

Siddhartha Banerjee

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School of Operations Research and Information Engineering
Cornell University
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RESEARCH INTERESTS *Stochastic modeling and the design of scalable algorithms and mechanisms* for large systems. In particular, my work spans across the following areas:

Pricing, Markets and Social Computing - game theory and mechanism design; pricing and revenue management; transportation systems.

Learning and Optimization on Networks - large-scale network algorithms; recommender systems; epidemic processes; queueing theory.

CURRENT POSITION **Cornell University:** Ithaca, NY, July 2015 - Present
Assistant Professor: School of Operations Research and Information Engineering.
Field Member: Computer Science, Center for Applied Mathematics, Electrical and Computer Engineering.

PRIOR ACADEMIC POSITIONS **Stanford University:** Stanford, CA, August 2013 - June 2015
Postdoctoral Researcher, [Social Algorithms Lab \(SOAL\)](#).
Hosted by [Ramesh Johari](#) and [Ashish Goel](#).

EDUCATION **The University of Texas at Austin**, Austin, TX, September 2007 - July 2013.
PhD. in Electrical and Computer Engineering, July 2013
(M.S. in Electrical and Computer Engineering, Dec. 2009.)
Department of Electrical and Computer Engineering
Thesis: [Controlling Complex Information Flows in Networks](#)
Advisors: [Sujay Sanghavi](#) and [Sanjay Shakkottai](#)
Indian Institute of Technology Madras, Chennai, India, 2003 - July 2007.
Bachelor's in Electrical Engineering, July 2007.

PRIOR INDUSTRY POSITIONS Technical consultant at **Lyft**, San Francisco, CA, Aug - Nov 2014.
Development and testing of algorithms for dynamic pricing.
Intern at **Technicolor Paris Research Lab**: Paris, France, Summer 2011.
Privacy-preserving recommendation (Mentors: Laurent Massoulié and Nidhi Hegde)
Intern at **Bell Labs, Alcatel-Lucent**: Murray Hill, NJ, Summer 2009.
Algorithms for in-network function computation (Mentor: Piyush Gupta)
Intern at **Fixed Income Division, Lehman Brothers**: Tokyo, Japan, Summer 2006.
Pricing exotic derivatives (Mentor: Prasana Venkatesh)

TEACHING EXPERIENCE **ORIE 4580/5580, Simulation Modeling & Analysis:** Instructor, Cornell, Fall 2017.
ORIE 4154, Pricing and Market Design: Instructor, Cornell, Spring 2017.
ORIE 6154, Revenue Management: Instructor, Cornell, Fall 2016.
ORIE 6180, Design of Online Marketplaces: Instructor, Cornell, Spring 2016.
ORIE 4520, Stochastics at Scale: Instructor, Cornell, Fall 2015.

PUBLICATIONS Google Scholar profile: [Siddhartha Banerjee](#). For preprints, see [my research page](#).

◇ **Preprints and submitted papers**

The Value of State Dependent Control in Ride-sharing Systems

Siddhartha Banerjee, Yash Kanora, Pengyu Qian

Working paper.

Two-Sided Facility Location

Reza Alijani, Siddhartha Banerjee, S. Gollapudi, Kostas Kollias, Kamesh Munagala.

Under submission.

Computing Constrained Shortest-Paths at Scale

Alberto Vera, Siddhartha Banerjee, Samitha Samaranayake.

Working paper.

The Price of Fragmentation in Mobility-on-Demand Services

Thibault Séjourné, Samitha Samaranayake, Siddhartha Banerjee.

One-shot revision, *ACM SIGMETRICS'18*, 2018.

Pricing and Optimization in Shared Vehicle Systems

Siddhartha Banerjee, Daniel Freund, Thodoris Lykouris.

Under submission.

(Earlier version in *ACM EC'17*, June 2017.)

INFORMS APS Student Paper competition finalist, 2017.

Non-Monetary Mechanism Design via Artificial Currencies

Artur Gorokh, Siddhartha Banerjee, Krishnamurthy Iyer.

Under submission.

(Combines results from **From Monetary to Non-Monetary Mechanism Design via Artificial Currencies** in *ACM EC'17*, June 2017, and **Near-Efficient Allocation in Repeated Settings** in *Web and Internet Economics (WINE'16)*, December 2016.)

