Mathias Staudigl

Chair for Mathematical Optimization
University of Mannheim

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Personal information

- 22.09.1983 - born in Vienna, Austria
- Married, two sons
- ORCID profile: https://orcid.org/0000-0003-2481-0019

Academic positions

- 2023- Full Professor (W3) for Mathematical Optimization, University of Mannheim
- 2019: Associate Professor for Multi-Agent Optimization, DACS, Maastricht University
- 2019: Associate Professor for Operations Research and Game Theory, School of Business and Economics, Maastricht University
- 2015 - 2019: Assistant Professor for Game theory and Operations Research (tenured), Maastricht University
- 2011 - 2015: Akademischer Rat at the Center for Mathematical Economics (IMW), University Bielefeld
- September 2010: Max Weber Fellow at the European University Institute, Florence (with Fernando Vega-Redondo)
- October 2009 - September 2010: Post-doc researcher at the Department of Mathematics and the Department of Economics at the University of Vienna.

Education

- 2010: Ph.D. Economics, University of Vienna (with *distinction*)
- 2007: MSc (Mag.rer.soc.oec) Economics, University of Vienna, (with *distinction*).

Supervision activities

Supervisor of: 5 PhD thesis, 8 Master Thesis, 15 Bachelor Thesis.
Master Students (completed):

- Laurens Snijer: Machine Learning in Econometrics
- Pieter Geelen: Nesting Clustering information into a Dataset
- Sander Aarts: Dynamic Regret for First-Order Methods with Applications
- Enrico Wegner: Statistical Learning under non-convex penalties
- Maren Höver: Data-driven traffic control.
- Diogo Freitas Carneiro Pedroso: Reinforcement learning in Energy networks
- Ewan Demeur: Solving Stochastic Generalized Nash Games
- Paul Disbeschl: Training GANS strategically
- Nils Rüber: Block coordinate methods for image recovery problems
- Johannes Carl Schnebel: Stochastic Approximation Methods for multi-stage stochastic optimization

PhD students:

- Aditya Aradhye (2016-2021): Sender-Receiver Stopping Games.
- Benoit Duvocelle (2016-2021): Game theoretic Learning and Optimization
- Dennis Meier (w/ Radu Bot) (2015-2020) Inducing strong convergence in Monotone splitting algorithms.
- Paulin Jacquot (2014-2019): Game theory and Optimization Methods for Decentralized Electric Systems
- Siqi Qu (2022-. . .): Equilibrium seeking from the lens of dynamical systems.
- Meggie Marschner (2023-. . .): Algorithms for Nested Variational inequalities
- Johannes Carl Schnebel (2025 -. . .): Non-stationary bilevel optimization problems

Post-Docs:

- Olivier Bilenne (2022-2023) (now at Universite d'Avignon)
- Andrea Ebner (2025-)

Shortlist places and offers

2012 Visiting fellow at Nuffield College, University of Oxford (accepted)

2014 Visiting Full Professor in Mathematical Economics: Department of Economics, University of Vienna (accepted)

2018 Shortlisted for Professor position in Machine learning, University of Vienna

Honors, Awards and Visiting Positions

2017 Chair of COST Action CA16228 "European Network of Game Theory" (GAMENET).

2013 Certificate of Excellence in Reviewing, Games and Economic Behavior

2010 *Würdigungspreis des Bundesministeriums für Wissenschaft und Forschung Österreich*; prize awarded by the Austrian federal ministry of science and technology to the 40 best graduate students in Austria.

2010 Max Weber Fellow, European University Institute, Florence, Italy

2008 *Würdigungspreis des Bundesministeriums für Wissenschaft und Forschung Österreich*; prize awarded by the Austrian federal ministry of science and technology to the 40 best undergraduate students in Austria.

