Jason D. Hartline

Professor of Computer Science
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Research Interests

Economics. Mechanism design, auction theory, microeconomics, economic theory, econometrics.

Law. Algorithmic law, accountability.

Computer Science. Algorithmic mechanism design, algorithmic game theory, machine learning theory, algorithms, data science.

Education

Ph.D. in Computer Science. University of Washington, Seattle, WA. *Summer 2003*
Thesis: Optimization in the Private Value Model: Competitive Analysis Applied to Auction Design
Advisor: Anna Karlin.

M.S. in Computer Science. University of Washington, Seattle, WA. *Spring 2000*

B.S. in Computer Science. Cornell University, Ithaca, NY. *Spring 1997*

B.S. in Electrical Engineering. Cornell University, Ithaca, NY. *Spring 1997*

Current Appointment

Professor. Northwestern U., Evanston, IL. *Fall 2019 – present*
Department of Computer Science, McCormick School of Engineering;
Managerial Economics and Decision Sciences Department, Kellogg School of Management (courtesy);
and Department of Economics, Wienberg School of Arts and Sciences (courtesy).

Cofounder. Virtual Chair Inc., Chicago IL. *Summer 2020 – Current*

Previous Appointments

Associate Professor. Northwestern U., Evanston, IL. *Fall 2012 – Summer 2019*
Department of Computer Science, McCormick School of Engineering;
Managerial Economics and Decision Sciences Department, Kellogg School of Management (courtesy);
and Department of Economics, Wienberg School of Arts and Sciences (courtesy).

Visiting Researcher. Microsoft Research, Cambridge, MA. *Spring 2015*

Visiting Professor. Harvard U., Cambridge, MA. *2014*
Computer Science and Economics departments.

Assistant Professor. Northwestern U., Evanston, IL. *Winter 2008 – Summer 2012*
Electrical Engineering and Computer Science Department, McCormick School of Engineering and
Managerial Economics and Decision Sciences Department, Kellogg School of Management (courtesy).

Researcher. Microsoft Research, Mountain View, CA. *2004 – 2007*
Research Area: Algorithmic Mechanism Design, Auction Theory, Pricing Algorithms, Auctions for Sponsored Search.

Post-doctoral Research Fellow. ALADDIN, Carnegie Mellon U., Pittsburgh, PA. *Fall 2003*
Research Area: Mechanism Design.
Supervisor: Avrim Blum.

Mentoring

Ph.D. Advisees. *current*
Anant Shah, Matthew vonAllmen, Chang Wang, Yifan Wu, Chenhao Zhang.

Former Students. *since 2009*
Modibo Camara (Stanford), Yingkai Li (Yale), Yiding Feng (Microsoft Research), Bach Ha (Microsoft), Aleck Johnsen, Nima Haghpanah (Penn State, Asst. Prof.), Darrell Hoy (Carta), Michalis Mamakos (Northwestern, postdoc), and Samuel Taggart (Oberlin, Asst. Prof.)

Post-doctoral Fellows. *since 2006*
Jinshuo Dong, Hedyeh Beyhaghi (CMU), Liad Blumrosen (Hebrew U.), Azarakhsh Malekian (Toronto)

Short-term Students. *since 2004*
Gagan Aggarwal, Abraham Flaxman, Ning Chen, Mukund Sundararajan, Benjamin Prosnitz, Matthew Burgess, Saeed Alaei, Hu Fu, Shweta Jain, Rad Niazadeh, Sarah Lim, Sadie Hood.

Service

Program Chair. ACM Conference on Electronic Commerce. *2023*

Program Committee. ACM Conference on Electronic Commerce. *2005, 2006, 2008 – present*

Program Committee. ACM Symposium on CS and Law. *2023*

Associate Editor. Journal of Economic Theory *2019 – present*

Co-organizer. Northwestern CS+Econ Quarterly Workshop *2018 – present*

Co-organizer. Northwestern Quarterly Theory Workshop *2016 – present*

General Chair. ACM Conference on Electronic Commerce. *2020*

Co-organizer. Special Quarter on Online Markets and Data Science *Spring 2018*
with Jacob Abernethy, Constantinos Daskalakis, and Denis Nekipelov.

Special Initiatives Chair. ACM Special Interest Group on E-commerce. *2014 – 2015*
on the Academic Job Market.

Guest Editor. Games and Economic Behavior. *2011 – 2014*
special issues for papers from STOC, FOCS, and SODA conferences.

