Pieter Kleer

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Career information

I am an assistant professor at Tilburg Univerity. Before that I was a postdoctoral research fellow in the Algorithms and Complexity department at the Max-Planck-Institut für Informatik (MPII) in Saarbrücken, hosted by Kurt Mehlhorn. I completed my PhD research in the Networks and Optimization group at Centrum Wiskunde & Informatica (CWI) in Amsterdam, supervised by Guido Schäfer. My PhD position was part of the Networks project (https://www.thenetworkcenter.nl/).

My current research focuses on two areas at the intersection of discrete mathematics and theoretical computer science: algorithmic game theory and Markov Chain Monte Carlo methods for (approximately) sampling and counting combinatorial objects.

Education

2015–2019 Doctoral degree, Vrije Universiteit Amsterdam (cum laude)

PhD thesis: *When Nash met Markov: Novel results for pure Nash equilibria and the switch Markov chain* (supervised by Guido Schäfer at CWI)

Promotores: Guido Schäfer and Lex Schrijver

Reading committee: Catherine Greenhill, Evdokia Nikolova, Britta Peis, Leen Stougie and Marc Uetz

2013–2015 M.Sc., Applied Mathematics, Delft University of Technology (cum laude)

Master thesis: *Distributed route discovery in communication networks using neighbour information* (supervisors: Karen Aardal, Bart Gijsen, Dion Gijswijt)

2010–2013 B.Sc., Applied Mathematics, Delft University of Technology (cum laude)

Bachelor thesis: *Stable matchings* (in Dutch) (supervisor: Dion Gijswijt)

Teaching at Tilburg University

- Computational Aspects in Econometrics
- Linear Optimization (for Data Science)
- For high school students:
  - Taught (Wiskunde D) OR module for students in Tilburg area, 2021.
  - Assisted students with their thesis project (Dutch: Profielwerkstuk) as part of the Econasium project, 2021.

Teaching/supervision (before Tilburg University)

2020	Lecturer/organizer of the advanced course *Topics in Algorithmic Game Theory and Economics*, Saarland Informatics Campus
2020	Supervisor of MPII D1 intern Mohammad Roghani
2018	Co-supervisor bachelor project Leon Lan, Amsterdam University College
2018	TA/Lecturer for master course *Behavioral Operations Research*, VU Amsterdam
2015	TA for master course *Discrete Optimization*, Dutch Mastermath program
2013–2014	TA for various bachelor courses, Delft University of Technology
2010–2014	Private tutor at 't Z-je (math/chemistry for high school/HBO students)

Professional activities

- PC member of SAGT 2022 (15th International Symposium on Algorithmic Game Theory)
- Organizer of (virtual) ADFOCS 2020: https://conferences.mpi-inf.mpg.de/adfocs/. Speakers:
  - Nicole Immorlica (Microsoft Research, New York City)
  - Jugal Garg and Ruta Mehta (University of Illinois at Urbana-Champaign)
- PhD representative (in the year 2017) of the Dutch Network on the Mathematics of Operations Research (LNMB)
- Co-organiser of the Fourth NETWORKS PhD Colloquium: https://www.thenetworkcenter.nl/Events/Archive/event/108/Fourth-NETWORKS-interactive-Phd-Colloquium
- (Former) author for The Network Pages: http://www.thenetworkpages.nl
- Volunteer at annual CWI open day (2015, 2016, 2017)
- Review work:

– Conferences: EC, WINE, SAGT, SODA, ICALP, AAMAS, IPCO, FSTTCS.

– Journals: Operations Research, Mathematical Programming, Mathematics of Operations Research, Discrete Optimization, Electronic Journal of Combinatorics, Random Structures and Algorithms, Theoretical Computer Science, Games and Economic Behaviour.

Awards

- Gijs de Leve Prize 2018-2020
  Awarded by the Dutch Network on the Mathematics of Operations Research (LNMB)

Research visits

- Columbia University in the City of New York, Computer Science Department and Data Science Institute, hosted by Tim Roughgarden, April 1–June 1, 2019
- RWTH Aachen University, Management Science group, hosted by Britta Peis and Veerle Timmermans, October 15–18, 2018

Publications

Working papers/under submission

[w3] P. Kleer. Price of Anarchy in Parallel Link Networks with Generalized Mean Objective.

[w2] P. Kleer and G. Amanatidis. Approximate Sampling and Counting of Graphs with Near-Regular Degree Intervals.

[w1] P. Kleer and H. Simon. Primal and Dual Combinatorial Dimensions.

Journal articles

Some of the journal articles listed below (although not all) supersede their conference version, which is given in the next section.

[j8] G. Amanatidis, P. Kleer and G. Schäfer. Budget-feasible mechanism design for non-monotone submodular objectives: Offline and online. *Mathetatics of Operations Research.*

[j7] Sampling Hypergraphs with Given Degrees. M. Dyer, C. Greenhill, J. Ross and L. Stougie. *Discrete Mathematics.*

[j6] G. Amanatidis and P. Kleer. Rapid mixing of the switch Markov chain for two-class joint degere matrices. *SIAM Journal on Discrete Mathematics.*

[j5] P. Kleer, V. Patel and F. Stroh. Switch-based Markov chains for sampling Hamiltonian cycles in dense graphs. *Electronic Journal of Combinatorics.*

[j4] G. Amanatidis and P. Kleer. Rapid mixing of the switch Markov chain for strongly stable degree sequences. *Random Structures and Algorithms.*

[j3] P. Kleer and G. Schäfer. Potential function minimizers of combinatorial congestion games: Efficiency and computation. *Mathematical Programming.*

[j2] P. Kleer and G. Schäfer. Tight inefficiency bounds for perception-parameterized affine congestion games. *Theoretical Computer Science.*

[j1] P. Kleer and G. Schäfer. The impact of worst-case deviations in non-atomic network routing games. *Theory of Computing Systems.*

Conference proceedings (peer-reviewed)

This list contains extended abstracts in peer-reviewed conference proceedings (including the conference versions of some of the journal submissions mentioned above).

