Jugal Garg

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Research Interests

Computational Aspects of Economics, Fair Division, and Game Theory; Design and Analysis of Algorithms; Mathematical Programming

Education

- **Ph.D.** (2012), Computer Science and Engineering, Indian Institute of Technology, Bombay, India.

Appointments

- **Assistant Professor** (2018-), Dept. of Industrial and Enterprise Systems Engineering, Univ. of Illinois at Urbana-Champaign, USA.
- **Affiliate Research Assistant Professor** (2016-), Dept. of Computer Science, Univ. of Illinois at Urbana-Champaign, USA.
- **Research Assistant Professor** (2016-18), Dept. of Industrial and Enterprise Systems Engineering, Univ. of Illinois at Urbana-Champaign, USA.
- **Post-doctoral Research Fellow** (2014-16), Algorithms and Complexity Group, Max-Planck-Institut für Informatik, Saarbrücken, Germany.
- **Post-doctoral Research Fellow** (2012-14), College of Computing, Georgia Tech, USA.

Honors and Awards

- Featured in the List of Teachers Ranked as Excellent for Spring 2016, Fall 2018, Spring 2021, and Fall 2022.
- Dean's Award for Excellence in Research, 2022.
- INFORMS Koopman Prize 2021 for the paper *Multi-Agent UAV Routing: A Game Theory Analysis with Tight Price of Anarchy Bounds*.
- The Exemplary Theory Paper Award and the Best Paper with a Student Lead Author Award at 21st ACM EC, 2020 for the paper *EFX Exists for Three Agents*.
- NSF CAREER Award, 2020.
- 21st Max Planck Advanced Course on the Foundations of Computer Science (ADFOCS) speaker, 2020.
- The James Franklin Sharp Outstanding Teaching Award, 2019.
- NSF CRII Award, 2018.
- Invited to China Theory Week 2012, hosted by Aarhus University, Denmark, 2012
- Algorithms and Randomness Center (ARC) Postdoctoral Fellowship, Georgia Tech, 2012-14.
- MSR India Rising Star Award, 2011.
- Shantanu Deshpande Memorial Scholarship for 2009-12.

PUBLICATIONS (papers with my students/postdoc are marked with *)

Refereed Journal Papers

* J26. Bhaskar Ray Chaudhury, Jugal Garg, and Kurt Mehlhorn. EFX Exists for Three Agents. *Journal of the ACM (minor revision).* **(winner of the Exemplary Theory Paper Award and the Best Paper with a Student Lead Author Award at ACM EC 2020)**

J25. Jugal Garg, Martin Hoefer, and Kurt Mehlhorn. Satiation in Fisher Markets and Approximation of Nash Social Welfare. *Mathematics of Operations Research (major revision).*

* J24. Bhaskar Ray Chaudhury, Jugal Garg, Kurt Mehlhorn, Ruta Mehta, and Pranabendu Misra. Improving EFX Guarantees through Rainbow Cycle Number. *Mathematics of Operations Research (major revision).*

J23. Jugal Garg, Edin Husić, and László Végh. Auction Algorithms for Market Equilibrium with Weak Gross Substitute Demands. *Mathematics of Operations Research (major revision).*

* J22. Jugal Garg and Aniket Murhekar. Computing Fair and Efficient Allocations with Few Utility Values. *Theoretical Computer Science (minor revision).* **(invited)**

J21. Jugal Garg and László Végh. A Strongly Polynomial Algorithm for Linear Exchange Markets. *Operations Research (accepted).*

* J20. Bhaskar Ray Chaudhury, Jugal Garg, Peter McGlaughlin, and Ruta Mehta. Competitive Allocation of a Mixed Manna. *Mathematics of Operations Research (accepted).*

* J19. Timothy Murray, Jugal Garg, and Rakesh Nagi. Prize-Collecting Multi-Agent Orienteering: Price of Anarchy Bounds and Solution Methods. *IEEE Transactions on Automation Science and Engineering, 19(1), 531-544, 2022.*

* J18. Bhaskar Chaudhury, Yun Kuen Cheung, Jugal Garg, Naveen Garg, Martin Hoefer, and Kurt Mehlhorn. Fair Division of Indivisible Goods for a Class of Concave Valuations. *Journal of Artificial Intelligence Research, 74: 111-142, 2022.*

* J17. Jugal Garg and Setareh Taki. An Improved Approximation Algorithm for Maximin Shares. *Artificial Intelligence, 300: 103547, 2021.*

J16. Bharat Adsul, Jugal Garg, Ruta Mehta, Milind Sohoni, and Bernhard von Stengel. Fast Algorithms for Rank-1 Bimatrix Games. *Operations Research, 69(2): 613-631, 2021.*