Advisory Editor. Games and Economic Behavior. *2012 – 2017*

Associate Editor. Operations Research Letters. *2011 – 2014*

Co-organizer. New York Computer science and Economics (NYCE) Day. *2013*

Co-organizer. FOCS Workshop on Bayesian Mechanism Design. *2014*

Program Committee. Symposium on Theory of Computation *2012*

Co-organizer. Workshop on Bayesian Mechanism Design *2011*

Co-organizer. Greece Economic and Algorithmic Theory Week. *2011, 2014*

Co-organizer. Bertinoro Workshop on Algorithmic Game Theory. *2006, 2010*

Tutorials Chair. ACM Conference on Electronic Commerce. *2010*

Local Arrangements. ACM Conference on Electronic Commerce. *2008*

Organizer. Midwest Theory Day. *2008*

Program Committee. ACM-SIAM Symposium on Discrete Algorithms. *2007*

Co-organizer. Bay Algorithmic Game Theory Symposium (biannual). *2006 – 2007*

Co-organizer. Workshop on Sponsored Search Auctions. *2006*

Co-organizer. Alternative Solution Concepts in Mechanism Design. *2006*

Co-organizer. ALADDIN Workshop on Auction Theory & Practice. *2003*

Awards, Fellowships, and Grants

FORC Best Student Paper. with Jiale Chen and Onno Zoeter *2023*
for "Fair Grading of Randomized Exams"

NSF AF. Mechanism Design for the Classroom *2022*

ESA Test of Time. with Andrew Goldberg *2021*
for "Competitive Auctions and Multiple Digital Goods" from ESA 2001.

SIGecom Test of Time. with Andrew Goldberg and Andrew Wright *2021*
for "Competitive Auctions and Digital Goods" from SODA 2021.

NSF TRIPODS. Institute for Data, Econometrics, Algorithms and Learning *2019*
with Aravindan Vijayaraghavan and others.

NSF AitF. Mechanism Design and Machine Learning for Peer Grading *2017*
with Douglas Downey and Eleanor O'Rourke.

NSF AF. Non-revelation Mechanism Design *2016*

Teacher of the Year. EECS Dept., Northwestern U. *2011*

NSF ICES. Towards Realistic Mechanisms: statistics, inference, and approximation in simple Bayes-Nash implementation. With Shuchi Chawla and Denis Nekipelov. *2011*

NSF CAREER Award. Mechanism Design *2009*

NSF TF. Mechanism Design and Approximation *2008*
with Shuchi Chawla.

ALADDIN Post-doctoral Research Fellowship. Carnegie Mellon University. *2003*

NSF Math Sciences Post-doctoral Research Fellowship. Declined. *2003*

Microsoft Endowed Fellowship. CS Dept., U. of Washington *2001*

Bob Bandes Teaching Award, Honorable Mention. CS Dept., U. of Washington *1998*

Small Business Innovative Research Grant. Department of Education *1997*

Patents

Online Pricing and Buyback. U.S. Patent #8260724 *2012*
with Moshe Babaioff and Robert Kleinberg.

Systems and Methods for Pricing and Selling Digital Goods. U.S. Patent #6985885 *2006*
with Andrew Goldberg and Andrew Wright.

Book Chapters

Profit Maximizing Mechanism Design. Algorithmic Game Theory *2007*
with Anna Karlin; eds. Noam Nisan, Tim Roughgarden, Eva Tardos, and Vijay Vazirani.

Popular Press

Badminton and the Science of Rule Making. *Huffington Post 2012*
with Robert Kleinberg.

Working Papers

Mechanism Redesign. *2017*
with Shuchi Chawla and Denis Nekipelov.

Journal Papers

Fast Core Pricing for Rich Advertising Auctions. *Operations Research 2022*
with Rad Niazadeh, Nicole Immorlica, Mohammad Resa Khani, and Brendan Lucier.

When is pure bundling optimal?. with Nima Haghpanah *Review of Economic Studies 2021*

Bernoulli factories and black-box reductions in mechanism design. *JACM 2021*
with Shaddin Dughmi, Robert Kleinberg, and Rad Niazadeh.

Efficient Computation of Optimal Auctions via Reduced Forms. *Math of OR 2019*
with Saeed Alaei, Hu Fu, Nima Haghpanah, and Azarakhsh Malekian.

