Dario Paccagnan

Postdoctoral Fellow

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This version: Mar 12, 2020

Academic Employment

Feb 19 - present — **Postdoctoral Fellow**, *University of California at Santa Barbara*
Center for Control, Dynamical Systems, and Computation
Mentor: Prof. Francesco Bullo

Nov 18 - Jan 19 — **Postdoctoral Researcher**, *ETH Zürich*, Automatic Control Laboratory
Mentor: Prof. John Lygeros

Education

Nov 14 - Nov18 — **Doctor of Sciences (Ph.D.)**, *ETH Zürich*, Automatic Control Laboratory
Dissertation: *Distributed control and game design in multiagent systems: from strategic agents to programmable machines*
ETH Medal for outstanding dissertation
Advisor: Prof. John Lygeros; Co-examiners: Prof. Andreas Krause, Prof. Jason Marden

Sept 12 - Aug 14 — **M.Sc. in Mathematical Modeling and Computation (with Honors) - GPA 12/12**, *Technical University of Denmark*, Thesis: *Optimal Monitoring via Differential Games*
Advisors: Prof. A. Astolfi and Prof. P.G. Hjorth

Sept 11 - Oct 14 — **M.Sc. in Aerospace Engineering (Cum Laude) - GPA 30/30**, *University of Padova*
Advisors: Prof. M.E. Valcher and Prof. A. Astolfi

Sept 08 - July 11 — **B.Sc. in Aerospace Engineering (Cum Laude) - GPA 29.86/30**, *University of Padova*
Thesis: *Active Constraints for Stabilization in Mechanical Systems*
Advisor: Prof. F. Rampazzo

Research Visits

Mar 17 - Aug 17 — *UC Santa Barbara*, Department of Computer Science, hosted by Prof. Jason Marden

Jan 14 - Aug 14 — *Imperial College London*, Department of Electrical and Electronic Engineering, hosted by Prof. Alessandro Astolfi

Grants

Feb 19 - Dec 20 — *Control and influence in multiagent networked systems*, Swiss National Science Foundation, Grant #P2EZP2-181618.

Mar 18 - Sept 18 — *Robustness of distributed control via game design*, Swiss National Science Foundation, Grant #P1EZP2-172122.

Honors and Awards

2019 — ETH Medal for outstanding doctoral thesis

2017 — Fellow of the Swiss National Science Foundation

2014 — M.Sc. awarded with special distinction by the Technical University of Denmark

2012 — Graduate Fellowship, European T.I.M.E. Programme

2012 — Elite student at the Technical University of Denmark

Invited Talks

Jan 20	**Eindhoven University of Technology,** Department of Electrical Engineering "Socio-technical and smart mobility systems"
Jan 20	**Delft University of Technology,** Delft Center for Systems and Control "Socio-technical and smart mobility systems"
Dec 19	**Imperial College London**, Department of Computing "Efficient Mechanisms for Socio-Technical Systems"
Nov 19	**Peking University**, College of Engineering "Congestion Pricing and Optimal Tolling Mechanisms"
Nov 19	**Global Automation and Control Early Career Workshop, Zhejiang University** "Efficient Mechanisms for Socio-Technical Systems: Traffic Routing, Congestion Games, and Tolls"
Oct 19	**Stanford University**, Dept. of Aeronautics and Astronautics, Autonomous Systems Lab "Efficient Mechanisms for Socio-Technical Systems: Traffic Routing, Congestion Games, and Tolls"
Jan 19	**ETH Zürich**, Department of Mathematics, Institute for Operations Research "Generalized coverage problems: approximation through game design"
Aug 18	**University of Liverpool**, Department of Computer Science "Distributed generalized coverage through utility design"
Oct 17	**Harvard University**, J.A. Paulson School of Engineering and Applied Sciences "The tradeoff between worst case and best case performance in multiagent systems"
Aug 17	**UC Riverside**, Department of Mechanical Engineering "The Tradeoff between Anarchy and Stability in Utility Design"
July 17	**University of Southern California**, Ming Hsieh Dept. of Electrical Engineering "Distributed optimisation through game design"
July 17	**UC Berkeley**, Energy and Resources Group "Nash Equilibria, Wardrop Equilibria and Utility Design in Distributed Control"
July 17	**UC San Diego**, Department of Mechanical and Aerospace Engineering "The Tradeoff between Anarchy and Stability in Utility Design"
July 16	**17th International Symposium on Dynamic Games and Applications**, Urbino, Italy "Distributed computation of Nash eq. in aggregative games with coupling constraints"

Teaching Experience

Spring 18	*Advanced Topics in Control* (MSc course), substitute lecturer and TA, ETH Zürich.
Fall 17	*Control Systems 1* (BSc course), substitute lecturer and Head TA, ETH Zürich.
Spring 15 and 16	*Nonlinear Systems and Control* (MSc course), TA, ETH Zürich.
Fall 15 and 16	*Linear System Theory* (MSc course), TA, ETH Zürich.