J15. Jugal Garg, Edin Husić, and László Végh. Approximating Nash Social Welfare under Rado Valuations. *SIGecom Exch. 19(1): 45-51, 2021.* **(invited)**

* J14. Timothy Murray, Jugal Garg, and Rakesh Nagi. Limited-Trust Equilibria. *European Journal of Operational Research, 289(1): 364-380, 2021.*

* J13. Peter McGlaughlin and Jugal Garg. Improving Nash Social Welfare Approximations. *Journal of Artificial Intelligence Research, 68: 225-245, 2020.*

* J12. Omkar Thakoor, Jugal Garg, and Rakesh Nagi. Multi-Agent UAV Routing: A Game Theory Analysis with Tight Price of Anarchy Bounds. *IEEE Transactions on Automation Science and Engineering, 17(1): 100-116, 2020.* **(winner of the INFORMS Koopman Prize 2021)**

J11. Xiaohui Bei, Jugal Garg, Martin Hoefer, and Kurt Mehlhorn. Earning and Utility Limits in Fisher Markets. *ACM Transactions on Economics and Computation, 7(2): 10:1-10:35, 2019.*

J10. Xiaohui Bei, Jugal Garg, and Martin Hoefer. Ascending-Price Algorithms for Unknown Markets. *ACM Transactions on Algorithms, 15(3): 37:1-37:33, 2019.*

J9. Jugal Garg, Ruta Mehta, and Vijay Vazirani. Substitution with Satiation: A New Class of Utility Functions and a Complementary Pivot Algorithm. *Mathematics of Operations Research, 43(3): 996-1024, 2018.*

J8. Jugal Garg, Ruta Mehta, Vijay Vazirani, and Sadra Yazdanbod. ETR-Completeness for Decision Versions of Multi-Player (Symmetric) Nash Equilibria. *ACM Transactions on Economics and Computation, 6(1): 1:1-1:23, 2018.*

* J7. Reshmina William, Jugal Garg, and Ashlynn Stillwell. A Game Theory Analysis of Green Infrastructure Implementation Policies. *Water Resources Research, 53:9 8003-8019, 2017.* **(featured in Editor's Highlight)**

J6. Jugal Garg. Market Equilibrium under Piecewise Leontief Concave Utilities. *Theoretical Computer Science, 703: 55-65, 2017.*

J5. Nikhil Devanur, Jugal Garg, and László Végh. A Rational Convex Program for Linear Arrow-Debreu Markets. *ACM Transactions on Economics and Computation, 5(1): 6:1-6:13, 2016.*

J4. Jugal Garg, Ruta Mehta, and Vijay Vazirani. Dichotomies in Equilibrium Computation, and Membership of PLC markets in FIXP. *Theory of Computing, 12(1): 1-25, 2016.*

J3. Jugal Garg, Ruta Mehta, Milind Sohoni, and Vijay Vazirani. A Complementary Pivot Algorithm for Market Equilibrium under Separable, Piecewise-Linear Concave Utilities. *SIAM Journal on Computing, 44(6): 1820-1847, 2015.*

J2. Bharat Adsul, Ch. Sobhan Babu, Jugal Garg, Ruta Mehta and Milind Sohoni. A Simplex-like Algorithm for Fisher Markets. *Current Science, 103(9): 1033-1042, 2012.*

J1. Narayan Rangaraj, Milind Sohoni, Prashant Puniya, and Jugal Garg. Rake Linking for Suburban Train Services. *Opsearch, 43(2), 2006.*

Refereed Conference Papers ("AR" stands for *acceptance rate*)

C45. Jugal Garg, Thorben Tröbst, and Vijay Vazirani. A Nash-Bargaining-Based Mechanism for One-Sided Matching Markets under Dichotomous Utilities. *To appear in the Proceedings of the 22nd International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS), 2023.* (45% AR)

* C44. Jugal Garg, Edin Husić, Aniket Murhekar, and László Végh. Tractable Fragments of the Maximum Nash Welfare Problem. *Proceedings of the 18th Conference on Web and Internet Economics (WINE), 2022.* (30% AR)

* C43. Bhaskar Ray Chaudhury, Jugal Garg, Peter McGlaughlin, and Ruta Mehta. Competitive Equilibrium with Chores: Combinatorial Algorithm and Hardness. *Proceedings of the 23rd ACM Conference on Economics and Computation (EC), 2022.* (27% AR)

