Balasubramanian Sivan

Staff Research Scientist, Google Research

CONTACT INFORMATION

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EDUCATION

University of Wisconsin-Madison
PhD in Computer Science (August 2008 - July 2013)
Advisor: Prof. Shuchi Chawla
Thesis title: Prior Robust Optimization

Indian Institute of Technology Madras
B.Tech in Computer Science and Engineering (August 2004 - July 2008)

RESEARCH INTERESTS

Algorithmic Game Theory, Online and Approximation Algorithms, Online Learning.

AWARDS AND HONORS

- Thesis: ACM SIGecom Doctoral Dissertation Award, 2014
- Thesis: Outstanding graduate student researcher award, 2014 (for best thesis), University of Wisconsin-Madison Computer Sciences dept.
- Fellowship: Simons Research Fellowship, Fall 2015 (Declined)
- Scholarship: Alumni scholarship, 2008, University of Wisconsin-Madison Computer Sciences dept.
- Service: NeurIPS 2021 Outstanding Reviewer Award

WORK EXPERIENCE

- Staff Research Scientist, Google Research, NY: November 2020 -
- Senior Research Scientist, Google Research, NY: November 2017 - October 2020
- Research Scientist, Google Research, NY: August 2015 - October 2017
- Postdoctoral Researcher, Microsoft Research, Redmond: August 2013 - July 2015
- Research Intern, Microsoft Research, New England: May 2012 - August 2012
- Research Intern, Microsoft Research, Redmond: May 2010 - August 2010

SURVEY

- *Bayesian Algorithmic Mechanism Design*
  with S. Chawla.
  SIGecom Exchanges, 13(1), 2014.

TUTORIALS

1. Gave a tutorial on *Dynamic Mechanism Design and Learning*
   Conference on Web and Internet Economics (WINE) 2017
2. Gave a tutorial on *Prior Robust Optimization* with Nikhil Devanur
   ACM Electronic Commerce (EC) 2013.
3. Invited speaker in a tutorial on *Online Matchings* organized by Nikhil Devanur and Vahab Mirrokni
   ACM Symposium on Theory of Computing (STOC) 2013.

POSTDOCS, INTERNS HOSTED

- Interns:
  - Antoine Desir (2016, cohosted with Nitish Korula)
  - Eric Balkanski (2017)

  - Ehsan Emamjomeh-Zadeh (2018, cohosted with Renato Paes Leme)
  - Yuan Deng (2019)
  - Yifeng Teng (2019, cohosted with Rita Ren, Renato Paes Leme)
  - Alireza Farhadi (2020, cohosted with Steven Delong, Rad Niazadeh)
- Postdoc: Rad Niazadeh (2020)
- PhD Committee Member: For Xingyu Zhang (Columbia University, IEOR)

Faculty Visitors Hosted

- Constantinos Daskalakis (Fall 2016; MIT EECS)
- Shipra Agrawal (Fall 2017; Columbia IEOR)

Professional Service

- **Program Committee Memberships:**
  - *Economics and Computation*: ACM EC (2013, 2015 - 2022), WINE (2016, 2021), The Web Conference (WWW: 2016 - 2019, 2022)
  - *Algorithms, Theory:* STOC (2020), SODA (2020)
  - *Artificial Intelligence::* IJCAI (2013), AAMAS (2018 - 2019), AAAI (2016 - 2017)
  - *Machine Learning:* NeurIPS (2018 - 2021), ICML (2018 - 2022)
- **Journal Refereeing:** Journal of the ACM (JACM), SIAM Journal on Computing (SICOMP), Games and Economic Behavior (GEB), Management Science (MS), Operations Research (OR), Mathematics of Operations Research (MOR), Journal of Machine Learning Research (JMLR), Information and Computation, Networks
- **Coorganizer:** Workshop on Algorithmic Game Theory and Data Science (2016)

Refereed Conference Publications

1. *Jointly Learning Prices and Product Features*
   with E. Emamjomeh-Zadeh, R. Paes Leme, and J. Schneider.
   International Joint Conference on Artificial Intelligence (IJCAI) 2021.
2. *Robust Repeated First Price Auctions*
   with S. Agrawal, E. Balkanski, and V. Mirrokni.
   ACM Conference on Economics and Computation (EC) 2021.
3. *Welfare-maximizing Guaranteed Dashboard Mechanisms*
   with Y. Deng, J. D. Hartline, and J. Mao.
   ACM Conference on Economics and Computation (EC) 2021.
4. *Variable Decomposition for Prophet Inequalities and Optimal Ordering*
   with A. Liu, R. Paes Leme, M. Pál, and J. Schneider.
   ACM Conference on Economics and Computation (EC) 2021.
5. *Learning to Price Against a Moving Target*
   with R. Paes Leme, Y. Teng, and P. Worah.
   International Conference on Machine Learning (ICML) 2021.
6. *Why Do Competitive Markets Converge to First-Price Auctions?*
   with R. Paes Leme and Y. Teng.
   The Web Conference (WWW) 2020.
7. *Strategizing against No-regret Learners*
   with Y. Deng and J. Schneider.
   *Neural Information Processing Systems (NeurIPS) [**ORAL**] 2019.*
8. *Prior-Free Dynamic Auctions with Low Regret Buyers*
   with Y. Deng and J. Schneider.
   Neural Information Processing Systems (NeurIPS) 2019.