2006 Scholarship "ERASMUS".

2005 Prize for Academic Excellence, University of Vienna

Research fields

- Continuous Optimization
  - Convex Optimization
  - Non-smooth Optimization
  - Distributed Optimization
  - Machine and online learning
- Stochastic Optimization
  - Stochastic Variational inequalities
  - Variance Reduction
  - Randomized algorithms
- Monotone Operators
  - Applications to Dynamical Systems
  - Applications to game theory
  - Numerical Methods for monotone inclusions

Service for the community

- Leader of the IFIP Working Group 7.8 "Non-linear Optimization"
- Associate Editor for *Applied Mathematics and Computation*
- Area Editor "Stochastic Modeling, Analysis and Uncertainty Quantification", *Advances in Continuous and Discrete Models*
- Member of the Editorial Board of Journal of Dynamics and Games.
- Guest-Editor of the Special Issue "Games, Dynamics and Optimization" in Journal of Applied Mathematics and Optimization
- Referee for the following journals: Journal of Economic Theory, Theoretical Economics, Games and Economic Behavior, International Journal of Game Theory, Economic Theory, Journal of Economic Dynamics and Control, Journal of Mathematical Economics, Journal of Theoretical Biology, International Journal of Stochastic Analysis, European Journal of Operational Research, IEEE Transactions on Automatic Control, Review of Economic Studies, SIAM Journal of Control and Optimization, SIAM Journal on Optimization, Dynamic Games and Applications, Methodology and Computing in Applied Probability, SIAM Journal on Mathematics of Data Science
- Member of the national organization committee of the 15th IFAC symposium on large scale complex systems 2019, TU Delft.
- Lecturer for the Dutch Network on the Mathematics of Operations Research (LNMB).
- DIAMANT representative at the NWO Initiative “AI & Mathematics”

Organization of Scientific meetings

- Co-organisation of the Workshop "Dynamics, Optimization and Control", Groningen, June 16-17, 2025
- PC member of the EUROPT 2022 and 2024
- Invited Session at 60th IEEEE Conference on Decision and Control 2021 on Game Equilibrium Seeking and Learning. Joint organization with Barbara Franci, Sergio Grammatico, Lacra Pavel and Uday V. Shanbhag. Approximately 30 participants.
- Invited Session at 61st IEEEE Conference on Decision and Control 2021. Joint organization with Barbara Franci, and Sergio Grammatico.
- Organized Minisympoisum at the SIAM CSE23 in Amsterdam.
- Invited Session at the SIAM Conference on Optimization (OP21). Co-Organized with Uday V. Shanbhag, Approximately 50 participants.

- Organizer of the Stream on Variational inequalities, Nash games, Multilevel and Dynamic Optimization at the 18th EUROPT Workshop on Advanced in Continuous Optimization in Toulouse, 2021. This stream consists of 6 scientific sessions, with five talks each. Approximately 50 Participants.
- Organizer of a conference session on primal-dual methods in structured optimization at the ICCOPT19.
- GAMENET training school for PhD students and early career researchers on industrial applications of game theory in Krakow 2018, in the framework of the COST Action CA16228. Participation of delegates from Amazon, Criteo, Google and EDF.
- Organizer of the conference series "Games, Dynamics and Optimization" (GDO) (Vienna 2018, Cluj-Napoca, 2019, Rome 2020)
- Co-Organizer of the One-World Optimization Seminar (OWOS). Co-organized with Radu Ioan Bot and Shoham Sabach.

Service for the Faculty and University

- Founder of the research theme "Data driven decision making" (D3M). I was in the planning and management team its first year of existence.
- Chair and Scientific Representative of the COST Action CA16228. European Network for Game Theory ("GAMENET"). GAMENET is the largest European network in game theory. It is financed through the H2020 framework.
- Member of the accreditation committee and designer of the Mathematics curriculum for the Bachelor of Science program "Business engineering".
- Member of the Council of the Faculty of Science and Engineering at Maastricht University; Chair of the Career Track Committee of the Faculty.
- Member of the Mathematics Cluster Maastricht (MCM)
- Group leader of the DACS research team “Games & AI” at Maastricht University