[c10] P. Kleer. Sampling from the Gibbs Distribution in Congestion Games. In Proceedings of the 22nd ACM Conference on Economics and Computation. *Proceedings of EC 2021.*

[c9] A. Antoniadis, T. Gouleakis, P. Kleer and P. Kolev. Secretary and Online Matching Problems with Machine Learned Advice. In Proceedings of 34th Conference on Neural Information Processing Systems. *Proceedings of NeurIPS 2020*

[c8] P. Kleer and G. Schäfer. Topological price of anarchy bounds for clustering games on networks. In Proceedings of the 15th Conference on Web and Internet Economics. *Proceedings of WINE 2019.*

[c7] G. Amanatidis, P. Kleer and G. Schäfer. Budget-Feasible Mechanism Design for Non-Monotone Submodular Objectives: Offline and Online. In Proceedings of the 2019 ACM Conference on Economics and Computation, pages 223–240, 2019. *Proceedings of EC 2019.*

[c6] G. Amanatidis and P. Kleer. Rapid mixing of the switch Markov chain for strongly stable degree sequences and 2-class joint degree matrices. In Proceedings of the 30th Annual ACM-SIAM Symposium on Discrete Algorithms. *Proceedings of SODA 2019.*

[c5] C.J. Carstens and P. Kleer. Speeding up switch Markov chains for sampling bipartite graphs with given degree sequence. *Leibniz International Proceedings in Informatics (LIPIcs),* 116(36):1–18, 2018. *Proceedings of APPROX-RANDOM 2018.*

[c4] P. Kleer and G. Schäfer. Path deviations outperform approximate stability in heterogeneous congestion games. In *Lecture Notes in Computer Science (LNCS)*, 10504:212–224, 2017. *Proceedings of SAGT 2017.*

[c3] P. Kleer and G. Schäfer. Potential function minimizers of combinatorial congestion games: Efficiency and computation. In Proceedings of the 2017 ACM Conference on Economics and Computation, pages 223–240, 2017. *Proceedings of EC 2017.* **Contributed talk at HALG 2018.**

[c2] P. Kleer and G. Schäfer. Tight inefficiency bounds for perception-parameterized affine congestion games. *Lecture Notes in Computer Science (LNCS)*, 10236:381–392, 2017. *Proceedings of CIAC 2017.* **Invited to special issue of Theoretical Computer Science.**

[c1] P. Kleer and G. Schäfer. The impact of worst-case deviations in non-atomic network routing games. In *Lecture Notes in Computer Science (LNCS)*, 9928:129–140, 2016. *Proceedings of SAGT 2016.* **Invited to special issue of Theory of Computing Systems.**

Selection of talks

- *Sampling from the Gibbs Distribution in Congestion Games*
  - Conference talk at EC 2021, 2021
  - Tilburg OR seminar, 2021
  - Mathematical Foundations of Dynamic Nash Flows (Dagstuhl meeting), 2020
- *Secretary and Online Matching Problems with Machine Learned Advice.*
  - Utrecht University, CS seminar, 2021
  - Brown University, Data Wednesday seminar, 2021
  - Universität zu Köln, CS noon seminar, 2020
  - Max-Planck-Institut für Informatik, D1 noon seminar, virtual, 2020
- *Rapid mixing of the switch Markov chain for sampling graphs with given degrees.*
  - University of Essex, Mathematics Essex Seminar Series, 2021
  - Invited talk at NMC2021, NETWORKS session, 2021
  - Max-Planck-Institut für Informatik, D1 noon seminar, Saarbrücken, 2019
  - Theory Seminar CS department, Columbia University, 2019
  - Seminar talk in Networks and Optimization group, CWI, 2019
  - Conference talk at SODA 2019, San Diego, 2019.
  - 5th NETWORKS PhD colloquium, Eindhoven University of Technology, 2018.
- *Tight inefficiency bounds for perception-parametrized affine congestion games.*
  - Seminar talk in Management Science group, RWTH Aachen University, 2018.
  - Conference talk at CIAC 2017, National Technical University of Athens, 2017.
- *Topological inefficiency bounds for clustering games on random networks.*
  - 6th Day on Computational Game Theory, Hasso-Plattner-Institut, Potsdam, 2019
  - Invited talk, OR 2018, Brussels, 2018.
- *Potential function minimizers in combinatorial congestion games.*

  - Contributed talk at HALG 2018, Vrije Universiteit Amsterdam, 2018.
  - 5th German Day on Computational Game Theory, University of Augsburg, 2018.
  - Conference talk at EC 2017, Massachusetts Institute of Technology, 2017.
  - Seminar talk in Networks and Optimization group, CWI, 2017.

- *The impact of worst-case deviations in non-atomic network routing games.*
  - LNMB Lunteren conference, Lunteren, 2017.
  - Conference talk at SAGT 2016, Liverpool, 2016.
  - Flexible Network Design workshop, Vrije Universiteit Amsterdam, 2016.