

Christian Kroer | Curriculum Vitae

📞 +1 (412) 667 0870 • ✉ ckroer@cs.cmu.edu
🌐 www.christiankroer.com • in christian-kroer • 🐙 ChrKroer
US green card holder

Research interests

Fields: Artificial intelligence, algorithms, operations research, economics.

Specific: Equilibrium computation, mechanism design, auctions, prediction markets, convex optimization, machine learning, robust optimization, and practical applications.

Education

Carnegie Mellon University <i>Ph.D. in computer science, PA, USA</i>	Pittsburgh 2012–present
IT University of Copenhagen <i>M.Sc. IT - software development and technology, Denmark</i>	Copenhagen 2009–2012
Aalborg University <i>B.A. human-centered informatics, Denmark</i>	Aalborg 2006–2009

Employment and Internships

Research Assistant <i>Carnegie Mellon University</i>	2012–present
Research Scientist (short-term contractor position) <i>Facebook, Operations, Economics and Computation team</i>	2016–2017
Research Intern <i>Facebook, Operations, Economics and Computation team</i>	Summer 2016
Research Intern <i>Microsoft Research New York City</i>	Summer 2015
Research Assistant (short-term contractor position) <i>Aalborg University</i>	2012
Teaching Assistant <i>IT University of Copenhagen</i>	2011–2012
Systems Developer <i>Netmester A/S</i>	2010–2011

Honors and Awards

2016 - 2018: Facebook Fellowship in economics and computation. One given worldwide per year. Full tuition, fees, stipend, and travel grant for two years, \$183,168.

2017: Runner-up in the Informs Computing Society Student Paper Competition

Publications

Working papers.....

- [1] Christian Kroer, Kevin Waugh, Fatma Kılınç-Karzan, and Tuomas Sandholm. Faster algorithms for extensive-form game solving via improved smoothing functions. In *submission to Mathematical Programming Series A*, 2018.
- [2] Vincent Conitzer, Christian Kroer, Eric Sodomka, and Nicolas E. Stier-Moses. Multiplicative pacing equilibria in auction markets. In *submission to AAAI*, 2018.
- [3] Christian Kroer, Gabriele Farina, and Tuomas Sandholm. Robust stackelberg equilibria in extensive-form games and extension to limited lookahead. In *submission to AAAI*, 2018.
- [4] Christian Kroer, Nam Ho-Nguyen, George Lu, and Fatma Kılınç-Karzan. Performance evaluation of iterative methods for solving robust convex quadratic problems. In *submission to Optimization for Machine Learning Workshop and work-in-progress*, 2018.

Published papers.....

- [1] Gabriele Farina, Christian Kroer, and Tuomas Sandholm. Regret minimization in behaviorally-constrained zero-sum games. In *ICML*, 2017.
- [2] Christian Kroer, Kevin Waugh, Fatma Kılınç-Karzan, and Tuomas Sandholm. Theoretical and practical advances on smoothing for extensive-form games. In *EC*, 2017.
- [3] Christian Kroer, Gabriele Farina, and Tuomas Sandholm. Smoothing method for approximate extensive-form perfect equilibrium. In *IJCAI*, 2017.
- [4] Noam Brown, Christian Kroer, and Tuomas Sandholm. Dynamic thresholding and pruning for regret minimization. In *AAAI*, 2017.
- [5] Christian Kroer and Tuomas Sandholm. Imperfect-recall abstractions with bounds in games. In *EC*, 2016.
- [6] Christian Kroer, Miroslav Dudík, Sébastien Lahaie, and Sivaraman Balakrishnan. Arbitrage-free combinatorial market making via integer programming. In *EC*, 2016.
- [7] Christian Kroer and Tuomas Sandholm. Sequential planning for steering immune system adaptation. In *IJCAI*, 2016.
- [8] Christian Kroer, Kevin Waugh, Fatma Kılınç-Karzan, and Tuomas Sandholm. Faster first-order methods for extensive-form game solving. In *EC*, 2015.
- [9] Christian Kroer and Tuomas Sandholm. Limited lookahead in imperfect-information games. In *IJCAI*, 2015.
- [10] Christian Kroer and Tuomas Sandholm. Discretization of continuous action spaces in extensive-form games. In *AAMAS*, 2015.
- [11] Christian Kroer and Tuomas Sandholm. Computational bundling for auctions. In *AAMAS*, 2015.

- [12] Christian Kroer and Tuomas Sandholm. Extensive-form game abstraction with bounds. In *EC*, 2014.
- [13] Bruce DeBruhl, Christian Kroer, Anupam Datta, Tuomas Sandholm, and Patrick Tague. Power napping with loud neighbors: optimal energy-constrained jamming and anti-jamming. In *WiSec*, 2014.
- [14] Christian Kroer, Martin Kjær Svendsen, Rune M Jensen, Joseph Kiniry, and Eilif Leknes. Symbolic configuration for interactive container ship stowage planning. *Computational Intelligence*, 2014.
- [15] Paolo Viappiani and Christian Kroer. Robust optimization of recommendation sets with the maximin utility criterion. In *ADT*, 2013.
- [16] Kevin Tierney, Amanda Jane Coles, Andrew Coles, Christian Kroer, Adam M Britt, and Rune Møller Jensen. Automated planning for liner shipping fleet repositioning. In *ICAPS*, 2012.
- [17] Christian Kroer and Yuri Malitsky. Feature filtering for instance-specific algorithm configuration. In *ICTAI*, 2011.