Memberships

- Mathematical Optimization Society
- SIAM
- German Operations Research Society
- The Continuous Optimization Working Group of EURO

Publications

Journal publications

1. *Potential games in volatile environments*, *Games and Economic Behavior*, Volume 72, Issue 1, 2011, pp. 271 - 287
2. *Stochastic Stability in asymmetric binary choice coordination games*. *Games and Economic Behavior*, 2012, Volume 75 2012, pp. 372 - 401
3. *Co-Evolutionary dynamics and Bayesian interaction games*, *International Journal of Game theory*, 2013, Volume 42, Issue 1, pp. 179 - 210
4. *Evolution of Social Networks* (w/ T. Hellmann), *European Journal of Operational Research*, 2014, Vol. 234(3): pp. 583 - 596.
5. *Constrained Interaction and Social Coordination* (w/ Simon Weidenholzer), *Journal of Economic Theory*, 2014, Vol. 152, pp. 41 - 63
6. *A Limit Theorems for Markov decision processes Journal of Dynamics and Games*, Pages: 639 - 659, Volume 1, Issue 4, October 2014
7. *Large deviations and stochastic stability in the small noise double limit* (w/ Bill Sandholm), *Theoretical Economics*, 2016, 11, pp. 279-355
8. *On repeated games with imperfect public monitoring: From discrete to continuous time* (with Jan-Henrik Steg) *Journal of Dynamics and Games*, Volume 4, Issue 1, January 2017
9. *Sample Path Large Deviations for Stochastic Evolutionary Game Dynamics* (w/ Bill Sandholm), *Mathematics of Operations Research*, 2018, Vol. 43, No. 4, pp. 1348-1377
10. *On the convergence of Gradient-like flows with noisy gradient input* (w/ P. Mertikopoulos), *SIAM Journal on Optimization*, 2018, Vol. 28, No. 1, pp. 163-197
11. *Stochastic Mirror Descent Dynamics and Their Convergence in Monotone Variational Inequalities* (w/ P. Mertikopoulos) , *Journal of Optimization Theory and Applications*, 2018, Vol. 179, Issue 3, pp. 838-867
12. *Multi-agent online learning in time-varying games* (w/ B. Duvocelle, D. Vermeulen and P. Mertikopoulos). *Mathematics of Operations Research*. https://doi.org/10.1287/moor.2022.1283
13. *Preface to the Special Issue on "Games, Dynamics and Optimization"* (w/ R.I. Bot) Applied Mathematics & Optimization, 81, 651–654 (2020).
14. *Hessian-Barrier Algorithm for linearly constrained optimization problems* (w/ I. Bomze, P. Mertikopoulos and W. Schachinger). *SIAM Journal on Optimization*, 2019, Vol. 29, No.3, pp. 2100-2127.
15. *Convergent noisy forward-backward-forward algorithms in non-monotone variational inequalities* (w/ P. Mertikopoulos). IFAC-PapersOnLine, 52(3):120–125, 2019.

16. *Mini-batch Forward-Backward-Forward Methods for solving Stochastic Variational inequalities* (w/ R. I. Bot, P. Mertikopoulos and P.V. Vuong), *Stochastic Systems*, 2021, Vol. 11, No.2, pp. 112-139.

17. *Inducing strong convergence of trajectories in dynamical systems associated to monotone inclusions with composite structure* (w/ R.I. Bot, S.M. Grad and D. Meier), 2020, *Advances in Nonlinear Analysis*, vol. 10, no. 1, 2021, pp. 450-476

18. *Generalized self-concordant analysis of Frank-Wolfe algorithms* (w/ P. Dvurechensky, K. Safin and S. Shtern), *Mathematical Programming*, 2022

19. *Computing Dynamic User Equilibrium on Large-Scale Networks Without Knowing Global Parameters.* (w/ D.V. Thong, A. Gibali and P.V. Vuong) *Netw Spat Econ 21*, 735–768 (2021).

