Gianluca Bianchin

Current Affiliation and Contact

Assistant Professor
Dept. of Mathematical Engineering (INMA)
ICTEAM Institute
University of Louvain, Belgium

Email: gianluca.bianchin@uclouvain.be
Address: 4 Ave. George Lemaitre, bt. L4.05.01
B-1348 Louvain-la-Neuve, Belgium
Webpage: http://gianlucabi.github.io
Scholar: Google Scholar link
ORCID: 0000-0002-3234-5535
ResearcherID: S-4861-2018

Academic Positions

Sep 22 - Present	**Assistant Professor** (Chargé de Cours) Department of Mathematical Engineering (INMA), ICTEAM Institute University of Louvain, Belgium (UCLouvain)
Apr 20 - Aug 22	**Postdoctoral Researcher** Department of Electrical, Computer & Energy Engineering University of Colorado Boulder, CO, USA (CU Boulder) Advisor: Prof. Emiliano Dall'Anese

Research Interests

My research interests are centered around system theory, control, and optimization in complex, cyber-physical, and network systems, primarily with applications to transportation systems. Topics of current interest are:

- Data-driven control
- Use of optimization methods for feedback control
- Control and optimization in electrified transportation and mobility on demand
- Resiliency and security of cyber-physical systems

Education

Sep 15 - Mar 20	**Ph.D. in Mechanical Engineering** University of California Riverside, CA, USA (UC Riverside) Advisor: Prof. Fabio Pasqualetti
Oct 12 - Oct 14	**M.Sc. in Control Engineering** (awarded *"Summa cum Laude"* - top 1%) University of Padova, Italy Advisor: Prof. Angelo Cenedese
Oct 09 - Jul 12	**B.Sc. in Information Engineering** University of Padova, Italy Advisor: Prof. Luca Schenato

Academic and Research appointments

May 25 - Jun 25	Visiting Professor **KTH Royal Institute of Technology** & Digital Futures, Stockholm, Sweden Visiting the Division of Control Systems (DCS)
Jun 19 - Sep 19	Graduate Intern **Robert Bosch LLC,** Sunnyvale, CA, USA Topic: Development and implementation of dynamical models for PEM fuel cells
Jun 18 - Sep 18	Graduate Intern **Pacific Northwest National Laboratory,** Richland, WA, USA Topic: Resilience analysis and characterization in traffic networks
Jan 15 - Sep 15	Visiting Scholar **University of California Riverside**, CA, USA Group: Cyber-Physical Systems and Distributed Computing Laboratory

Honors & Awards

2023	**IEEE Transactions on Control of Network Systems Best Paper Award** Awarded to the best paper published in the Transactions; granted annually to 1 out of 200 accepted papers
2019	**Automatica Editor's choice of the month**, awarded by the IFAC Journal Automatica Awarded for promising paper published in the journal; granted monthly to 1 out of 20 accepted papers
2019	**Dissertation Year Program Award**, awarded by UC Riverside Award recognizing quality dissertations in the department, 1 award per department
2017	**University of California Green Grant Award**, awarded by UC Riverside Awarded for promising research proposal on energy sustainability, one of three campus-wide awards
2015	**Dean's Distinguished Fellowship Award**, awarded by UC Riverside Awarded to top Ph.D. applicants in the College, one of five department-wide awards
2014	**M.Sc. Degree awarded *"Summa cum Laude"*** by the University of Padova

Funding

More than **€1.500.000** in competitive funding since 2022:

2025	Green shared multi-modal transportation: a real-time optimization approach Funding Instrument: Walloon region WEL-T Investigator Program (Starting Grant) Status: **funded, €600K** as single PI
2024	Data-driven control of complex network systems in the data-limited environment Funding Instrument: FRS-FNRS Aspirant ASP (awarded under my supervision) Status: **funded, €200K** as single PI
2024	Sustainability in Data-Driven Control: A Resource-Centric Approach Funding Agency: UCLouvain Special Research Funds FSR Status: **funded, €800K** among 4PIs Project in collaboration with: R. Jungers, J. Hendrickx, J.-C. Delvenne
2022	Control-Informed Learning of Physical Systems with Humans in the Loop Funding Agency: UCLouvain Special Research Funds FSR Status: **funded, €80K** as single PI