* C42. Jugal Garg, Aniket Murhekar, and John Qin. Fair and Efficient Allocations of Chores under Bivalued Preferences. *Proceedings of the 36th AAAI Conference on Artificial Intelligence (AAAI), 2022.* (15% AR)

C41. Jugal Garg, Yixin Tao, and László Végh. Approximating Equilibrium under Constrained Piecewise Linear Concave Utilities with Applications to Matching Markets. *Proceedings of the 33rd Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 2022.* (30% AR)

C40. Jugal Garg, Thorben Tröbst, and Vijay Vazirani. One-Sided Matching Markets with Endowments: Equilibria and Algorithms. *Proceedings of the 21st International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS), 2022.* (26% AR)

* C39. Bhaskar Ray Chaudhury, Jugal Garg, Peter McGlaughlin, and Ruta Mehta. On the Existence of Competitive Equilibrium with Chores. *Proceedings of the 13th Innovations in Theoretical Computer Science Conference (ITCS), 2022.* (49% AR)

* C38. Jugal Garg, Pooja Kulkarni, and Aniket Murhekar. On Fair and Efficient Allocations of Indivisible Public Goods. *Proceedings of the 41st Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS), 2021.* (37% AR)

* C37. Jugal Garg and Aniket Murhekar. Computing Fair and Efficient Allocations with Few Utility Values. *Proceedings of the 14th International Symposium on Algorithmic Game Theory (SAGT), 2021.* (41% AR) **Invited to the TCS Special Issue for SAGT 2021.**

* C36. Jugal Garg, Martin Hoefer, Peter McGlaughlin, and Marco Schmalhofer. When Dividing Mixed Manna is Easier than Dividing Goods: Competitive Equilibria with a Constant Number of Chores. *Proceedings of the 14th International Symposium on Algorithmic Game Theory (SAGT), 2021.* (41% AR)

* C35. Bhaskar Ray Chaudhury, Jugal Garg, Kurt Mehlhorn, Ruta Mehta, and Pranabendu Misra. Improving EFX Guarantees through Rainbow Cycle Number. *Proceedings of the 22nd ACM Conference on Economics and Computation (EC), 2021.* (26% AR)

C34. Jugal Garg, Edin Husić, and László Végh. Approximating Nash Social Welfare under Rado Valuations. *Proceedings of the 53rd Symposium on Theory of Computing (STOC), 2021.* (28% AR)

* C33. Bhaskar Ray Chaudhury, Jugal Garg, Peter McGlaughlin, and Ruta Mehta. Competitive Allocation of a Mixed Manna. *Proceedings of the 32nd Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 2021.* (28% AR)

* C32. Bhaskar Ray Chaudhury, Jugal Garg, and Ruta Mehta. Fair and Efficient Allocations under Subadditive Valuations. *Proceedings of the 35th AAAI Conference on Artificial Intelligence (AAAI), 2021.* (21% AR)

* C31. Jugal Garg and Aniket Murhekar. On Fair and Efficient Allocations of Indivisible Goods. *Proceedings of the 35th AAAI Conference on Artificial Intelligence (AAAI), 2021.* (21% AR)

C30. Jugal Garg, Edin Husić, and László Végh. Auction Algorithms for Market Equilibrium with Weak Gross Substitute Demands and their Applications. *Proceedings of the 38th International Symposium on Theoretical Aspects of Computer Science (STACS), 2021.* **Invited to the TOCS Special Issue for STACS 2021** (24% AR)

* C29. Jugal Garg and Setareh Taki. An Improved Approximation Algorithm for Maximin Shares. *Proceedings of the 21st ACM Conference on Economics and Computation (EC), 2020.* (20% AR)

* C28. Bhaskar Ray Chaudhury, Jugal Garg, and Kurt Mehlhorn. EFX Exists for Three Agents. *Proceedings of the 21st ACM Conference on Economics and Computation (EC), 2020.* **Winner of the Exemplary Theory Paper Award and the Best Paper with a Student Lead Author Award** (20% AR)

* C27. Jugal Garg and Peter McGlaughlin. Computing Competitive Equilibria with Mixed Manna. *Proceedings of the 19th International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS), 2020.* (23% AR)

* C26. Jugal Garg, Pooja Kulkarni, and Rucha Kulkarni. Approximating Nash Social Welfare under Submodular Valuations through (Un)Matchings. *Proceedings of the 31st Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 2020.* (30% AR)

* C25. Jugal Garg and Peter McGlaughlin. Improving Nash Social Welfare Approximations. *Proceedings of the 28th International Joint Conference on Artificial Intelligence (IJCAI), 2019.* (18% AR)