20. *First-order methods for Convex Optimization* (w/ P. Dvurechensky and S. Shtern), 2021, *EURO Journal on Computational Optimization, Vol. 9, 2021*.

21. *Large deviations and Stochastic stability in Population Games* (w/ S. Arigapudi and W. H. Sandholm). 2022, 9(4): 569-595, *Journal of Dynamics & Games*

22. *A competitive search game with a moving target* (w/ B.Duvocelle, J. Flesch and D. Vermeulen). *European Journal of Operational Research*, Volume 303, Issue 2, 2022, Pages 945-957.

23. *Mini-batch stochastic three-operator splitting for distributed optimization* (w/ B. Franci) (2022). *IEEE Control Systems Letters, vol. 6, pp. 2882-2887, 2022.*

24. *Stochastic Relaxed Inertial Forward-Backward-Forward splitting for Monotone Inclusions in Hilbert spaces* (w. Cui, S., Shanbhag, U. and P.V. Vuong), Vol. 83, No. 22, pp. 465–524, *Computational Optimization and Applications*

25. *Incentive compatibility in sender-receiver stopping games* (w/ A. Aradhye, J. Flesch and D. Vermeulen), 2022. *Games and Economic Behavior*.

26. *A Relaxation-based Probabilistic Approach for PDE-constrained Optimization under Uncertainty with Pointwise State Constraints* (w/ D. P. Kouri and T. M. Surowiec). Vol. 85, 441–478 (2023) *Computational Optimization and Applications*

27. *Distributed Random Block-Coordinate descent methods for ill-posed composite convex optimisation problems* (w/ P. Jacquot), 2023 in: *Fixed Point Theory Algorithms Sci Eng*, 14 (2023).

28. *Hessian barrier algorithms for non-convex conic optimization* (w/ P. Dvurechensky) *Mathematical Programming* (2024). https://doi.org/10.1007/s10107-024-02062-7

29. *A regularized variance-reduced modified extragradient method for stochastic hierarchical games*, *arXiv preprint arXiv:2302.06497*. (w/ S. Cui and U. Shanbhag, Forthcoming in Journal of Optimization Theory and Applications - Special Issue: Optimization: Theory, Algorithms and Applications in Energy, 2025.

30. *A conditional gradient homotopy method with applications to Semidefinite Programming arXiv preprint arXiv:2207.03101* (w/ P. Dvurechensky and S. Shtern)

31. *Tikhonov regularized exterior penalty dynamics for constrained variational inequalities*. arXiv preprint arXiv:2403.13460. (w/ S. Qu), IEEE Control & System Letters.

32. *Derivative-free stochastic bilevel optimization for inverse problems* (forthcoming in COAP) (w./T. van Leeuwen & S. Weissmann)

33. *Asymptotic behavior of penalty dynamics for constrained variational inequalities* (w/ Qu, S. & Peypouquet, J.) (2025). arXiv preprint arXiv:2503.03902. (forthcoming in *Applied Mathematics & Optimization*.

34. *Complexity guarantees for risk-neutral generalized Nash equilibrium problems* (w./Tao, H., Iannelli, A., Marschner, M., Shanbhag, U. V., & Cui, S. (2025). arXiv preprint arXiv:2506.11409 (submitted for publication to IEEE TAC)

Conference Proceedings

1. *An Online Feasible Point Method for Benign Generalized Nash Equilibrium Problems* (w./ Sachs, S., Hadiji, H., van Erven, T)), The 36th International Conference on Algorithmic Learning Theory, 2025

2. *A Gauss-Seidel method for solving multi-leader-multi-follower games* (w/ F. Fabiani, B. Franci, S. Sagratella, M. Schmidt), 2025 23rd European Control Conference (ECC)

3. *Barrier Algorithms for Constrained Non-Convex Optimization* (w/ P. Dvurechensky), ICML 2024

4. *Proximal-like algorithms for equilibrium seeking in mixed-integer Nash equilibrium problems* (w/ F. Fabiani, B. Franci, S. Sagratella, M. Schmidt). IEEE 61-st Conference on Decision and Control (CDC), 2022.