Workshop papers.....

- [1] Vincent Conitzer, Christian Kroer, Eric Sodomka, and Nicolas E. Stier-Moses. Multiplicative pacing equilibria in auction markets. In *Workshop on Algorithmic Game Theory and Data Science at EC*, 2017.
- [2] Gabriele Farina, Christian Kroer, and Tuomas Sandholm. Regret minimization in behaviorally-constrained zero-sum games. In *Algorithmic Game Theory Workshop at IJCAI*, 2017.
- [3] Noam Brown, Christian Kroer, and Tuomas Sandholm. Dynamic thresholding and pruning for regret minimization. In *Algorithmic Game Theory Workshop at IJCAI*, 2016.
- [4] Christian Kroer and Tuomas Sandholm. Imperfect-recall abstractions with bounds. In *Algorithmic Game Theory Workshop at IJCAI*, 2015.
- [5] Christian Kroer and Tuomas Sandholm. Extensive-form game abstraction with bounds. In *Workshop on Computer Poker and Imperfect Information at AAI*, 2015.

Invited talks

- 2017:** Multiplicative Pacing Equilibria in Auction Markets. INFORMS Annual Conference
- 2017:** Multiplicative Pacing Equilibria in Auction Markets. Duke University CS-ECON Seminar
- 2016:** Arbitrage-Free Combinatorial Market Making via Integer Programming. INFORMS Annual Conference.
- 2015:** Faster First-Order Methods for Extensive-Form Game Solving. INFORMS Annual Conference.
- 2015:** Faster First-Order Methods for Extensive-Form Game Solving. 22nd International Symposium on Mathematical Programming (ISMP).
- 2013:** Computational Bundling for Auctions. INFORMS Annual Conference.

Other talks

- 2016:** First-Order Methods for Extensive-Form Game Solving. CMU AI Seminar.
- 2016:** Faster First-Order Methods for Extensive-Form Game Solving. INFORMS Annual Conference.
- 2016:** Arbitrage-Free Combinatorial Market Making via Integer Programming. Facebook Operations, Economics and Computation group.
- 2016:** Abstraction and convex optimization in sequential game solving. CMU graduate AI class.
- 2015:** Discretization of Continuous Action Spaces in Extensive-Form Games. INFORMS Annual Conference.
- 2014:** Sequential game solving overview. CMU undergrad AI class.
- 2014:** Extensive-Form Game Abstraction with Bounds. CMU theory lunch.
- 2014:** Extensive-Form Game Abstraction with Bounds. CMU open house.

Teaching

Electronic Negotiation <i>Vertical mentor</i>	Carnegie Mellon University 2017
Electronic Negotiation <i>Vertical mentor</i>	Carnegie Mellon University 2016
Graduate Artificial Intelligence <i>TA</i>	Carnegie Mellon University 2016
Electronic Negotiation <i>Vertical mentor</i>	Carnegie Mellon University 2015
Artificial Intelligence <i>TA, Nominated for TA award</i>	Carnegie Mellon University 2015
Electronic Negotiation <i>Vertical mentor</i>	Carnegie Mellon University 2014
Intelligent Systems Programming <i>TA</i>	IT University of Copenhagen 2012
Algorithm Design <i>TA</i>	IT University of Copenhagen 2011

Service

- Reviewing:** TARK 2017, EC 2017, AAAI 2017, AISTAT 2017, ICML 2016, WINE 2015, JAAMAS 2015, 2016, ACM Transactions on Economics and Computation, 2013, 2014, Transactions on Computational Intelligence and AI in Games 2014, 2015.
- Societies:** INFORMS, AAAI, ACM
- 2017:** Member of the CMU CSD Speakers Club.
- 2017:** Program committee member for the Computer Poker Workshop at AAAI.
- 2016:** Program committee member for IJCAI.
- 2014 - 2016:** CMU CS Ph.D. admissions committee member.

2013: CMU CSD Immigration Course coordinator.

Programming

Strong experience: Java, Python, C++, C#.

Medium experience: SQL, C, HTML, CSS.

Familiar with: R, Matlab, Scala, XSLT, Ruby, Javascript.

Frameworks

OS: Linux, OS X, Windows.

Statistics/ML: pandas, scikit-learn, tidyverse.

Version control: Git, SVN, Mercurial.

Optimization: CPLEX, Gurobi, NumPy, CVXPY.

Web: ASP.NET, React, Bootstrap, Flask.

References

Tuomas Sandholm

Professor, Computer Science
Carnegie Mellon University
Pittsburgh, PA

✉ sandholm@cs.cmu.edu

Vincent Conitzer

Professor, Computer Science
Duke University
Durham, NC

✉ conitzer@cs.duke.edu

Michael P. Wellman

Professor, Computer Science
University of Michigan
Ann Arbor, MI

✉ wellman@umich.edu

Fatma Kılınç-Karzan

Assoc. Professor of Operations Research
Tepper School of Business
Carnegie Mellon University
Pittsburgh, PA

✉ fkilinc@andrew.cmu.edu

Nicolas E. Stier-Moses

Research Scientist Manager
Business and Operations
Facebook Core Data Science
Menlo Park, CA

✉ nstier@fb.com