Giacomo Baggio

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Appointments

Assistant Professor
Department of Information Engineering
University of Padova, Italy — Oct. 2019 – Present

Postdoctoral Scholar
Department of Mechanical Engineering
University of California, Riverside, USA — Mar. 2018 – Sep. 2019
- Advisor: Prof. F. Pasqualetti

Visiting Scholar
Department of Engineering
University of Cambridge, UK — Sep. 2015 – June 2016
- Advisor: Prof. R. Sepulchre

Education

Ph.D. in Information Engineering
Department of Information Engineering
University of Padova, Italy — Feb. 2018
- Advisor: Prof. A. Ferrante
- Final grade: cum laude

"Laurea Magistrale" (M.Sc. equivalent), Automation Engineering
University of Padova, Italy — April 2014
- Final grade: 110/110 cum laude

"Laurea Triennale" (B.Sc. equivalent), Mechatronics Engineering
University of Padova, Italy — Sept. 2011
- Final grade: 110/110 cum laude

Honors & Awards

Finalist IEEE CSS Italy Chapter Best Young Author Paper Award
IEEE Control Systems Society, Italy Chapter — 2021

Roberto Tempo Best CDC Paper Award
IEEE Control Systems Society — 2020

IEEE Control Systems Letters Outstanding Paper Award
IEEE Control Systems Society — 2020

Best Student Paper Award (co-author)
American Control Conference (ACC), 2019 — 2019

Best Student Paper Award (student author)
European Control Conference (ECC), 2018 — 2018

Outstanding Master Thesis Recognition
Department of Information Engineering, University of Padova, Italy 2014

Teaching Experience

University of Padova

Instructor:
- Systems Theory, *"Laurea Magistrale" (M.Sc.), Mechatronics Engineering* 2021-22
- Systems Theory, *"Laurea Magistrale" (M.Sc.), Mechatronics Engineering* 2020-21
- Systems Theory, *"Laurea Magistrale" (M.Sc.), Mechatronics Engineering* 2019-20

Teaching assistant:
- Estimation and Filtering, *"Laurea Magistrale" (M.Sc.), Automation Engineering* 2016-17

University of Cambridge

Teaching assistant:
- Signals and Systems (3F1), *Engineering Tripos Part IIA* 2015-16

Invited Talks

Invited talk @ Data-driven Analysis and Control of Dynamical Systems
SIAM DS 21 minisymposium 2021

Invited talk @ Controlling Complex Networks: *When Control Theory Meets Network Science*
Networks 2021 satellite symposium 2021

Invited talk @ Numerical ODEs, Matrix Analysis and Data Science (NOMADS) seminars
Gran Sasso Science Institute 2020

Invited talk @ Polytechnic University of Turin,
Department of Mathematical Sciences, Turin 2018

Invited talk @ University of Padova,
Department of Mathematics, Padova 2017

Publications

Journal Papers

1. **G. Baggio**, and S. Zampieri,
"Non-normality Improves Information Transmission Performance of Network Systems",
IEEE Transactions on Control of Network Systems, 2021. In press.
2. **G. Baggio**, F. Ticozzi, P. D. Johnson, and L. Viola,
"Dissipative Encoding of Quantum Information",
Quantum Information & Computation, 2021. In press.
3. **G. Baggio**, D. S. Bassett, and F. Pasqualetti,
"Data-driven Control of Complex Networks",
Nature Communications, vol. 12, no. 1, pp. 1-13, 2021.
4. **G. Baggio**, V. Rutten, G. Hennequin, and S. Zampieri,
"Efficient Communication in Complex Dynamical Networks: The Role of Matrix Non-Normality",
Science Advances, vol. 6, no. 22, eaba2282, 2020.

5. T. Menara, **G. Baggio**, D. S. Bassett, and F. Pasqualetti,
"Conditions for Feedback Linearization of Network Systems",
IEEE Control Systems Letters, vol. 4, no. 3, pp. 578-583, July 2020.
6. T. Menara, **G. Baggio**, D. S. Bassett, and F. Pasqualetti,
"Stability Conditions for Cluster Synchronization in Networks of Heterogeneous Kuramoto Oscillators",
IEEE Transactions on Control of Network Systems, vol. 7 , no. 1, pp. 302-314, March 2020.
7. **G. Baggio**, V. Katewa and F. Pasqualetti,
"Data-Driven Minimum-Energy Controls for Linear Systems,"
IEEE Control Systems Letters, vol. 3, no. 3, pp. 589-594, July 2019.
8. **G. Baggio**, A. Ferrante, and R. Sepulchre,
"Conal Distances Between Rational Spectral Densities",
IEEE Transactions on Automatic Control, vol. 64 , no. 5, pp. 1848-1857, May 2019.
9. B. Zhu and **G. Baggio**,
"On the Existence of a Solution to a Spectral Estimation Problem *à la* Byrnes–Georgiou–Lindquist"
IEEE Transactions on Automatic Control, vol. 64 , no. 2 , pp. 820-825, 2019.
10. **G. Baggio** and A. Ferrante,
"Parametrization of Minimal Spectral Factors of Discrete-Time Rational Spectral Densities"
IEEE Transactions on Automatic Control, vol. 64, no. 1, pp. 396-403, 2019.
11. **G. Baggio**,
"Further Results on the Convergence of the Pavon–Ferrante Algorithm for Spectral Estimation"
IEEE Transactions on Automatic Control, vol. 63 , no. 10, pp. 3510-3515, 2018.
12. N. Bof, **G. Baggio**, and S. Zampieri,
"On the Role of Network Centrality in the Controllability of Complex Networks"
IEEE Transactions on Control of Network Systems, vol. 4, no. 3, pp. 643-653, 2017.
13. **G. Baggio** and A. Ferrante,
"On Minimal Spectral Factors with Zeroes and Poles lying on Prescribed Regions"
IEEE Transactions on Automatic Control, vol. 61, no. 8, pp. 2251-2255, 2016.
14. **G. Baggio** and A. Ferrante,
"On the Factorization of Rational Discrete-Time Spectral Densities",
IEEE Transactions on Automatic Control, vol. 61, no. 4, pp. 969-981, 2016.