Engineering the Information Commons: Incentives for Sharing Partial Progress

Anilesh Krishnaswamy, Remco Heesen, Siddhartha Banerjee, Ashish Goel

Under submission.

(Earlier version: **Re-incentivizing Discovery: Mechanisms for Progress Sharing in Research** by S. Banerjee, A. Goel, A. Krishnaswamy in *ACM EC'14*, June 2014.)

Pricing in Ride-Share Platforms: A Queueing-Theoretic Approach

Siddhartha Banerjee, Ramesh Johari, Carlos Riquelme.

Working paper.

(Extended abstract in *ACM EC 2015*, June 2015.)

◇ **Journal Publications**

Online Collaborative Filtering on Graphs

Siddhartha Banerjee, Sujay Sanghavi, Sanjay Shakkottai.

In *Operations Research*, 2016.

The Importance of Exploration in Online Marketplaces

Siddhartha Banerjee, Ramesh Johari, Zhengyuan Zhou.

In *IEEE Internet Computing*, 2015.

(Earlier version in *IEEE CDC 2014*, December 2014.)

The Price of Privacy in Untrusted Recommendation Engines

Siddhartha Banerjee, Nidhi Hegde, Laurent Massoulié.

In the *IEEE Journal of Selected Topics in Signal Processing (Special Issue on Privacy)*

(Earlier version in *50th Allerton Conference*, October 2012.)

Epidemic Spreading with External Agents

Siddhartha Banerjee, Aditya Gopalan, Abhik Das, and Sanjay Shakkottai.

In the *IEEE Transactions on Information Theory*, 2014

(Earlier version in *IEEE INFOCOM 2011*, April 2011.)

Towards a Queueing-Based Framework for In-Network Function Computation

Siddhartha Banerjee, Piyush Gupta, Sanjay Shakkottai.

In *Queueing Systems - Theory and Applications (QUESTA)*, 2012

(Earlier version in *ISIT 2011*, July 2011.)

Wireless Scheduling with Heterogeneous Delayed Network-State Information

Aneesh Reddy, Siddhartha Banerjee, Aditya Gopalan, Sanjay Shakkottai, Lei Ying.

In *Queueing Systems - Theory and Applications (QUESTA)*, 2012.

(Earlier version in *48th Allerton Conference*, October 2010.)

Optimal Feedback Allocation For Cellular Uplink: Theory and Algorithms

Harish Ganapathy, Siddhartha Banerjee, Ned Dimitrov, Constantine Caramanis.

In *IEEE Transactions on Signal Processing*, 2012.

(Earlier version in *47th Allerton Conference*, October 2009.)

Greedy Sensor Selection: Leveraging Submodularity

Manohar Shamaiah, Siddhartha Banerjee, Haris Vikalo.

In *IEEE Wireless Communications Letters*, 2012.

(Earlier version in *IEEE CDC 2010*, December 2010.)

◇ **Conference Publications**

Segmenting Two-Sided Markets

Siddhartha Banerjee, Srinivas Gollapudi, Kostas Kollias, Kamesh Munagala.

In *26th International World Wide Web Conference (WWW'17)*, April 2017.

Sublinear Estimation of a Single Element in Sparse Linear Systems

Nitin Shyamkumar, Siddhartha Banerjee, Peter Lofgren.

In *54th Allerton Conference*, October 2016.

Unbounded Human Learning: Optimal Scheduling for Spaced Repetition

Siddharth Reddy, Igor Labutov, Siddhartha Banerjee, Thorsten Joachims.

In *ACM SIGKDD 2016*, August 2016.

INFORMS Undergraduate Student Paper Award, 2017.

Network Formation of Coalition Loyalty Programs

Arpit Goel, Vijay Kamble, Siddhartha Banerjee, Ashish Goel.

In *NetEcon 2016*, June 2016.

Personalized PageRank Estimation and Search: A Bidirectional Approach

Peter Lofgren, Siddhartha Banerjee, Ashish Goel.

In *ACM WSDM 2016*, February 2016.

Bidirectional PageRank Estimation: From Average-Case to Worst-Case

Peter Lofgren, Siddhartha Banerjee, Ashish Goel.

In *WAW 2015*, December 2015

Fast Bidirectional Probability Estimation in Markov Models

Siddhartha Banerjee, Peter Lofgren.

