Gianluca Bianchin

Ph.D. Candidate in Mechanical Engineering
University of California at Riverside
WCH 228, 900 University Ave.
Riverside, CA, 92521, USA

gianluca@engr.ucr.edu

Pesonal Website
Google Scholar profile

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Education

Sep 15 - Present	**Ph.D. in Mechanical Engineering**, University of California, Riverside Advisor: Fabio Pasqualetti
Oct 12 - Oct 14	**M.Sc. in Controls Engineering (Summa Cum Laude)**, University of Padova, Italy Advisor: Angelo Cenedese Thesis: Coordinated Control of Mixed Robot and Sensor Networks for Distributed Area Exploration
Oct 09 - Jul 12	**B.Sc. in Information Engineering**, University of Padova, Italy Advisor: Luca Schenato Thesis: Modeling and Optimization of Hybrid Vehicles Powertrains

Research Interests

My main research interests are in the modeling, analysis, and control of large-scale interconnected systems, with a focus on transportation networks. I work primarily on problems related to network design, vehicle routing, and distributed optimization and control. A second research direction is in security, robustness, and reliability of cyber-physical systems, with an emphasis on attacks modeling and countermeasures design.

Research Experience

2015 - Present	**Graduate Student Researcher**, University of California, Riverside at Cyber-Physical Systems and Distributed Computing Laboratory Advised by Fabio Pasqualetti
Jun 18 - Sep 18	**Graduate Student Intern**, Pacific Northwest National Laboratory, Richland, WA at Optimization and Control Group Funding: Control of Complex Systems Initiative (CCSI) Advised by Soumya Kundu
2017 - 2018	**MEGSA Committee Member**, University of California, Riverside Organizer and chair of the 9^{th} Mechanical Engineering Symposium
Jan 15 - Sep 15	**Visiting Scholar**, University of California, Riverside at Department of Mechanical Engineering
Jan 14 - Oct 14	**Graduate Student Researcher**, University of Padova, Italy at NAVLAB - Laboratory for Autonomous Navigation Advised by Angelo Cenedese

Honors & Awards

2019	**Dissertation Year Program Award**, University of California, Riverside

2017	**UC Riverside Green Grant** (G^3), University of California, Riverside (one of three campus-wide awards per academic year)
2015	**Dean's Distinguished Fellowship Award**, University of California, Riverside
2014	M.Sc. degree awarded with special distinction by the University of Padova (institutional award)

Advising Experience

2017 - 2018	Yin-Cen Liu, University of California, Riverside Master's Thesis: RSSI-aided Trajectory Planning Against GNSS Spoofing
2016	Tommaso Menara, University of California, Riverside Master's Thesis: A Novel Characterization of Strong Structural Controllability: Sparsity Conditions and Control Paths

Teaching Experience

2017 - 2018	**Instructor and Consultant**, GradQuant Center, University of California, Riverside Courses: Data Processing in Matlab, Introduction to LaTeX
	Teaching Assistant, University of California, Riverside
Spring 17, 19	ME 223 - Secure and Reliable Control Systems (graduate class)
Winter 18	ME 133 - Mechatronics (undergraduate class)

Talks, Seminars, and Presentations

Dec 2018	*2018 IEEE Conference on Decision and Control*, Miami Beach, FL, USA Talk: "A Network Optimization Framework for the Control of Traffic Dynamics and Intersection Signaling"
Oct 2018	*2018 Autonomous Systems Workshop*, University of California, Riverside Poster: "Secure Trajectory Planning Against Spoofing Attacks"
Sep 2018	Optimization and Control Group, Pacific Northwest National Laboratory
May 2018	*35^{th} Southern California Control Workshop*, University of California, Riverside Talk: "A Network Optimization Approach for the Optimization of Intersection Signaling"
Jul 2016	*2016 IEEE American Control Conference*, Boston, MA, USA Talk: "The Observability Radius of Networks"
May 2016	*7^{th} MEGSA Graduate Symposium*, University of California, Riverside, USA Poster: "On Control and Security of Complex Networks"
May 2015	*28^{th} Southern California Control Workshop*, University of California, Los Angeles Talk: "The Role of the Diameter in the Controllability of Complex Networks"