Conference Papers

1. **G. Baggio** and F. Pasqualetti,
"Learning Minimum-Energy Controls from Heterogeneous Data",
American Control Conference (ACC), pp. 3991-3996, Denver, CO, USA, 2020.
2. T. Menara, **G. Baggio**, D. S. Bassett, and F. Pasqualetti
"A Framework to Control Functional Connectivity in the Human Brain",
IEEE Conference on Decision and Control (CDC), pp. 4697-4704, Nice, France, 2019.
3. G. Baggio, S. Zampieri, and C. W. Scherer,
"Gramian Optimization with Input-Power Constraints",
IEEE Conference on Decision and Control (CDC), pp. 5686-5691, Nice, France, 2019.

4. F. Ticozzi, G. Baggio, and L. Viola,
"Quantum Information Encoding from Stabilizing Dynamics"
IEEE Conference on Decision and Control (CDC), pp. 413-418, Nice, France, 2019.
5. **G. Baggio**, V. Katewa, F. Pasqualetti, and S. Zampieri,
"The Shannon Capacity of Linear Dynamical Networks",
European Control Conference (ECC), pp. 602-607, Naples, Italy, 2019.
6. T. Menara, **G. Baggio**, D. S. Bassett, and F. Pasqualetti,
"Exact and Approximate Stability Conditions for Cluster Synchronization of Kuramoto Oscillators",
American Control Conference (ACC), pp. 205-210, Philadelphia, PA, USA, 2019.
7. **G. Baggio**, V. Rutten, G. Hennequin, and S. Zampieri,
"Information Transmission in Dynamical Networks: The Normal Network Case" *IEEE Conference on Decision and Control (CDC)*, pp. 2543-2548, Miami, FL, USA, 2018.
8. **G. Baggio** and S. Zampieri,
"On the Relation between Non-normality and Diameter in Linear Dynamical Networks",
European Control Conference (ECC), pp. 1839-1844, Limassol, Cyprus, 2018.
9. G. Michieletto, S. Milani, A. Cenedese, and **G. Baggio**,
"Improving Consensus-based Distributed Camera Calibration via Edge Pruning and Graph Traversal Initialization",
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 3166-3170, Calgary, Canada, 2018.
10. **G. Baggio** and R. Sepulchre,
"LTI Stochastic Processes: a Behavioral Perspective",
Proceedings of 20th IFAC World Congress, pp. 2806-2811, Toulouse, France, 2017.
11. **G. Baggio**, "On the Convergence of a Matricial Fixed-Point Iteration Connected with Spectral Estimation",
Proceedings of 20th IFAC World Congress, pp. 7415-7420, Toulouse, France, 2017.
12. **G. Baggio**, F. Ticozzi, and L. Viola, "Quantum State Preparation by Controlled Dissipation in Finite Time: From Classical to Quantum Controllers",
IEEE Conference on Decision and Control (CDC), pp. 1072-1077, Maui, HI, USA, 2012.

Professional Activities

Peer Review activity

International journals: IEEE Transactions on Automatic Control ∘ Automatica ∘ Control Systems Letters ∘ Systems and Control Letters ∘ IEEE Transactions on Control of Network Systems ∘ IEEE Transactions on Control Systems Technology ∘ IEEE Transactions on Network Science and Engineering ∘ European Journal of Control ∘ IEEE Access ∘ IEEE Systems.

International conferences: IEEE Control and Decision Conference (CDC) ∘ IEEE American Control Conference (ACC) ∘ European Control Conference (ECC) ∘ IFAC World Congress ∘ IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys) ∘ Indian Control Conference (ICC).

Editorial Activity

Complex Networks 2020 (9th International Conference on Complex Networks & Their Applications), Member of the Program Committee

Complex Networks 2021 (10th International Conference on Complex Networks & Their Applications), Member of the Program Committee

European Control Conference (ECC) 2021, Associate Editor

Session Chair/Organizer

IEEE CDC 2019, Chair of the session "Control of Networks II"

Professional Affiliations

IEEE, Member	2019–Present
IEEE Control System Society (CSS), Member	2019–Present
SIAM, Member	2021–Present