Prof. P. Palumbo (taught in English).
- **Hybrid Systems** (2010-14), held jointly by Prof. M. D. Di Benedetto and Dr. A. D'Innocenzo (taught in Italian).
- **Embedded Systems** (2010-13), held jointly by Prof. M. D. Di Benedetto and Dr. L. Pomante (taught in Italian).
- **Mathematical Models in Life Sciences** (2011-12), held by Prof. P. Palumbo (taught in English).
- **Elements of Linear Systems Theory** (2010-11), held by Dr. G. Pola (taught in Italian).
- **Automatic Control** (2007-11), held jointly by Prof. M. D. Di Benedetto and Prof. S. Di Gennaro (taught in Italian).
- **Control Systems** (2008-09), held jointly by Prof. M. D. Di Benedetto and Prof. S. Di Gennaro

(taught in English).

Tutorship (with Dr. P. M. Soave, Dr. P. Gaudio and Dr. A. Malizia) in the following thesis for the level II International Master Course in “PROTECTION AGAINST CBRNE EVENTS” at the University of Rome, Tor Vergata:

- Eleonora Pacciani, **Modelling and Simulation in Disaster Medicine: An Innovative Approach to Medical Response in Emergency of Major Incident**, 2015.

Co-tutorship in the following Master Thesis at the eCampus University, Novedrate (Italy):

- Carmine Di Cato, **Nonlinear output feedback methods for the attitude control of ground vehicles**, 2019. Tutor: Prof. Vincenzo Suraci.

Co-tutorship in the following Master Theses at the University of L’Aquila:

- Cansu Uluseker, **Mathematical Model for Leptin Dynamics**, 2014. Tutors: Prof. Pasquale Palumbo, Dr. Andrea De Gaetano.
- Savino D’Eramo, **Analysis and Testing of Software Development Environments for Embedded Platforms** (in Italian), 2012. Tutor: Prof. Luigi Pomante.
- Stefano Perrotti, **Symbolic Methods for the Control of Nonlinear Systems over Communication Networks** (in Italian), 2012. Tutor: Prof. Giordano Pola.

Awards and Honors

- Achievement (with P. Palumbo and A. Singh) of the **Premium Award 2018 for Best Paper in IET Systems Biology** for the paper “The impact of negative feedback in metabolic noise propagation”, IET Systems Biology Vol. 10 (5), pp. 179-186, 2016.

Grants

- POF-SE-Abruzzo Scholarship for research abroad (2011).
- PORAbruzzo Scholarship for research abroad (2010).
- URI (International Relations Office) Scholarship (2008).

Talks

- **May 30th, 2019**
Artificial Pancreas: from established methods to novel approaches, BEA-SmarT DEWS@UNIVAQ–IASI@CNR Laboratory, Department of Information Engineering, Computer Science and Mathematics, University of L’Aquila, Italy.
- **September 20th, 2017**
Formal Methods in Modern Control Theory, series “Young Experts Seminars” (YES@IASI), Institute for Systems Analysis and Computer Science (IASI) “Antonio Ruberti”, Italian National Research Council (CNR).
- **May 24th, 2016**
Pathophysiology and mathematical modeling in biomedicine, DIITET Department, Italian National Research Council (CNR).

- **December 4th, 2015**
Stochastic Approach in Systems Biology: Modeling and Simulation, given at the Department of Information Engineering, Computer Science and Mathematics, University of L'Aquila, Italy.
- **May 19th, 2015**
Vehicle Control and Coordination, given at the Department of Information Engineering, Computer Science and Mathematics, University of L'Aquila, Italy.
- **May 29th, 2014**
The Chemical Master Equation, given at the CNR-IEIIT, Turin, Italy.
- **May 21st, 2014**
Control of Complex Systems: a Symbolic Approach, given at the Department of Information Engineering, Computer Science and Mathematics, University of L'Aquila, Italy.
- **January 30th, 2012**
Decentralized Symbolic Models and Controllers, given at the Royal Institute of Technology (KTH), Stockholm, Sweden, ACCESS Linnaeus Center.
- **November 14th, 2011**
Discrete Abstractions and Symbolic Control, given at the Royal Institute of Technology (KTH), Stockholm, Sweden, ACCESS Linnaeus Center.
- **December 5th, 2008**
Interaction between Two Subjects, given at the University of California, Berkeley, USA, EECS Department, TRUST Research Center.
- **June 22nd, 2007**
Active Front Steering and Active Differential Integration, given at the Ford European Research Center, Aachen, Germany.

Programming skills

- Modeling/Desktop/Web languages: C++, Java, Php, UML, HTML, JavaScript, SQL.
- Control and Embedded Computation: Matlab, nesC, TinyOS 2.x.
- Development environments and visual tools: Joomla!, Netbeans IDE, Wordpress.

Language skills

- Italian (native language), English (good).