Reviewer & Volunteer Activity

Journals	IEEE Transactions on Automatic Control • Automatica • IEEE Transactions on Control of Network Systems • IEEE Control Systems Letters (L-CSS) • SIAM Journal on Control and Optimization • IEEE Transactions on Smart Grid • Systems & Control Letters
Conferences	IEEE Conference on Decision and Control • IEEE American Control Conference • IEEE European Control Conference • IFAC World Congress • Conference on Automation Science and Engineering

Volunteer 2016 IEEE Conference on Decision and Control, Las Vegas, NE, USA

Publications

Journal Articles

[J1] **G. Bianchin**, Y.-C. Liu, and F. Pasqualetti, "Secure navigation of robots in adversarial environments," *IEEE Control Systems Letters*, 2019, submitted

[J2] **G. Bianchin** and F. Pasqualetti, "Gramian-based optimization for the analysis and control of traffic networks," *IEEE Transactions on Intelligent Transportation Systems*, 2018, submitted

[J3] Y.-C. Liu, **G. Bianchin**, and F. Pasqualetti, "Secure trajectory planning against undetectable spoofing attacks," *Automatica*, 2018, submitted

[J4] **G. Bianchin**, P. Frasca, A. Gasparri, and F. Pasqualetti, "The observability radius of networks," *IEEE Transactions on Automatic Control*, vol. 62, no. 6, pp. 3006–3013, 2017

Peer-reviewed Conference Articles

[C1] **G. Bianchin**, F. Pasqualetti, and S. Kundu, "Resilience of traffic networks with partially controlled routing," in *American Control Conference*, Philadelphia, PA, USA, Jul. 2019, submitted

[C2] **G. Bianchin** and F. Pasqualetti, "A network optimization framework for the analysis and control of traffic dynamics and intersection signaling," in *IEEE Conf. on Decision and Control*, Miami, FL, Dec. 2018

[C3] T. Menara, **G. Bianchin**, M. Innocenti, and F. Pasqualetti, "On the number of strongly structurally controllable networks," in *American Control Conference*, Seattle, WA, USA, 2017, pp. 340–345

[C4] **G. Bianchin**, P. Frasca, A. Gasparri, and F. Pasqualetti, "The observability radius of network systems," in *American Control Conference*, Boston, MA, Jul. 2016, pp. 185–190

[C5] **G. Bianchin**, F. Pasqualetti, and S. Zampieri, "The role of diameter in the controllability of complex networks," in *IEEE Conf. on Decision and Control*, Osaka, Japan, Dec. 2015, pp. 980–985

[C6] **G. Bianchin**, A. Cenedese, M. Luvisotto, and G. Michieletto, "Distributed fault detection in sensor networks via clustering and consensus," in *IEEE Conf. on Decision and Control*, 2015, pp. 3828 – 3833

Book Chapters

[B1] **G. Bianchin** and F. Pasqualetti, "Time-delay attacks in network systems," in *Cyber-Physical Systems Security*. Springer International Publishing, 2018, pp. 157–174

Theses

[T1] **G. Bianchin**, "Coordinated control of mixed robot and sensor networks in diameterstributed area exploration," Master's thesis, University of Padova, 2014

Workshops and Summer Schools Participation

Oct 2017	33rd Southern California Control Workshop, University of California, Santa Barbara
Oct 2016	31st Southern California Control Workshop, University of California, Irvine
Jul 2015	Games and Contracts for Cyber-Physical Security, IPAM, University of California, Los Angeles
Jun 2015	Trustworthy Cyber Infrastructure for the Power Grid, University of Illinois, Urbana-Champaign