As a postdoc and graduate student, I contributed to the development and writing of the following proposals:

2020	Closed-loop Optimization and Control of Physical Networks Subject to Dynamic Costs, Constraints, and Disturbances Funding Agency: National Science Foundation (NSF), division CMMI Status: **funded, $300K** Project in collaboration with: Emiliano Dall'Anese, Jorge Cortés
2020	Control-Theoretic Design of Data-Driven Policies for Containing Transmission of Infectious Diseases Funding Agency: University of Colorado, AB Nexus Status: **funded, $50K** Project in collaboration with: Emiliano Dall'Anese, Andrea G. Buchwald, Jorge I. Poveda

Teaching Activities

I currently teach the following courses:

2022 - Present	**Linear control** (UCLouvain LINMA1510) Bachelor's and Master's course with approx. 200 students
2024 - Present	**Stochastic processes** (UCLouvain LINMA1731) Bachelor's course with approx. 80 students
2024 - Present	**Stochastic optimal control and Reinforcement Learning** (UCLouvain LINMA2222) Master's course with approx. 15 students
2022 - Present	**System identification** (UCLouvain LINMA2875) Master's course, approx. 15 students
2022 - Present	**Seminar on Applied Mathematics** (UCLouvain LINMA2120) I am the co-organizer of the weekly seminar series organized by the department

As a postdoc and graduate student, I co-taught the following courses:

2020	Coordinated Control of Multi-Agent Systems (CU Boulder ECEN5008), graduate course
2018	Data Processing in Matlab (UC Riverside), one-day graduate course
2017	Introduction to LaTeX (UC Riverside), one-day graduate course

As a graduate student, I was a Teaching Assistant for the following courses:

2017 + 2019	Secure and Reliable Control Systems (UC Riverside ME223), graduate course
2018	Mechatronics (UC Riverside ME133), undergraduate course

Advising and Student Mentoring

2024 - Present	**Vijayanand Jaganath Digge (Ph.D. student)**, UCLouvain Project: Learning-based control in resource-limited environments
2024 - Present	**Alexandre Thyrion (Ph.D. student)**, UCLouvain Project: Control-based method to explain human reaching movements
2023 - Present	**Amir Mehrnoosh (Ph.D. student)**, UCLouvain Project: Distributed learning for control
2022 - Present	Direct **supervision of over 15 Master's theses** at UCLouvain

As a postdoc and graduate student, I supervised the following students:

2021-2022	Liliaokeawawa Cothren (Ph.D. student), CU Boulder Project: Perception-based gradient flow for feedback control
2021	Molly Alvine (undergraduate student), CU Boulder Project: Control of mobility on demand systems with EVs
2021	Killian Wood (Ph.D. student), CU Boulder Project: Stochastic optimization with decision-dependent distributions
2020	Felipe Galarza-Jimenez (Ph.D. student), CU Boulder Project: Hybrid methods in online optimization
2017	Yin-Cen Liu (Master's student), UC Riverside Project: RSSI-Aided Trajectory Planning Against GPS Spoofing
2016	Tommaso Menara (Master's student), UC Riverside Project: Strong Structural Controllability of networks

Professional and Scientific Memberships

Member of the Logistics in Wallonia Competitiveness Pole

IEEE Control Systems Society (IEEE CSS)

Institute for Electrical and Electronics Engineers (IEEE)

International Federation of Automatic Control (IFAC)

Society for Industrial and Applied Mathematics (SIAM)

Organization of Scientific Meetings and Events

2025-2026	**Co-organizer of the 2026 Benelux Meeting on Systems and Control**
2024-2027	**Publicity chair of the 2027 European Control Conference**
2024	**Organizer of doctoral workshop for the Graduate School on Systems and Control (SOCN)** Title: *"Structure Learning in Critical Infrastructure Networks"*
2023	**Co-organizer of workshop at the American Control Conference** Title: *"Online Optimization Methods for Data-driven Feedback Control"*
2018	**Co-organizer of the Mechanical Engineering Symposium** at UC Riverside Title: *"Annual MEGSA Symposium"*