5. *A privacy-preserving distributed computational approach for distributed locational marginal prices* (w/ O. Bilenne, P. Jacquot, N. Oudjane, and C. Wan), IEEE 61st Conference on Decision and Control (CDC), 2022.

6. *Equilibrium Tracking and Convergence in Dynamic Games* (w/ P. Mertikopoulos). In: IEEE 60th Conference on Decision and Control (CDC), 2021

7. *A relaxed-inertial forward-backward- forward algorithm for stochastic generalized Nash equilibrium seeking* (w/ S. Cui, B. Franci, S. Grammatico, U. V Shanbhag). In: IEEE 60th Conference on Decision and Control (CDC).

8. *Distributed Convergence to Nash equilibrium in continuous games with Noisy first-order feedback* (w/ P. Mertikopoulos). In: 56th IEEE Conference on Decision and Control (CDC), 2017

9. *On the convergence of stochastic Forward-backward-forward algorithms with Variance reduction in Pseudo-Monotone Variational Inequality Problems* (w/ R.I. Bot, P. Mertikopoulos and P.T Vuong) (NIPS 2018 Smooth Games Optimization and Machine Learning Workshop)

10. *Distributed forward-backward (half) forward algorithms for generalized Nash equilibrium seeking* (w/ B. Franci and S. Grammatico), European Control Conference (ECC) 2020

11. *Self-concordant analysis of Frank-Wolfe algorithms* (w/ P. Dvurechensky, P. Ostroukov, K. Safin and S, Shtern), ICML2020

Selected Presentations

- 14th EUROPT Workshop on Advances in Continuous Optimization
- Paris Symposium on Game Theory, Paris 2018
- ISMP, Bordeaux, France
- NIPS Workshop on Smooth Games Optimization and Machine Learning, NIPS2018.
- 15th IFAC symposium on large scale complex systems 2019, TU Delft
- ICCOPT 2019
- ICT.OPEN 2021. Talk on Distributed DLMP based demand response in electricity networks
- Dutch National Mathematical Conference NMC2021.
- SIAM Conference on Optimization 2021.
- EUROPT 2021: Co-organizer of the Stream "Variational Inequalities, Nash Games, multi-level and dynamic optimization" (Virtual due to COVID-19)
- Dutch Days on Optimization (Oct. 13, 2022, CWI Amsterdam).
- Workshop on polynomial optimization and applications in control and energy (CWI, Nov. 17-18)
- CWI Boot Camp on ML Theory: Invited Lecture on Learning in Games.
- EUROPT 2024 (Program Committee member)
- ISMP 2024
- Semi-Plenary speaker at NOPTA 2024 (celebrating the 75th birthday of Boris Mordukhovich)

Grants and Involved Projects

My research has been funded by

- NSF Grants SES-0851580 and SES-1155135, Co-PI, USD 100K
- US Air Force OSR Grant FA9550-09- 0538, Co-PI, USD 80K
- Vienna Science and Technology Fund (WWTF) under project fund MA 09-017, Associated Investigator, EUR 451K
- ANR project OCARLESS (ANR-16-CE33-0004-01), EUR 207K

- COST European Cooperation for Science and Technology (Action Number CA16228), Scientific Representative and Action Chair, EUR 500K
- PGMO Grant 2020: "Privacy preserving algorithms for distributed control of energy markets", PI, 60K,
- PGMO Grant 2021: "Stochastic AC Optimal Power flow under integrated chance constraints", PI, 20K
- PGMO Grant 2022:"Stochastic bilevel optimization for the coordinated management of DERs", PI, 10K
- PGMO Grant 2023. "An integrated optimization and simulation platform for multi-asset energy systems", PI, 50K
- DFG Project: Non-stationary hierarchical optimization, PI, 250K