In *NIPS 2015*, December 2015.

FAST-PPR: Scaling Personalized PageRank Estimation for Large Graphs

Peter Lofgren, Siddhartha Banerjee, Ashish Goel, C. Seshadri.

In *ACM SIGKDD 2014*, August 2014.

The Behavior of Epidemics under Bounded Susceptibility

Subhashini Krishnasamy, Siddhartha Banerjee, Sanjay Shakkottai.

In *ACM SIGMETRICS 2014*, June 2014.

Epidemic Thresholds with External Agents

Siddhartha Banerjee, Avhishek Chatterjee, Sanjay Shakkottai.

In *IEEE INFOCOM 2014*, April 2014.

Greedy Learning of Markov Network Structure

Praneeth Netrapalli, Siddhartha Banerjee, Sujay Sanghavi, Sanjay Shakkottai.

In *48th Allerton Conference*, October 2010.

PROFESSIONAL
SERVICE

Publications Chair: SIGMETRICS 2017

Workshop Chair: Performance 2017

TPC Member: SIGMETRICS 2018, EC 2018, SIGMETRICS 2016, EC 2017, NetEcon 2017, EC 2016

Journal Reviewer: Operations Research, Management Science, QUESTA, IEEE Trans. Networking, IEEE Trans. Mobile Computing, IEEE Trans. Signal Processing.

Conference Reviewer: INFOCOM, SIGMETRICS, STOC, SODA, ICALP, ICML, ISIT, MOBIHOC.

Co-Organizer: Cornell ORIE Colloquium (2015-)

RAIN seminar series at Stanford (2013 - 2015)

WNCG Seminar (2012 - 2013), WNCG student seminar (2009 - 2012) at UT Austin.

INVITED
TALKS

Ridesharing

– Simons Institute Program on Real-Time Decision Making, Berkeley CA, January 2018

Pricing in Dynamic Two-Sided Markets

– 55th Annual Allerton Conference, Urbana-Champaign IL, October 2017

Personalization, for everyone

– Texas Wireless Summit, Austin TX, October 2017

The Power of Bidirectional Estimators

– Los Alamos National Laboratories, Los Alamos NM, June 2017

– Stanford University ISL Colloquium, Palo Alto CA, February 2016

Pricing and Optimization in Shared Vehicle Systems

– Mostly OM Workshop, Beijing, China, May 2017

– NII Workshop on Optimization under Uncertainty, Shonan, Japan, May 2017

– Department Seminar at Georgia Tech ISYE, Atlanta GA, December 2016

Dynamic Pricing in Rideshare Platforms

– Simons Institute Workshop on Real-Time Decision Making, Berkeley CA, June 2016

– Duke University CS-Econ Colloquium, Durham NC, April 2016

Siddhartha Banerjee

What Money Can't Buy - Beyond Pricing in Online Marketplaces

– Cornell CS Theory Seminar, Ithaca NY, November 2016

Sublinear Estimation of a Single Element in Sparse Linear Systems

– 54th Annual Allerton Conference, Urbana-Champaign IL, October 2016

Fast Bidirectional Estimation in Markov Chains

– Cornell CAM Colloquium, Ithaca Ny, September 2015

– Indian Institute of Science, Bangalore, India, July 2015

– WNCG Seminar Series at UT Austin, Austin TX, May 2015

New Models and Mechanisms for Online Platforms

– Baskin School of Engineering at UC Santa Cruz, Santa Cruz CA, February 2015

– NYU Stern IOMS Seminar, New York City NY, January 2015

– Cornell ORIE Department Seminar, Ithaca NY, January 2015

– MEDS Department Seminar at Kellogg, Evanston IL, December 2014

HONORS

INFORMS APS Undergraduate Student Paper Prize winner: Siddharth Reddy (undergraduate advisee) for *Unbounded Human Learning: Optimal Scheduling for Spaced Repetition*, 2017

INFORMS APS Student Paper Prize finalist: Daniel Freund and Thodoris Lykouris (graduate student collaborators) for *Pricing and Optimization in Shared Vehicle Systems*, 2017

WNCG Student Leadership Award, UT Austin, 2013.

Governor's Gold Medal, Institute Silver Medal, IIT Madras, 2007.