

Dr. Ruta Mehta

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RESEARCH INTERESTS Algorithmic Game Theory, Market Analysis for Strategic Behavior, Combinatorial Optimization, Genetic Evolution, Dynamical Systems, Machine Learning.

POSITIONS HELD **Assistant Professor** - Jan'16 to Current
Department of Computer Science, University of Illinois at Urbana-Champaign.

Postdoctoral Fellow -Aug'15 to Dec'15
Simons Institute for the Theory of Computing, UC Berkeley.

Postdoctoral Fellow -Sept'12 to July'15
College of Computing, Georgia Institute of Technology.
(Host: Prof. Vijay V. Vazirani)

Visiting Researcher - Summer, 2011
Algorithms and Randomness Center, Georgia Tech.
(Host: Prof. Maria Florina Balcan)

Software Engineer and Developer - Aug'05 to July'07
Sybase Software India Pvt. Ltd.

EDUCATION **PhD in Computer Science and Engineering** -July'07 to July'12
Indian Institute of Technology, Bombay.
Advisor: Prof. Milind Sohoni.

M.Tech. in Computer Science and Engineering -July'03 to July'05
Indian Institute of Technology, Bombay.

B.E. in Computer Science and Engineering -June'99 to June'03
Maharaja Sayajirao University, Baroda.

HONORS

- Invited to Economics and Computation program at the Simons Institute, UC Berkeley.
- Outstanding Post-Doctoral Researcher Award 2014, College of Computing, Georgia Tech.
- First ACM India Doctoral Dissertation Award 2012.
- Excellence in Ph.D. Thesis Award, 2012, IIT-Bombay.
- Google India Anita Borg Memorial Scholarship 2012.
- IBM PhD Award in 2010 (Awarded annually to an Indian PhD student).
- IBM PhD Fellowship for the year 2009-2010 (Two annual fellowships in India).
- Invited to attend Rising Stars in EECS, 2013 (hosted by MIT).
- Invited to China Theory Week 2012, hosted by Aarhus University, Denmark.

PROFESSIONAL SERVICES **Teaching**

- Topics on Algorithmic Game Theory (at UIUC). Spring'16
- Equilibrium Computation (with Prof. V. V. Vazirani). Spring'14
- Advanced Topics in Algorithmic Game Theory (with J. Garg and G. Piliouras). Spring'13

Co-organize Game Theory Workshop (14 - 17 Dec, 2015), as a part of Combinatorial Optimization trimester at Hausdorff Center for Mathematics, Universität Bonn, Germany.

Program Committee: SAGT'16, EC'16, ITCS'16, FOCS'15, FSTTCS'15, WWW'15

- PUBLICATIONS **The Role of Mutation for Survival, under Sexual Reproduction, in Dynamic Environments**
(with Ioannis Panageas, Georgios Piliouras, Vijay V. Vazirani and Sadra Yazdanbod)
- Submitted, 2016.
- A Market Model for Scheduling, and a Polynomial-time Algorithm for Computing Equilibria**
(with Nikhil R. Devanur, Jugal Garg, Vijay V. Vazirani and Sadra Yazdanbod)
- Submitted, 2016.
- Nash Social Welfare Approximation for Strategic Agents**
(with Simina Branzei and Vasilis Gkatzelis)
- Submitted, 2016.
- To Give or not to Give: Fair Division with Strict Preferences**
(with Simina Branzei and Yuezhou Lv)
- Submitted, 2016.
- Get Me to My GATE On Time: Efficiently Solving General-Sum Bayesian Threat Screening Games**
(with Aaron Schlenker, Matthew Brown, Arunesh Sinha and Milind Tambe)
- Submitted, 2016.
- The Complexity of Genetic Diversity: Sex with Two Chromosomes is Advantageous but Unpredictable**
(with Ioannis Panageas, Georgios Piliouras and Sadra Yazdanbod)
- Submitted, 2016.
- Leontief Markets Can Solve Multivariate Polynomial Equations, Yielding FIXP and ETR Hardness**
(with Jugal Garg, Vijay V. Vazirani and Sadra Yazdanbod)
- Submitted, 2016.
- ETR-Completeness of Decision Versions of 3-Nash**
(with Jugal Garg, Vijay V. Vazirani and Sadra Yazdanbod)
- ICALP, 2015.
- Settling Some Open Problems on Symmetric Nash Equilibria**
(with Vijay V. Vazirani and Sadra Yazdanbod)
- SAGT, 2015.
- Natural Selection as an Inhibitor of Genetic Diversity: Multiplicative Weights Update Algorithm and a Conjecture of Haploid Genetics**
(with Ioannis Panageas and Georgios Piliouras)
- ITCS, 2015.
- Learning Economic Parameters from Revealed Preferences**
(with Maria-Florina Balcan, Amit Daniely, Ruth Urner and Vijay V. Vazirani)
- WINE, 2014.
- To Save Or Not To Save: The Fisher Game**
(with Nithum Thain, Laszlo A. Vegh and Adrian Vetta)
- WINE, 2014.
- Constant Rank Bimatrix Games are PPAD-hard**
- STOC, 2014 (Invited to SIAM Journal on Computing)