C24. Jugal Garg and László Végh. A Strongly Polynomial Algorithm for Linear Exchange Markets. *Proceedings of the 51st Symposium on Theory of Computing (STOC), 2019.* **Invited to HALG 2020 and to the SICOMP special issue for STOC 2019** (27% AR)

* C23. Jugal Garg, Peter McGlaughlin, and Setareh Taki. Approximating Maximin Share Allocations. *Proceedings of the Symposium on Simplicity in Algorithms (SOSA), 2019.* (29% AR)

* C22. Bhaskar Ray Chaudhury, Yun Kuen Cheung, Jugal Garg, Naveen Garg, Martin Hoefer, and Kurt Mehlhorn. On Fair Division of Indivisible Items. *Proceedings of the 38th Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS), 2018.* (35% AR)

* C21. Rahul Swamy, Timothy Murray, and Jugal Garg. Network Cost-Sharing Games: Equilibrium Computation and Applications to Election Modeling. *Proceedings of the 12th International Conference on Combinatorial Optimization and Applications (COCOA), 2018.* **Invited to the JOCO Special Issue for COCOA 2018** (47% AR)

* C20. Jugal Garg and Peter McGlaughlin. A Truthful Mechanism for Interval Scheduling. *Proceedings of the 11th International Symposium on Algorithmic Game Theory (SAGT), 2018.* (35% AR)

C19. Jugal Garg, Martin Hoefer, and Kurt Mehlhorn. Approximating the Nash Social Welfare with Budget-Additive Valuations. *Proceedings of the 29th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 2018.* (33% AR)

C18. Nikhil Devanur, Jugal Garg, Ruta Mehta, Vijay Vazirani and Sadra Yazdanbod. A New Class of Combinatorial Markets with Covering Constraints: Algorithms and Applications. *Proceedings of the 29th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 2018.* (33% AR)

C17. Jugal Garg, Ruta Mehta, Vijay Vazirani, and Sadra Yazdanbod. Settling the Complexity of Leontief and PLC Exchange Markets under Exact and Approximate Equilibria. *Proceedings of the 49th Symposium on Theory of Computing (STOC), 2017.* (24% AR)

C16. Xiaohui Bei, Jugal Garg, Martin Hoefer, and Kurt Mehlhorn. Earning Limits in Fisher Markets with Spending-Constraint Utilities. *Proceedings of the 10th International Symposium on Algorithmic Game Theory (SAGT), 2017.* (45% AR)

C15. Xiaohui Bei, Jugal Garg, Martin Hoefer, and Kurt Mehlhorn. Computing Equilibria in Markets with Budget-Additive Utilities. *Proceedings of the 24th European Symposium on Algorithms (ESA), 2016.* (27% AR)

C14. Xiaohui Bei, Jugal Garg, and Martin Hoefer. Ascending-Price Algorithms for Unknown Markets. *Proceedings of the 17th ACM Conference on Economics and Computation (EC), 2016.* (33% AR)

C13. Ran Duan, Jugal Garg, and Kurt Mehlhorn. An Improved Combinatorial Polynomial Algorithm for the Linear Arrow-Debreu Market. *Proceedings of the 27th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 2016.* (28% AR)

C12. Xiaohui Bei, Wei Chen, Jugal Garg, Martin Hoefer, and Xiaoming Sun. Learning Market Parameters using Aggregate Demand Queries. *Proceedings of the 30th AAAI Conference on Artificial Intelligence (AAAI), 2016.* (26% AR)

C11. Jugal Garg, Ruta Mehta, Vijay Vazirani, and Sadra Yazdanbod. ETR-Completeness for Decision Versions of Multi-Player (Symmetric) Nash Equilibria. *Proceedings of the 42nd International Colloquium on Automata, Languages and Programming (ICALP), 2015.* (28% AR)

C10. Jugal Garg and Ravi Kannan. Markets with Production: A Polynomial Time Algorithm and a Reduction to Exchange. *Proceedings of the 16th ACM Conference on Economics and Computation (EC), 2015.* (33% AR)

C9. Jugal Garg, Ruta Mehta, and Vijay Vazirani. Dichotomies in Equilibrium Computation, and Complementary Pivot Algorithms for a New Class of Non-Separable Utility Functions. *Proceedings of the 46th Symposium on Theory of Computing (STOC), 2014.* (29% AR)

C8. Jugal Garg and Vijay Vazirani. On Computability of Equilibria in Markets with Production. *Proceedings of the 25th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 2014.* (28% AR)

C7. Jugal Garg. Market Equilibrium under Piecewise Leontief Concave Utilities. *Proceedings of the 10th Conference on Web and Internet Economics (WINE), 2014.* (43% AR)