Optimal auctions vs. Anonymous Pricing. *Games and Economic Behavior 2018*
with Saeed Alaei, Rad Niazadeh, Manolis Pountourakis, and Yang Yuan. Special issue.

Non-optimal Mechanism Design. *American Economic Review 2015*
with Brendan Lucier.

Bayesian Incentive Compatibility and Matchings. *Games and Economic Behavior 2015*
with Robert Kleinberg and Azarakhsh Malekian. Special issue.

Mechanism Design via Consensus Estimates, Cross Checking, and Profit Extraction. *Transactions on Economics and Computation 2013*
with Bach Ha. Special issue.

Optimal Crowdsourcing Contests. *Games and Economic Behavior 2015*
with Shuchi Chawla and Balu Sivan. Special issue.

Envy freedom and prior-free mechanism design. *Journal of Economic Theory 2015*
with Nikhil Devanur and Qiqi Yan. Special issue.

Bayesian Mechanism Design. *FTTCS*[1] *2012*

Approximation in Mechanism Design. *American Economic Review 2012*

Derandomization of Auctions. *Games and Economic Behavior 2010*
with Gagan Aggarwal, Amos Fiat, Andrew Goldberg, Nicole Immorlica, and Madhu Sudan.

Algorithms for Data Migration. *Algorithmica 2010*
with Eric Anderson, Joseph Hall, M. Hobbes, Anna Karlin, Jared Saia, Ram Swaminathan, and John Wilkes.

Reducing Mechanism Design to Algorithm Design via Machine Learning. *JCSS*[2] *2008*
with Maria-Florina Balcan, Avrim Blum, and Yishay Mansour.

Competitive Auctions. *Games and Economic Behavior 2006*
with Andrew Goldberg, Anna Karlin, Mike Saks, and Andrew Wright. Special issue.

Characterizing History Independent Data Structures. *Algorithmica 2005*
with Edwin Hong, Alexander Mohr, William Pentney, and Emily Rocke. Special issue.

Refereed Conference Papers

Equivocal Blends: Prior Independent Lower Bounds. *ITCS*[3] *2024*
with Aleck Johnsen

Designing Shared Information Displays for Agents of Varying Strategic Sophistication.
CSCW[4] 2024 *with Hedyeh Beyhaghi, Modibo Camara, Aleck Johnsen, and Sheng Long*

The Rational Agent Benchmark for Data Visualization. *VIS*[5] *2023*
with Yifan Wu, Ziyang Guo, Michalis Mamakos, Jessica Hullman

Optimal Scoring Rules for Multi-dimensional Effort. *COLT*[6] *2023*
with Liren Shan, Yingkai Li, and Yifan Wu

[1] Foundations and Trends in Theoretical Computer Science.
[2] Journal of Computer and Systems Sciences.
[3] Innovations in Theoretical Computer Science Conference
[4] ACM SIGCHI Conference on Computer-Supported Cooperative Work & Social Computing
[5] IEEE Transactions on Visualization and Computer Graphics
[6] Conference on Learning Theory.

Fair Grading Algorithms for Randomized Exams. *FORC*[7] *2023*
with Jiale Chen and Onno Zoeter. Best student paper award.

Screening with Disadvantaged Agents. *FORC 2023*
with Hedyeh Beyhaghi, Modibo Camara, Aleck Johnsen, and Sheng Long

Non-strategic Econometrics (for Initial Play). *AAMAS*[8] *2023*
with Daniel Chui and James Wright

Simple Mechanisms for Non-linear Agents. *SODA*[9] *2023*
with Yiding Feng and Yingkai Li

Algorithmic Learning Foundations for Common Law. *CSLaw*[10] *2022*
with Dan Linna, Liren Shan, and Alex Tang

Classification Protocols with Minimal Disclosure. *CSLaw 2022*
with Jinshuo Dong and Aravindan Vijayaraghavan

Karp: A Language for NP Reductions. *PLDI*[11] *2022*
with Chenhao Zhang and Christos Dimoulas

Visualization Equilibrium. *IEEE VIS*[12] *2021*
with Paula Kayongo, Glen Sun, and Jessica Hullman

Revelation Gap for Pricing from Samples. with Yiding Feng and Yingkai Li *STOC*[13] *2021*

Welfare-maximizing Guaranteed Dashboard Mechanisms. *EC*[14] *2021*
with Yuan Deng, Jieming Mao, and Balasubramanian Sivan

Non-quasi-linear Agents in Quasi-linear Mechanisms. *ITCS 2021*
with Moshe Babaioff, Richard Cole, Nicole Immorlica, and Brendan Lucier

Mechanisms for a no-regret agent: Beyond the common prior. *FOCS*[15] *2020*
with Modibo Camara and Aleck Johnsen

Benchmark design and prior-independent optimization. *FOCS 2020*
with Aleck Johnsen and Yingkai Li

Inference from Prices. *SODA 2020*
with Aleck Johnsen, Denis Nekipelov, and Zihe Wang.