Academic Service

Editorial responsibilities:

2024 - Present	IEEE CSS Associate Editor at large
2024	IEEE CDC Technical Program Committee
2022 - Present	IEEE CSS Associate Editor

Proposals evaluation committees:

2024 - Present	Member of FRIA jury (Belgian grant instrument)

Ph.D. committees:

2022 - Present	Member of Ph.D. committees of 2 students at UCLouvain

Reviewer service (journal papers):

• IEEE Transactions on Automatic Control • IFAC Automatica • IEEE Transactions on Control of Network Systems • IEEE Control Systems Letters • IEEE Transactions on Control Systems Technology • Systems & Control Letters • SIAM Journal on Control and Optimization • IEEE Transactions on Intelligent Transportation Systems • Journal of Urban Technology • IEEE Robotics and Automation Letters • Journal of Selected Topics in Signal Processing • IEEE Transactions on Smart Grid

Reviewer service (peer-reviewed conference papers):

• IEEE Conference on Decision and Control • American Control Conference • European Control Conference • IFAC World Congress • IFAC Workshop on Distrib. Estimation and Control in Netw. Systems • Conference on Automation Science and Engineering

Selected Invited Talks

May 2025	KTH Royal Institute of Technology & Digital Futures, Stockholm, Sweden Title: *"Optimization for Dynamic Transportation via the Internal Model Principle"*
Apr 2025	Brussels Institute for Advanced Studies (BrIAS), Brussels, Belgium Title: *"Time-varying Optimization of Highly Dynamic Transportation Systems"*
Nov 2023	Department seminar at Leibniz Universität Hannover, Hanover, Germany Title: *"Time-varying Optimization of Dynamical Systems for Smart Societies"*
Jan 2023	KTH Royal Institute of Technology, Stockholm, Sweden Title: *"Data-driven Online Optimization of Physical Systems"*
Mar 2022	University of Michigan, Ann Arbor, MI, USA Title: *"Learning to Optimize Network Systems with Applications to Traffic Control"*
Feb 2022	Washington State University, Pullman, WA, USA Title: *"Data-driven online optimization for network control"*
Jan 2022	University of Louvain, Louvain-la-Neuve, Belgium Title: *"Learning to Optimize Network Systems via Online Optimization and Control"*
Apr 2021	Meeting of the Colorado COVID-19 modeling group, Boulder, CO, USA Title: *"When can we safely return to normal from the COVID-19 Pandemic?"*
Apr 2021	GIPSA-lab, Grenoble, France Title: *"Analysis and Design of Robust Traffic Networks: from Static to Dynamic Schemes"*
May 2020	National Renewable Energy Laboratory (NREL), Golden, CO, USA Title: *"Stability and Robustness of Traffic Networks with App-Informed Vehicle Routing"*
Sep 2019	GE Global Research, Niskayuna, NY, USA Title: *"Towards Dependable CPS: Network-Wide Optimization and Secure Control"*
Sep 2019	Robert Bosch LLC, Sunnyvale, CA, USA Title: *"PEM Fuel Cell Modeling and State Observers: A Control-Systems Perspective"*
Sep 2018	Pacific Northwest National Laboratory (PNNL), Richland, WA, USA Title: *"The Role of Partially Controlling Routing in Traffic Networks"*

Publications

Articles under review

[R1] **G. Bianchin** and B. V. Scoy, "The internal model principle of time-varying optimization," *IEEE Transactions on Automatic Control*, Aug. 2024, (Under review) arXiv:2407.08037 [link]

[R2] A. Mehrnoosh and **G. Bianchin**, "Optimization of linear multi-agent dynamical systems via feedback distributed gradient descent methods," *arXiv preprint*, Jul. 2025, arXiv:2403.18386

[R3] **G. Bianchin** and B. V. Scoy, "The discrete-time internal model principle of time-varying optimization: Limitations and algorithm design," in *IEEE Conf. on Decision and Control*, Dec. 2025, (To appear) [link]

[R4] R. Anguluri and **G. Bianchin**, "Data-driven control of second-order models," *IEEE Control Systems Letters*, Jun. 2023, (submitted)