C6. Jugal Garg, Ruta Mehta, Milind Sohoni, and Nisheeth Vishnoi. Towards Polynomial Simplex-Like Algorithms for Market Equilibria. *Proceedings of the 24th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 2013.* (29% AR)

C5. Jugal Garg, Ruta Mehta, Milind Sohoni, and Vijay V. Vazirani. A Complementary Pivot Algorithm for Market Equilibrium under Separable, Piecewise-Linear Concave Utilities. *Proceedings of the 44th Symposium on Theory of Computing (STOC), 2012.* (29% AR)

C4. Bharat Adsul, Jugal Garg, Ruta Mehta, and Milind Sohoni. Rank-1 Bi-matrix Games: A Homeomorphism and a Polynomial Time Algorithm. *Proceedings of the 43rd Symposium on Theory of Computing (STOC), 2011.* **Invited to the GEB Special Issue for STOC/FOCS/SODA 2011** (28% AR)

C3. Jugal Garg, Albert Jiang and Ruta Mehta. Bilinear Games: Polynomial Time Algorithms for Rank Based Subclasses. *Proceedings of the 7th Workshop on Internet and Network Economics (WINE), 2011.* (31% AR)

C2. Bharat Adsul, Ch. Sobhan Babu, Jugal Garg, Ruta Mehta, and Milind Sohoni. Nash Equilibria in Fisher Market. *Proceedings of the 3rd International Symposium on Algorithmic Game Theory (SAGT), 2010.* **Invited to the TOCS special issue for SAGT 2010** (42% AR)

C1. Bharat Adsul, Ch. Sobhan Babu, Jugal Garg, Ruta Mehta, and Milind Sohoni. A Simplex-like Algorithm for Fisher Markets. *Proceedings of the 3rd International Symposium on Algorithmic Game Theory (SAGT), 2010.* (42% AR)

Preprints

* P6. Hannaneh Akrami, Noga Alon, Bhaskar Ray Chaudhury, Jugal Garg, Kurt Mehlhorn, and Ruta Mehta. EFX Allocations: Simplifications and Improvements. arXiv:2205.07638

* P5. Timothy Murray, Jugal Garg, and Rakesh Nagi. Limited-Trust in Social Network Games. arXiv:2103.01460

* P4. Ioannis Caragiannis, Jugal Garg, Nidhi Rathi, Eklavya Sharma, and Giovanna Varricchio. Existence and Computation of Epistemic EFX. arXiv:2206.01710

P3. Jugal Garg, Edin Husić, Wenzheng Li, László Végh, and Jan Vondrák. Approximating Nash Social Welfare by Matching and Local Search. arXiv:2211.03883

* P2. Jugal Garg, Aniket Murhekar, and John Qin. Improving Fairness and Efficiency Guarantees for Allocating Indivisible Chores. arXiv:2212.02440

Services

1. Program Committees

(a)	PC member of ACM Conference on Economics and Computation (EC)	2023
(b)	PC member of International Joint Conference on Artificial Intelligence (IJCAI)	2023
(c)	PC member of Symposium on Discrete Algorithms (SODA)	2023
(d)	PC member of AAAI Conference on Artificial Intelligence (AAAI)	2022
(e)	PC member of ACM Conference on Economics and Computation (EC)	2022
(f)	PC member of International Joint Conference on Artificial Intelligence (IJCAI)	2022
(g)	PC member of Symposium on Algorithmic Game Theory (SAGT)	2022
(h)	PC member of The Web Conference (formerly known as WWW)	2022
(i)	PC member of AAAI Conference on Artificial Intelligence (AAAI)	2021
(j)	PC member of Conference on Autonomous Agents and Multi-Agent Systems (AAMAS)	2021
(k)	PC member of ACM Conference on Economics and Computation (EC)	2021
(l)	PC member of International Joint Conference on Artificial Intelligence (IJCAI)	2021
(m)	PC member of AAAI Conference on Artificial Intelligence (AAAI)	2020
(n)	PC member of ACM Conference on Economics and Computation (EC)	2020
(o)	PC member of Annual IEEE Symposium on Foundations of Computer Science (FOCS)	2020
(p)	PC member of International Joint Conference on Artificial Intelligence (IJCAI)	2020
(q)	PC member of Symposium on Discrete Algorithms (SODA)	2020
(r)	PC member of ACM Conference on Economics and Computation (EC)	2019
(s)	PC member of European Symposium on Algorithms (ESA)	2019

(t) PC member of ACM Conference on Economics and Computation (EC) 2018
(u) PC member of Conference on Foundations of Software Technology and TCS (FSTTCS) 2018
(v) PC member of Conference on Web and Internet Economics (WINE) 2017
(w) PC member of Conference on Web and Internet Economics (WINE) 2016