Mentoring and Supervision

PhD student co-supervision (University of California, Santa Barbara)

June 18 - present	Rahul Chandan, "*Equilibrium Efficiency, and Utility Design*"

Master and Semester Thesis Supervision & Committee Member (ETH Zürich, MSc level)

Oct 17 - Apr 18	Jean-Sébastien Brouillon, "*Converging to the best location equilibrium*"
Apr 17 - Nov 17	Sant Kumar, "*A decentralized fixed point algorithm for affine aggregative games*"
Sept 16 - Feb 17	Ogunsula Bolutife, "*The location equilibrium and distributed dynamics to achieve it*"
Mar 16 - Aug 16	Guillaume Burger, "*Dynamic route choice as an aggregative game*"
Dec 16 - May 17	Panin Pienroj, "*Model predictive control for aggregative games*"
Mar 15 - Aug 16	Albert Marc, "*Multiagent route choice as a mean-field game*"

Program Committee Member

SAGT 2020	13th Symposium on Algorithmic Game Theory

Review Activity

Journals	Automatica ○ IEEE Transactions on Automatic Control ○ Operations Research ○ Games and Economic Behavior ○ IEEE Transactions on Systems, Man and Cybernetics: Systems ○ IEEE Systems Journal ○ IEEE Transactions on Control of Network Systems ○ Systems & Control Letters ○ European Journal of Control ○ Journal of Global Optimization ○ International Journal of Game Theory ○ International Game Theory Review ○ IEEE Transactions on Network Science and Engineering ○ IEEE Transactions on Instrumentation and Measurement
Conferences	IEEE Conference on Decision and Control ○ IFAC World Congress ○ European Control Conference ○ American Control Conference ○ IEEE Conference on Smart Grid Communications ○ IFAC Workshop on Distributed Estimation and Control in Networked Systems

Industry Experience

Jan 18 - present

Member of the Board of Directors of Aleph Digital Industry Srl, Treviso, Italy.

Aleph Digital Industry provides technological solutions for the process industry, and in particular in the remote management, scheduling and control of industrial plants.

Nov 13 - Nov 15

Founder and consultant at iNAV calibration, Copenhagen, Denmark.

iNav calibration offers technical consulting in the field of marine navigation and process industry. Selected projects:

- Modeling and calibration of a marine grade IMU (gyro + accelerometer)
- Development of dead reckoning algorithms (inertial navigation) in the absence of GPS signal
- Tools for the compression, storage, and analysis of time series for quality control in the process industry (temperature, humidity, pressure, etc).

Workshops Participation

Nov 19	Global Automation and Control Early Career Workshop, Zhejiang University
July 19	30th Stony Brook International Conference on Game Theory
Feb 18	Game Theory and Distributed Control, Université Paris-Saclay
July 17	Adaptive Learning: Theory, Data, and Applications, Stony Brook University
Oct 16	Variational Inequalities, Nash Eq. Problems and Applications, University of Catania
July 16	17th International Symposium on Dynamic Games and Applications, University of Urbino
July 15	SIAM Conference on Control and Its Applications (CT15)
Apr 14	100th ESGI - European Study Group with Industry, University of Oxford
July 13	European Summer School in Industrial Mathematics, Universidad Carlos III de Madrid
June 12	14th Conf. on Hyperbolic Problems: Theory, Numerics and Applications, Univ. of Padova
Sept 11, Apr 12	SADCO Workshops in Optimal Control, Imperial College London and ENSTA ParisTech

Languages

Italian (Mother Tongue)

English (Full Working Proficiency)

German, Danish (Basic Knowledge)

List of Publications

Journal Articles

[J9] **D. Paccagnan**, R. Chandan, and J.R. Marden. "Utility Design for Distributed Resource Allocation – Part I: Characterizing and Optimizing the Exact Price of Anarchy," *IEEE Transactions on Automatic Control* (Early Access), **2019**, DOI: 10.1109/TAC.2019.2961995.

[J8] **D. Paccagnan** and J.R. Marden. "Utility Design for Distributed Resource Allocation – Part II: Applications to Submodular, Covering, and Supermodular Problems," *IEEE Transactions on Automatic Control* (conditionally accepted), **2019**, arXiv:1807.01343.

[J7] **D. Paccagnan***, B. Gentile*, F. Parise*, M. Kamgarpour, and J. Lygeros. "Nash and Wardrop equilibria in aggregative games with coupling constraints," *IEEE Transactions on Automatic Control*, vol. 64, no. 4, pp. 1373-1388, April **2019**, DOI: 10.1109/TAC.2018.2849946.

[J6] **D. Paccagnan** and J.R. Marden. "The importance of system-level information in multiagent systems design: Cardinality and covering problems," *IEEE Transactions on Automatic Control*, vol. 64, no. 8, pp. 3253-3267, Aug **2019**, DOI: 10.1109/TAC.2018.2878397.

[J5] **D. Paccagnan**, F. Parise, and J. Lygeros. "On the efficiency of Nash equilibria in aggregative charging games," *IEEE Control Systems Letters*, vol. 2, no. 4, pp. 629, **2018**, DOI: 10.1109/LCSYS.2018.2845674.
Additionally presented at the 57th *IEEE Conference on Decision and Control*, 2018.