9. *Robust Repeated Auctions under Heterogeneous Buyer Behavior*
with S. Agrawal, C. Daskalakis, and V. Mirrokni.
ACM Conference on Economics and Computation (EC) 2018.

10. *Truthful Multi-Parameter Auctions with Online Supply: an Impossible Combination*
with N. R. Devanur and V. Syrgkanis.
ACM-SIAM Symposium on Discrete Algorithms (SODA) 2018.

11. *Testing Incentive Compatibility in Display Ad Auctions*
with S. Lahaie, A. M. Medina, and S. Vassilvitskii.
The Web Conference (WWW) 2018.

12. *Tight Lower Bounds for Multiplicative Weights Algorithmic Families*
with N. Gravin and Y. Peres.
International Colloquium on Automata, Languages, and Programming (ICALP) 2017.

13. *Stability of service under time-of-use pricing*
with S. Chawla, N. R. Devanur, A. E. Holroyd, A. Karlin, and J. B. Martin.
ACM Symposium on Theory of Computing (STOC) 2017.

14. *Towards Optimal Algorithms for Prediction with Expert Advice*
with N. Gravin and Y. Peres.
ACM-SIAM Symposium on Discrete Algorithms (SODA) 2016.

15. *Simple Pricing Schemes For Consumers With Evolving Values*
with S. Chawla, N. R. Devanur, and A. Karlin.
ACM-SIAM Symposium on Discrete Algorithms (SODA) 2016.

16. *Multi-Score Position Auctions*
with D. X. Charles and N. R. Devanur.
ACM International Conference on Web Search and Data Mining (WSDM) 2016.

17. *Price Competition, Fluctuations and Welfare Guarantees*
with M. Babaioff and R. Paes Leme.
ACM Conference on Economics and Computation (EC) 2015.

18. *Perfect Bayesian Equilibria in Repeated Sales*
with N. R. Devanur and Y. Peres.
ACM-SIAM Symposium on Discrete Algorithms (SODA) 2015.

19. *Prior-Independent Mechanisms for Scheduling*
with S. Chawla, J. D. Hartline, and D. L. Malec.
ACM Symposium on Theory of Computing (STOC) 2013.

20. *Cost-Recovering Bayesian Algorithmic Mechanism Design*
with H. Fu, B. Lucier, and V. Syrgkanis.
ACM Electronic Commerce (EC) 2013.

21. *Vickrey Auctions for Irregular Distributions*
with V. Syrgkanis.
Conference on Web and Internet Economics (WINE) 2013.

22. *Revenue Maximization with Nonexcludable Goods*
with M. Bateni, N. Haghpanah, and M. Zadimoghaddam.
Conference on Web and Internet Economics (WINE) 2013.

23. *Optimal Crowdsourcing Contests*
with S. Chawla and J. D. Hartline.
ACM-SIAM Symposium on Discrete Algorithms (SODA) 2012.

24. *Asymptotically Optimal Algorithm for Stochastic Adwords*
with N. R. Devanur and Y. Azar.
ACM Electronic Commerce (EC) 2012.

25. *Single-Call Mechanisms*
with C. Wilkens.
ACM Electronic Commerce (EC) 2012.

26. *Lower Bounds on Revenue of Approximately Optimal Auctions*
with V. Syrgkanis and O. Tamuz.
Workshop on Internet and Network Economics (WINE) 2012.

27. *Near Optimal Online Algorithms and Fast Approximation Algorithms for Resource Allocation Problems*
with N. R. Devanur, K. Jain, and C. Wilkens.
ACM Electronic Commerce (EC) 2011.

28. *Multi-parameter Mechanism Design and Sequential Posted Pricing*
with S. Chawla, J. D. Hartline, and D. L. Malec.
ACM Symposium on Theory of Computing (STOC) 2010.

29. *The Power of Randomness in Bayesian Optimal Mechanism Design*
with S. Chawla and D. L. Malec.
ACM Electronic Commerce (EC) 2010.

30. *Core and Conditional Core Path of Specified Length in Special Classes of Graphs*
with S. Harini and C. Pandurangan.
Workshop on Algorithms and Computation (WALCOM) 2009.