2. **Continuing Education Activities**

- **Workshop** (co-organized) on *Nash welfare, Market Equilibrium, and Stable Polynomials* at STOC 2019, Phoenix, June 23-26, 2019.
- **Mini-course** on *Computational Fair Division* at the 21st Max Planck Summer School: Advanced Course on the Foundations of Computer Science (ADFOCS 2020). I was invited as one of the three keynote speakers.
- **Mini-course** on *Equilibrium Computation* at the IMPECS School on Game Theory, 2014. I was invited as one of the four keynote speakers.
- **Tutorial** on *Finding fair and efficient allocations through competitive equilibrium* at the Summer School on Game Theory and Social Choice, City University of Hong Kong, 2022.
- **Plenary talks** I have delivered several plenary talks at workshops, conferences, and summer schools.

3. **Journal Reviews**

Operations Research (OR)
Mathematics of Operations Research (MOR)
Mathematical Programming (MP)
Operations Research Letters (ORL)
Annals of Operations Research (AOR)
Mathematical Methods of Operations Research
Journal of the ACM (JACM)
ACM Transactions on Economics and Computation (TEAC)
Information Processing Letters (IPL)
Theoretical Computer Science (TCS)
SIAM Journal on Discrete Mathematics (SIDMA)
Journal of Artificial Intelligence Research (JAIR)
Autonomous Agents and Multi-Agent Systems (JAAMAS)
Journal of Economic Theory (JET)
International Journal on Game Theory (IJGT)
Information and Computation
IEEE Transactions on Cloud Computing

4. **Conference Reviews:** I have reviewed papers for various conferences in my research area, typically 1-2 papers per conference per year.

Conference on Approximation Algorithms for Combinatorial Optimization Problems (APPROX)
IEEE Symposium on Foundations of Computer Science (FOCS)
International Colloquium on Automata, Languages and Programming (ICALP)
Innovations in Theoretical Computer Science Conference (ITCS)
International Symposium on Algorithmic Game Theory (SAGT)
ACM-SIAM Symposium on Discrete Algorithms (SODA)
International Symposium on Theoretical Aspects of Computer Science (STACS)
ACM Symposium on Theory of Computing (STOC)
Conference on Web and Internet Economics (WINE)

5. **Department Committees:**

(a) Graduate Committee 2018-20, 2022-present

(b) Courses and Curriculum, 2022-present

(c) Seminars 2020-2022

(d) Research and Scholarly Enhancement 2020-2021

(e) Faculty Meeting Secretary 2018-19

6. **Ph.D. Thesis Committees:**

   (a) Arun Raman, ISE, UIUC (Advisor: RS Sreenivas)
   (b) Menglong Li, ISE, UIUC (Advisor: Xin Chen)
   (c) Jialin Song, ISE, UIUC (Advisor: Qiong Wang)
   (d) Rahul Swamy, ISE, UIUC (Advisor: Sheldon Jacobson)
   (e) Tung Mai, College of Computing (ACO program), Georgia Tech (Advisor: Vijay Vazirani), Defended on May 17, 2018 (Member)
   (f) Ioannis Panageas, College of Computing (ACO program), Georgia Tech (Advisor: Prasad Tetali), Defended in July 2016 (Reader)

7. Served on NSF Algorithmic Foundations panel (2019, 2020)
8. Served on the organizing team of Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS) 2011.
9. Served as a faculty advisor to 20+ undergraduate students every year to advise them on their career path and discuss any academic issues they may be facing

Student Research Advising

- Postdoctoral Researcher
  - Bhaskar Ray Chaudhury (PhD from MPI, Germany; future faculty fellow) 2021 - present
- PhD students
  - **Graduated**
    - Setareh Taki 2017 - 2022
    - Peter McGlaughlin 2016 - 2021
    - Timothy Murray (co-advised with Rakesh Nagi) 2017 - 2020
  - **Current**
    - Eklavya Sharma 2022 - present
    - John Qin 2020 - present
    - Aniket Murhekar (CS; co-advised with Ruta Mehta; **Siebel Scholar 2020**) 2020 - present
    - Pooja Kulkarni (CS; CJ and Hina Desai CS Fellowship) 2018 - present
- Masters students
  - Vanshika Gupta (co-advised with Rakesh Nagi) 2022 - present
  - Aniket Murhekar (CS; co-advised with Ruta Mehta; **Siebel Scholar 2020**) 2018 - 2020
  - Omkar Thakoor (CS; currently a PhD student at USC) 2016 - 2017
- Undergraduate students
  - Xiao Tan (BA, Economics; Funded by REU) 2019