- PUBLICATIONS**
- Dichotomies in equilibrium computation, and complementary pivot algorithms for a new class of non-separable utility functions**
 (with Jugal Garg and Vijay V. Vazirani)
 - STOC, 2014
- Exchange Markets: Strategy meets Supply-Awareness**
 (with Milind Sohoni)
 - WINE, 2013.
- Towards Polynomial Simplex-Like Algorithms for Market Equilibria**
 (with Jugal Garg, Milind Sohoni and Nisheeth Vishnoi)
 - SODA, 2013.
- An Incentive Compatible, Efficient Market for Air Traffic Flow Management**
 (with Vijay V. Vazirani)
 - Manuscript, 2013.
- The Weighted Majority Algorithm does not Converge in Nearly Zero-sum Games**
 (with Maria Florina Balcan and Florin Constantin)
 - In ICML 2012 workshop on Markets Mechanisms and Multi-Agent Models, 2012.
- A Complementary Pivot Algorithm for Market Equilibrium under Separable, Piecewise-Linear Concave Utilities**
 (with Jugal Garg, Milind Sohoni and Vijay V. Vazirani)
 - SIAM Journal on Computing, 2015. (Preliminary version appeared in STOC'12).
- Bilinear Games: Polynomial Time Algorithms for Rank Based Subclasses**
 (with Jugal Garg and Albert X. Jiang)
 - WINE, 2011.
- Rank-1 Bimatrix Games: A Homeomorphism and a Polynomial Time Algorithm**
 (with Bharat Adsul, Jugal Garg and Milind Sohoni)
 - STOC, 2011.
- Nash Equilibria in Fisher Market**
 (with Bharat Adsul, Ch. Sobhan Babu, Jugal Garg and Milind Sohoni)
 - SAGT, 2010.
- A Simplex-like Algorithm for Fisher Markets**
 (with Bharat Adsul, Ch. Sobhan Babu, Jugal Garg and Milind Sohoni)
 - Special issue on Game Theory of *Current Science*, 2012 (Preliminary version appeared in SAGT'10).
- INVITED AND CONFERENCE TALKS**
- A Market for Scheduling, with Applications to Cloud Computing**
 Game Theory Workshop at HIM, Universität Bonn; *plenary talk*. - Dec'15.
 Econ-CS Seminar, Duke University. - Mar'16.
- Games, Equilibria, and Evolution**
 Theory Seminar, Dept. of Computer Science, Duke University. - Mar'16.
- Leontief Markets Can Solve Multivariate Polynomial Equations, Yielding FIXP and ETR Hardness**
 Mathematics of Information seminar at CMI, CalTech. - Jan'15
 TTIC Colloquium at Toyota Technological Institute (TTI), Chicago. - Oct'14.
 ACO Student Seminar at Georgia Tech, Atlanta. - Nov'14.

INVITED AND CONFERENCE TALKS	(Essentially) Resolving the Complexity of Constant Rank Bimatrix Games	
	Simons Institute for the Theory of Computing, UC Berkeley.	- Nov'15
	International Symposium on Math. Programming Pittsburgh.	Jul'15
	Theory Seminar at U. Chicago.	- Oct'14.
	Dagstuhl Seminar on Equilibrium Computation, Germany.	- Aug'14
	Bellairs Workshop on Algorithmic Game Theory, Barbados; <i>plenary talk</i> .	- Apr'14
	Algorithms and Complexity Seminar at MIT.	- Nov'13
	ESRC workshop on Algorithmic Game Theory, LSE, London, UK.	- Oct'13
	Constant Rank Bimatrix Games are PPAD-hard	
	46 th ACM Symposium on Theory of Computing (STOC'14).	- Jun'14
Exchange Markets: Strategy Meets Supply-Awareness		
9th Conference on Web and Internet Economics, Boston.	- Dec'13	
Rank-1 Bimatrix Games: A Homeomorphism and a Polynomial Time Algorithm		
Workshop on Computational Game Theory, Stony Brook, NY.	- July'13	
Computer Science Division, University of California Berkeley.	- Apr'13	
ACO Colloquium, College of Computing, Georgia Tech, Atlanta.	- Apr'13	
China Theory Week 2012, Aarhus University, Denmark.	- Aug'12	
Mysore Park Theory Workshop 2012, Mysore, India.	- Aug'12	
43 rd ACM Symposium on Theory of Computing, San Jose, USA.	- June'11	
Seminar, Dept. of CSE, IIT, Bombay.	- Feb'11	
Seminar, Dept. of IEOR, IIT, Bombay.	- Feb'11	
Indo-US Symposium, IISC, India.	- Dec'10	
On Computability of Equilibria in Markets with Production.		
International Symposium on Mathematical Programming, Berlin	- Aug'12	
A Complementary Pivot Algorithm for Market Equilibrium under Separable, Piecewise-Linear Concave Utilities		
ARC Colloquium, College of Computing, Georgia Tech, Atlanta.	- Dec'11	
Bilinear Games: Polynomial Time Algorithms for Rank Based Subclasses		
7 th Workshop on Internet & Network Economics, Singapore.	- Dec'11	
A Simplex-like Algorithm for Fisher Markets		
3 rd International Symposium on Algorithmic Game Theory, Athens, Greece.	- Oct'10	
India IBM Research Lab, Delhi, India.	- Aug'09	
REFERENCES	On request.	