[7]Symposium on Foundations of Responsible Computing.
[8]International Conference on Autonomous Agents and Multiagent Systems
[9]ACM-SIAM Symposium on Discrete Algorithms.
[10]ACM Symposium on Computer Science and Law
[11]ACM SIGPLAN International Conference on Programming Language Design and Implementation
[12]IEEE Transactions on Visualization and Computer Graphics
[13]ACM Symposium on Theory of Computing.
[14]ACM Conference on Economics and Computation.
[15]IEEE Symposium on Foundations of Computer Science.

A Truthful Cardinal Mechanism for One-Sided Matching. *SODA 2020*
with Rediet Abebe, Richard Cole, and Vasilis Gkatzelis.

Sample Complexity for Non-Truthful Mechanisms. *EC 2019*
with Samuel Taggart.

Dashboard Mechanisms for Online Marketplaces. *EC 2019*
with Aleck Johnsen, Denis Nekipelov, and Onno Zoeter.

Optimal Auctions vs. Anonymous Pricing: Beyond Linear Utility. *EC 2019*
with Yiding Feng and Yingkai Li.

An End-to-end Argument in Mechanism Design (Prior-independent Auctions for Budgeted Agents). With Yiding Feng. *FOCS 2018*

Fast Core Pricing for Rich Advertising Auctions. *EC 2018*
with Nicole Immorlica, Mohammad Reza Khani, Brendan Lucier, and Rad Niazadeh.

Bernoulli Factories and Black-box Reductions in Mechanism Design. *STOC 2017*
with Shaddin Dughmi, Robert Kleinberg, and Rad Niazadeh

Bayeesian Budget Feasibility with Posted Pricing. *WWW*[16] *2016*
with Eric Balkanski.

A/B Testing of Auctions. *EC 2016*
with Shuchi Chawla and Denis Nekipelov.

No-regret Learning in Bayesian Games. *NeurIPS*[17] *2015*
with Vasilis Syrgkanis and Eva Tardos.

Reverse Mechanism Design. *EC 2015*
with Nima Haghpanah.

Optimal auctions vs. Anonymous Pricing. *FOCS 2015*
with Saeed Alaei, Rad Niazadeh, Manolis Pountourakis, and Yang Yuan.

Mechanism Design for Data Science. *EC 2014*
with Shuchi Chawla and Denis Nekipelov.

Price of Anarchy for Auction Revenue. *EC 2014*
with Darrell Hoy and Samuel Taggart.

Optimal Auctions for Correlated Buyers with Sampling. *EC 2014*
with Hu Fu, Nima Haghpanah, and Robert Kleinberg.

The Simple Economics of Approximately Optimal Auctions. *FOCS 2013*
with Saeed Alaei, Hu Fu, and Nima Haghpanah.

Auctions with Unique Equilibria. *EC 2013*
with Shuchi Chawla.

[16] International Conference on the World Wide Web.
[17] Conference on Neural Information Processing Systems

Prior-independent Auctions for Risk-averse Agents. *EC 2013*
with Hu Fu and Darrell Hoy.

Prior-free Auctions for Budgeted Agents. *EC 2013*
with Nikhil Devanur and Bach Ha.

Prior-independent Mechanisms for Scheduling. *STOC 2013*
with Shuchi Chawla, David Malec, and Balu Sivan.

Mechanism Design via Multi- to Single-agent Reduction. *EC 2012*
with Saeed Alaei, Hu Fu, Nima Haghpanah, and Azarakhsh Malekian.

Optimal Crowdsourcing Contests. *SODA 2012*
with Shuchi Chawla and Balu Sivan. Invited to GEB special issue.

Mechanism Design via Consensus Estimates, and Cross Checking, and Profit Extraction. With Bach Ha. Invited to TEAC special issue. *SODA 2012*

Truth, Envy, and Profit. *EC 2011*
with Qiqi Yan. Invited to JET special issue.