Journal Articles - under review

[J4] **D. Paccagnan**, R. Chandan, B.L. Ferguson, and J.R. Marden. "Incentivizing efficient use of shared infrastructure: Optimal tolls in congestion games," *Under review*, arXiv:1911.09806, **2020**.

[J3] R. Chandan, **D. Paccagnan**, and J.R. Marden. "Optimal mechanisms for distributed resource-allocation," *Under review*, arXiv:1911.07823, **2019**.

[J2] B. Gentile, **D. Paccagnan**, B. Ogunsola, and J. Lygeros. "The Nash Equilibrium with Inertia," *Under review*, arXiv:1910.00220, **2019**.

[J1] V. Ramaswamy, **D. Paccagnan**, and J.R. Marden. "Multiagent coverage problems: The trade-off between anarchy and stability," *Under review*, arXiv:1710.01409, **2018**.

Peer-reviewed Conference Articles

[C12] **D. Paccagnan**, and M. Campi. "The Scenario Approach Meets Uncertain Game Theory and Variational Inequalities". *IEEE Conference on Decision and Control*, to appear, arXiv:1903.06762, **2019**.

[C11] R. Chandan, **D. Paccagnan**, and J.R. Marden. "When Smoothness Is Not Enough: Toward Exact Quantification and Optimization of the Price-Of-Anarchy". *IEEE Conference on Decision and Control*, to appear, arXiv:1904.10915, **2019**.

[C10] R. Chandan, **D. Paccagnan** and J.R. Marden. "Optimal Price of Anarchy in Cost-Sharing Games". *American Control Conference*, **2019**, DOI: 10.23919/ACC.2019.8815011.

[C9] R. Chandan, **D. Paccagnan**, B.L. Ferguson, and J.R. Marden. "Computing Optimal Taxes in Atomic Congestion Games". *NetEcon '19: Workshop on the Economics of Networks, Systems and Computation*, **2019**, DOI: 10.1145/3338506.3340239 (extended abstract).

[C8] V. Ramaswamy, **D. Paccagnan** and J.R. Marden. "Multiagent Maximum Coverage Problems: The Trade-off Between Anarchy and Stability". *European Control Conference*, **2019**, (**I**), DOI: 10.23919/ECC.2019.8795936.

[C7] **D. Paccagnan** and J.R. Marden. "The Risks and Rewards of Conditioning Noncooperative Designs to Additional Information". *Allerton Conference on Communication, Control, and Computing*, **2017**. DOI: 10.1109/ALLERTON.2017.8262841.

[C6] B. Gentile, **D. Paccagnan**, B. Ogunsola and J. Lygeros. "A Novel Concept of Equilibrium Over a Network". *IEEE Conference on Decision and Control*, **2017**, **(I)**. DOI: 10.1109/CDC.2017.8264222.

[C5] G. Burger, **D. Paccagnan**, B. Gentile, and J. Lygeros. "Guarantees of convergence to a dynamic user equilibrium for a network of parallel roads". *IFAC World Congress*, **2017**, **(I)**. DOI: 10.1016/j.ifacol.2017.08.2048.

[C4] **D. Paccagnan***, B. Gentile*, F. Parise*, M. Kamgarpour, and J. Lygeros. "Distributed computation of generalized Nash equilibria in quadratic aggregative games with affine coupling constraints". *IEEE Conference on Decision and Control*, **2016**, **(I)**. DOI: 10.1109/CDC.2016.7799210.

[C3] **D. Paccagnan**, M. Kamgarpour, and J. Lygeros. "On Aggregative and Mean Field Games with Applications to Electricity Markets". *European Control Conference*, **2016**. DOI: 10.1109/ECC.2016.7810286.

[C2] **D. Paccagnan**, M. Kamgarpour, and J. Lygeros. "On the Range of Feasible Power Trajectories for a Population of Thermostatically Controlled Loads". *IEEE Conference on Decision and Control*, **2015**. DOI: 10.1109/CDC.2015.7403144.

[C1] M.J. Joergensen, **D. Paccagnan**, N.K. Poulsen, and M.B. Larsen. "IMU Calibration and Validation in a Factory, Remote on Land and at Sea". *IEEE Position Location and Navigation Symposium*, **2014**. DOI: 10.1109/PLANS.2014.6851514.

Book Chapters

[B1] B. Gentile*, F. Parise*, **D. Paccagnan***, M. Kamgarpour and J. Lygeros. "A game theoretic approach to decentralized charging of plug-in electric vehicles". Accepted *in Challenges in Engineering and Management of Cyber-Physical Systems of Systems*, *River Publishers*, to appear, **2018**.

PhD Thesis

[Th1] **D. Paccagnan**. "Distributed Control and Game Design: From Strategic Agents to Programmable Machines," *ETH Zürich*, **2019**, DOI: 10.3929/ethz-b-000314981.

* denotes authors with equal contribution; **(I)** denotes invited session paper.