[R5] **G. Bianchin** and E. Dall'Anese, "Event-triggered feedback optimization of LTI systems with applications to pandemic control," *IEEE Control Systems Letters*, Aug. 2022, (submitted), [link]

Journal papers

[J1] **G. Bianchin**, M. Vaquero, J. Cortés, and E. Dall'Anese, "k-dimensional agreement in multiagent systems," *IEEE Transactions on Automatic Control*, vol. 69, no. 12, pp. 8978–08 985, Dec. 2024

[J2] **G. Bianchin** and F. Pasqualetti, "Navigation systems may deteriorate stability in traffic networks," *IEEE Open Journal of Control Systems*, vol. 3, pp. 239–252, 2024, (Early access) [link]

[J3] **G. Bianchin**, M. Vaquero, J. Cortés, and E. Dall'Anese, "Online stochastic optimization for unknown linear systems: Data-driven synthesis and controller analysis," *IEEE Transactions on Automatic Control*, vol. 69, no. 7, pp. 4411–4426, Jul. 2024, early Access [link]

[J4] E. Perotti, A. M. Ospina, **G. Bianchin**, A. Simonetto, and E. Dall'Anese, "Renewable-based charging in green ride-sharing," *Scientific Reports*, vol. 15425, no. 13, Sep. 2023, arXiv:2305.02419, [link]

[J5] F. Avram, R. Adenane, L. Basnarkov, **G. Bianchin**, D. Goreac, and A. Halanay, "An age of infection kernel, an R formula, and further results for arino–brauer A, B matrix epidemic models with varying populations, waning immunity, and disease and vaccination fatalities," *Mathematics*, vol. 11, no. 6, Dec. 2021, [link]

[J6] L. Cothren, **G. Bianchin**, and E. Dall'Anese, "Online optimization of dynamical systems with deep learning perception," *IEEE Open Journal of Control Systems*, vol. 1, pp. 306–321, Oct. 2022, arXiv:2205.09574, [link]

[J7] **G. Bianchin**, E. Dall'Anese, J. I. Poveda, D. Jacobson, E. J. Carlton, and A. Buchwald, "Novel use of online optimization in a mathematical model of COVID-19 to guide the relaxation of pandemic mitigation measures," *Scientific Reports*, vol. 4731, no. 12, Jun. 2022, [link]

[J8] F. Avram, R. Adenane, **G. Bianchin**, and A. Halanay, "Stability analysis of an eight parameter SIR-type model including loss of immunity, and disease and vaccination fatalities," *Mathematics*, vol. 10, no. 3, p. 402, 2022, [link]

[J9] **G. Bianchin**, J. I. Poveda, and E. Dall'Anese, "Online optimization of switched LTI systems using continuous-time and hybrid accelerated gradient flows," *Automatica*, vol. 146, p. 110579, 2022, [link]

[J10] K. Wood, **G. Bianchin**, and E. Dall'Anese, "Online projected gradient descent for stochastic optimization with decision-dependent distributions," *IEEE Control Systems Letters*, vol. 6, pp. 1646–1651, 2021, [link]

[J11] **G. Bianchin**, J. Cortés, J. I. Poveda, and E. Dall'Anese, "Time-varying optimization of LTI systems via projected primal-dual gradient flows," *IEEE Transactions on Control of Network Systems*, vol. 9, no. 1, pp. 474–486, Mar. 2022, [link] **Award: IEEE Transactions on Control of Network Systems Best Paper Award**

[J12] F. Galarza-Jimenez, **G. Bianchin**, J. I. Poveda, and E. Dall'Anese, "Online optimization of LTI systems under persistent attacks: Stability, tracking, and robustness," *Nonlinear Analysis: Hybrid Systems*, vol. 44, p. 101152, May 2022, [link]

[J13] F. Galarza-Jimenez, J. Poveda, **G. Bianchin**, and E. Dall'Anese, "Extremum seeking under persistent gradient deception: A switching systems approach," *IEEE Control Systems Letters*, vol. 6, no. 1, pp. 133–138, 2021, [link]