Teaching

- IE 310: Deterministic Models in Optimization, Spring 2023.
- IE 405: Computing for ISE, Fall 2019, Fall 2020, Fall 2021, Fall 2022.
- IE 498: Computing for ISE, Spring 2016, Spring 2017, Spring 2018, Fall 2018. (Featured in the *List of Teachers Ranked as Excellent* for Spring 2016, Fall 2018)
- IE 598: Games, Markets, and Mathematical Programming, Fall 2016, Fall 2017, Spring 2020.
- IE 598: Topics in Game Theory and Fair Division, Spring 2021. (Featured in the *List of Teachers Ranked as Excellent* for Spring 2021)
- CS 8803: Advanced Topics in Algorithmic Game Theory, Spring 2013 (co-taught at Georgia Tech).

Selected Invited and Conference Talks

Invited talk at FOCS 2022 workshop, Denver. October 2022
On the Existence of EFX Allocations

Invited tutorial at Summer School on Game Theory and Social Choice, Hong Kong (virtual). June 2022
Finding fair and efficient allocations through competitive equilibrium

Invited talk at DIMAP seminar at the University of Warwick, UK (virtual). October 2021
Title: Fair division of indivisible goods.

Invited talk at IJTCS 2021, Beijing, China (virtual). August 2021
Title: Fair division of indivisible goods.

Invited talk at EC 2021 workshop on Fair Resource Allocation, Hungary (virtual). July 2021
Title: Approximating maximin shares.

21st Max Planck Advanced Course on the Foundations of Computer Science (ADFOCS) speaker, Saarbrücken, Germany (virtual). August 2020
Title: A short course on computational fair division.

Invited talk at HALG 2020, Zurich (virtual). September 2020
Title: A Strongly Polynomial Algorithm for Linear Exchange Markets.

Plenary talk at ITA 2020, San Diego. February 2020
Title: A Strongly Polynomial Algorithm for Linear Exchange Markets.

Invited talk at IIT-Bombay, India. January 2020
Title: A Strongly Polynomial Algorithm for Linear Exchange Markets.

Invited talk at INFORMS Annual Meeting, Seattle. October 2019
Title: An Improved Approximation Algorithm for Maximin Shares.

Conference talk at 51^{st} ACM Symposium on Theory of Computing (STOC), Phoenix. June 2019
Title: A Strongly Polynomial Algorithm for Linear Exchange Markets.

Workshop talk at STOC 2019, Phoenix, June 2019
Title: Nash welfare, Market Equilibrium, and Stable Polynomials

Invited talk at UCI, Irvine. May 2019
Title: A Strongly Polynomial Algorithm for Linear Exchange Markets.

Invited talk at LSE, London, UK. March 2019
Title: A Strongly Polynomial Algorithm for Linear Exchange Markets.

Invited talk at Purdue University, West Lafayette. October 2018
Title: Fisher Markets and Nash Social Welfare.

Plenary talk at Bellairs Workshop on Algorithmic Game Theory, Barbados. April 2018
Title: Fisher Markets and Nash Social Welfare.

Invited seminar on Combinatorics, Games and Optimisation, LSE, London, UK. March 2018
Title: Fisher Markets and Nash Social Welfare.

Conference talk at SODA 2018, New Orleans. January 2018
Title: Approximating the Nash Social Welfare with Budget-Additive Valuations.

Invited talk at Workshop on Algorithms and Optimization, ICTS, Bangalore, India. January 2018
Title: Fisher Markets and Nash Social Welfare.

Invited talk at International Federation of Operational Research Societies (IFORS), Quebec City. July 2017
Title: A New Class of Combinatorial Markets with Covering Constraints: Algorithms and Applications.

The 49^{th} ACM Symposium on Theory of Computing (STOC), Montreal, Canada. June 2017
Title: Settling the Complexity of Leontief and PLC Exchange Markets under Exact and Approximate Equilibria (poster).

INFORMS 2016 Annual Conference, Nashville. November 2016
Title: A Market Model for Scheduling with Applications to Cloud Computing.

Invited talk at ICCOPT 2016, Tokyo, Japan. August 2016
Title: Polynomial-Time Complementary Pivot Algorithms for Market Equilibria.

CS Theory Seminar, UIUC. February 2016
Title: A Market for Scheduling, with Applications to Cloud Computing.

Invited talk at Game Theory Workshop, Bonn, Germany. December 2015
Title: ETR-Completeness for Decision Versions of Multi-Player (Symmetric) Nash Equilibria.