Bayesian Incentive Compatibility and Matchings. *SODA 2011*
with Robert Kleinberg and Azarakhsh Malekian. Invited to GEB special issue.

Bayesian Algorithmic Mechanism Design. *STOC 2010*
with Brendan Lucier.

Sequential Posted Pricing and Multi-parameter Mechanism Design. *STOC 2010*
with Shuchi Chawla, David Malec, and Balasubramanian Sivan.

Simple versus Optimal Mechanisms. *EC 2009*
with Tim Roughgarden.

Limited and Online Supply and the Bayesian Foundations of Prior-free Mechanism Design. with Nikhil Devanur. *EC 2009*

Selling Ad Campaigns: Online Algorithms with Cancellations. *EC 2009*
with Moshe Babaioff and Robert Kleinberg.

Mechanism Design and Money Burning. *STOC 2008*
with Tim Roughgarden.

Optimal Marketing Strategies over Social Networks. *WWW 2008*
with Vahab Mirrokni and Mukund Sundararajan.

Auctions for Structured Procurement. *SODA 2008*
with Matthew Cary, Abraham Flaxman, and Anna Karlin.

Algorithmic Pricing via Virtual Valuations. *EC 2007*
with Shuchi Chawla and Robert Kleinberg.

Knapsack Auctions. *2006*
with Gagan Aggarwal.

Bayesian Optimal No-deficit Mechanism Design. *WINE*[18] *2006*
with Shuchi Chawla, R. Ravi, and Uday Rajan.

Mechanism Design via Machine Learning. *FOCS 2005*
with Maria-Florina Balcan, Avrim Blum, and Yishay Mansour.

Derandomization of Auctions. *STOC 2005*
with Gagan Aggarwal, Amos Fiat, Andrew Goldberg, Nicole Immorlica, and Madhu Sudan.

On Profit-Maximizing Envy-Free Pricing. *SODA 2005*
with Venkat Guruswami, Anna Karlin, David Kempe, Claire Kenyon, and Frank McSherry.

Collusion-Resistant Mechanisms for Single Parameter Agents. *SODA 2005*
with Andrew Goldberg.

Near-Optimal Online Auctions. *SODA 2005*
with Avrim Blum.

From Optimal Limited to Unlimited Supply Auctions. *EC 2005*
with Robert McGrew.

On the Competitive Ratio of the Random Sampling Auction. *WINE 2005*
with Uriel Feige, Abraham Flaxman, and Robert Kleinberg.

Near-Optimal Pricing in Near-Linear Time. *WADS*[19] *2005*
with Vladlen Koltun.

A Lower Bound on the Competitive Ratio of Truthful Auctions. *STACS*[20] *2004*
with Andrew Goldberg, Anna Karlin, and Mike Saks.

Competitiveness via Consensus. *SODA 2003*
with Andrew Goldberg

Envy-Free Auctions for Digital Goods. *EC 2003*
with Andrew Goldberg.

Truthful and Competitive Double Auctions. *ESA*[21] *2002*
with Kaustubh Deshmukh, Andrew Goldberg, and Anna Karlin.

Competitive Generalized Auctions. *STOC 2002*
with Amos Fiat, Andrew Goldberg, and Anna Karlin.

Characterizing History Independent Data Structures. *ISAAC*[22] *2002*
with Edwin Hong, Alexander Mohr, William Pentney, and Emily Rocke.

[18] Conference on Web and Internet Economics.
[19] Workshop on Algorithms and Data Structures.
[20] Symposium on Theoretical Aspects of Computer Science.
[21] European Symposium on Algorithms.
[22] International Symposium on Algorithms and Computation.

Competitive Auctions and Digital Goods. *SODA 2001*
with Andrew Goldberg and Andrew Wright.

Competitive Auctions for Multiple Digital Goods. *ESA 2001*
with Andrew Goldberg.

On Algorithms for Efficient Data Migration. *SODA 2001*
with Joe Hall, Anna Karlin, Jared Saia, and John Wilkes.

An Experimental Study of Data Migration Algorithms. *WAE*[23] *2001*
with E. Anderson, J. Hall, M. Hobbes, A. Karlin, J. Saia, R. Swaminathan, and J. Wilkes.

[23]International Workshop on Algorithm Engineering.