[J14] Y.-C. Liu, **G. Bianchin**, and F. Pasqualetti, "Secure trajectory planning against undetectable spoofing attacks," *Automatica*, vol. 112, p. 108655, 2020, [link] **Award: February 2020 Automatica Editor's choice**

[J15] **G. Bianchin**, Y.-C. Liu, and F. Pasqualetti, "Secure navigation of robots in adversarial environments," *IEEE Control Systems Letters*, vol. 4, no. 1, pp. 1–6, 2020, [link]

[J16] **G. Bianchin** and F. Pasqualetti, "Gramian-based optimization for the analysis and control of traffic networks," *IEEE Transactions on Intelligent Transportation Systems*, vol. 21, no. 7, pp. 3013–3024, 2020, [link]

[J17] **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, [link]

Peer-reviewed conference proceedings

[C1] **G. Bianchin** and J.-C. Delvenne, "Cycle families and resilience of dynamical networks," in *American Control Conference*, 2024, pp. 5201–5206, [link]

[C2] **G. Bianchin**, "Data-driven exact pole placement for linear systems," in *IEEE Conf. on Decision and Control*, Singapore, Dec. 2023, pp. 685–690, arXiv:2303.11469, [link]

[C3] L. Cothren, **G. Bianchin**, and E. Dall'Anese, "Data-enabled gradient flow as feedback controller: Regulation of linear dynamical systems to minimizers of unknown functions," in *Learning for Dynamics & Control*, Stanford, CA, Jun. 2022, pp. 234–247, [link]

[C4] **G. Bianchin**, M. Vaquero, J. Cortés, and E. Dall'Anese, "Data-driven synthesis of optimization-based controllers for regulation of unknown linear systems," in *IEEE Conf. on Decision and Control*, Austin, TX, Dec. 2021, pp. 5783–5788, [link]

[C5] **G. Bianchin** and F. Pasqualetti, "Routing apps may cause oscillatory congestions in traffic networks," in *IEEE Conf. on Decision and Control*, Jeju Island, Republic of Korea, Dec. 2020, pp. 253–260, [link]

[C6] **G. Bianchin**, F. Pasqualetti, and S. Kundu, "Resilience of traffic networks with partially controlled routing," in *American Control Conference*, Philadelphia, PA, USA, Jul. 2019, pp. 2670–2675, [link]

[C7] **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, USA, Dec. 2018, pp. 1017–1022, [link]

[C8] T. Menara, **G. Bianchin**, M. Innocenti, and F. Pasqualetti, "On the number of strongly structurally controllable networks," in *American Control Conference*, Seattle, WA, USA, May 2017, pp. 340–345, [link]

[C9] **G. Bianchin**, P. Frasca, A. Gasparri, and F. Pasqualetti, "The observability radius of network systems," in *American Control Conference*, Boston, MA, USA, Jul. 2016, pp. 185–190, [link]

[C10] **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, [link]

[C11] **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*, Osaka, Japan, Dec. 2015, pp. 3828–3833, [link]

Book Chapters and Code Releases

[M1] **G. Bianchin**, "Online primal-dual controller for the control of epidemic outbreaks," `https://github.com/gianlucaBi/safe_levels_NPIs`, 2021, [Online; accessed 20-Sep-2021]

[M2] **G. Bianchin**, "Online primal-dual controller for ramp metering in transportation systems," `https://github.com/gianlucaBi/onlinePrimalDual_rampMetering`, 2020, [Online; accessed 20-Sep-2021]

[M3] **G. Bianchin** and F. Pasqualetti, "Time-delay attacks in network systems," in *Cyber-Physical Systems Security*. Springer International Publishing, 2018, pp. 157–174, [link]

[M4] **G. Bianchin** and F. Pasqualetti, "SUMO toolbox for Gramian-based optimization," `https://github.com/gianlucaBi/Gramian-Based-Traffic-Optimization`, 2018, [Online; accessed 23-Oct-2020]

Theses

[T1] **G. Bianchin**, "Control-theoretic methods for the robustness of network systems: Application to traffic control and cyber-physical security," Ph.D. dissertation, University of California Riverside, 2020

[T2] **G. Bianchin**, "Coordinated control of mixed robot and sensor networks in distributed area exploration," Master's thesis, University of Padova, 2014