Invited talk at Operations Research Seminar, UCL, Louvain-la-Neuve, Belgium. October 2015
Title: Complementary Pivot Algorithms for Market Equilibria.

Conference Talk at SAGT 2015, Saarbrücken, Germany. September 2015
Title: Settling Some Open Problems on 2-Player Symmetric Nash Equilibria.

Invited talk at Operations Research Seminar, LSE, London, UK. September 2015
Title: Polynomial-Time Complementary Pivot Algorithms for Market Equilibria.

Invited talk at ISMP 2015, Pittsburgh. July 2015
Title: Polynomial-Time Complementary Pivot Algorithms for Market Equilibria.

Conference talk at ICALP 2015, Kyoto, Japan. July 2015
Title: ETR-Completeness for Decision Versions of Multi-Player (Symmetric) Nash Equilibria.

Conference talk at EC 2015, Portland. June 2015
Title: Markets with Production: A Polynomial Time Algorithm and a Reduction to Exchange.

ISE Seminar, UIUC, May 2015
Title: Complementary Pivot Algorithms for Market Equilibria.

Invited talk at CSE Seminar, IIT-Bombay, India. March 2015
Title: Equilibrium in Markets: Algorithms and Complexity.

Invited talk at CSE Seminar, IIT-Kanpur, India. March 2015
Title: Equilibrium in Markets: Algorithms and Complexity.

Invited talk at STCS Seminar, TIFR, Mumbai, India. March 2015
Title: Equilibrium in Markets: Algorithms and Complexity.

Conference WINE 2014, Beijing, China. December 2014
Title: Market Equilibrium under Piecewise Leontief Concave Utilities (poster).

Invited talk at CSE Seminar, IIT-Bombay, India. December 2014
Title: Leontief Exchange Markets Can Solve Multivariate Polynomial Equations, Yielding `FIXP` and `ETR` Hardness.

Invited tutorial at School on Algorithmic Game Theory, Sangli, India. December 2014
Title: Lectures on Equilibrium Computation.

MPI Seminar, Germany. November 2014
Title: Leontief Exchange Markets Can Solve Multivariate Polynomial Equations, Yielding `FIXP` and `ETR` Hardness.

Invited talk at Dagstuhl Seminar on Equilibrium Computation, Germany. August 2014
Title: Leontief Exchange Markets Can Solve Multivariate Polynomial Equations, Yielding `FIXP` and `ETR` Hardness.

Conference talk at STOC 2014, New York. June 2014
Title: Dichotomies in Equilibrium Computation, and Complementary Pivot Algorithms for a New Class of Non-Separable Utility Functions.

Conference talk at SODA 2014, Portland. January 2014
Title: On Computability of Equilibria in Markets with Production.

ACO Seminar, Georgia Tech, Atlanta. October 2013
Title: On Computability of Equilibria in Markets with Production.

Conference talk at SODA 2013, New Orleans. January 2013
Title: Towards Polynomial Simplex-Like Algorithms for Market Equilibria.

Invited talk at ISMP 2012, Berlin, Germany. August 2012
Title: A Complementary Pivot Algorithm for Market Equilibrium under Separable, Piecewise-Linear Concave Utilities.

Invited talk at China Theory Week 2012, Aarhus University, Denmark. August 2012
Title: Linear Complementarity Problem and Market Equilibria.

Invited talk at Mysore Park Theory Workshop 2012, Mysore, India. August 2012
Title: Linear Complementarity Problem and Market Equilibria.

Invited talk at IBM T. J. Watson Research Center, New York. May 2012
Title: A Complementary Pivot Algorithm for Market Equilibrium under Separable, Piecewise-Linear Concave Utilities.

Conference talk at STOC 2012, New York. May 2012
Title: A Complementary Pivot Algorithm for Market Equilibrium under Separable, Piecewise-Linear Concave Utilities.

Invited talk at Microsoft Research, India. March 2012
Title: A Complementary Pivot Algorithm for Market Equilibrium under Separable, Piecewise-Linear Concave Utilities.

Invited talk at Microsoft Research, India. June 2011
Title: Rank-1 Bi-matrix Games: A Homeomorphism and a Polynomial Time Algorithm.

Workshop on Innovations in Algorithmic Game Theory, Israel. May 2011
Title: Rank-1 Bi-matrix Games: A Homeomorphism and a Polynomial Time Algorithm (poster).

Conference talk at SAGT 2010, Athens, Greece. October 2010
Title: Nash Equilibria in Fisher Market.

International Summer School on Algorithmic Game Theory, Shanghai, China. July 2010
Title: Nash Equilibria in Fisher Market.