31. *On Conditional Covering Problem*
with S.Harini and C. Pandurangan.
International Workshop on Combinatorial Algorithms (IWOCA) 2008 .

Refereed Journal Publications

1. *Improved Revenue Bounds for Posted-Price and Second-Price Mechanisms*
with H. Beyhaghi, N. Golrezaei, R. Paes Leme, and M. Pál.
To appear in *Operations Research (OR)* 2021.

2. *Separation between second price auctions with personalized reserves and the revenue optimal auction*
with W. Ma.
Operations Research Letters (ORL) 2020.

3. *Near Optimal Online Algorithms and Fast Approximation Algorithms for Resource Allocation Problems*
with N. R. Devanur, K. Jain, and C. Wilkens.
Journal of the ACM (JACM) 2019.

4. *Perfect Bayesian Equilibria in Repeated Sales*
with N. R. Devanur and Y. Peres.
Special invited issue of *Games and Economic Behavior (GEB)* 2019, dedicated to selected papers from STOC/FOCS/SODA 2014 and 2015.

5. *Optimal Crowdsourcing Contests*
with S. Chawla and J. D. Hartline.
Special invited issue of *Games and Economic Behavior (GEB)* 2019, dedicated to selected papers from STOC/FOCS/SODA 2012.

6. *The Power of Randomness in Bayesian Optimal Mechanism Design*
with S. Chawla and D. L. Malec.
Special invited issue of *Games and Economic Behavior (GEB)* 2015, dedicated to selected papers from ACM EC 2010 and ACM EC 2011.

7. *Single-Call Mechanisms*
with C. Wilkens.
Special invited issue of *ACM Transactions on Economics and Computation (ACM TEAC)* 2015, dedicated to selected papers from ACM EC 2012.
8. *Revenue Maximization with Nonexcludable Goods*
with M. Bateni, N. Haghpanah, and M. Zadimoghaddam.
Special invited issue of *ACM Transactions on Economics and Computation (ACM TEAC)* 2015, dedicated to selected papers from WINE 2013.
9. *On Conditional Covering Problem*
with S.Harini and C. Pandurangan.
Mathematics in Computer Science, Special Issue on "Advances in Combinatorial Algorithms", Birkhäuser Basel, 2009.

Patents

1. *Offline Resource Allocation Algorithms*
with N. R. Devanur, K. Jain and C. Wilkens
US Patent 9,009,318

Invited Presentations

1. INFORMS session on Revenue Management for Marketing and Advertising, "Improved Revenue Bounds for Posted-Price and Second-Price Mechanisms", November 2021.
2. Google Research, "Strategizing against No-regret Learners", August 2021.
3. Recent Trends in Theoretical Computer Science Workshop, Toyota Technological Institute at Chicago, "Strategizing against No-regret Learners", January 2020.
4. MIT MBA Lecture, "Challenges and Opportunities in Ads Optimization", November 2019.
5. Simons Institute Program on Online and Matching-Based Market Design, "Open Problems in the Display Ads Market Place", September 2019.
6. Google Market Algorithms Workshop, "Dynamic Auctions Robust to Buyer Heterogeneity", February 2019.
7. University of Wisconsin-Madison Theory Seminar, "Towards Optimal Algorithms for Prediction with Expert Advice", November 2018.
8. Northwestern University Theory Seminar, "Stability of Service under Time-of-Use Pricing", November 2018.
9. Google Research Workshop on Machine Learning Theory, "Towards Optimal Algorithms for Prediction with Expert Advice", October 2018.
10. Columbia University IEOR / DRO, "Simple Pricing Schemes for Consumers with Evolving Values", October 2018.
11. NII Shonan Meeting on Algorithms and Optimization under Uncertainty, "Stability of Service under Time-of-Use Pricing", May 2017.
12. INFORMS, "Simple Pricing Schemes for Consumers with Evolving Values", November 2016.
13. University of Pennsylvania CS Theory Seminar, "Towards Optimal Algorithms for Prediction with Expert Advice", April 2016.
14. Google Research Mountain View, "A Tale of Two Repeated Games", May 2015.
15. Microsoft Research Redmond, "A Tale of Two Repeated Games", April 2015.
16. Microsoft Research Cambridge, "Prior Robust Optimization", April 2015.
17. Cornell University ORIE, "Prior Robust Optimization", April 2015.
18. University of British Columbia CS, "Prior Robust Optimization", March 2015.

19. Microsoft Research Redmond, "Perfect Bayesian Equilibria in Repeated Sales", 2015.
20. Columbia Business School, "Prior Robust Optimization", January 2015.
21. University of Washington Theory Seminar, "Optimal Crowdsourcing Contests", January 2015.
22. University of Washington Theory Seminar, "Towards Optimal Algorithms for Prediction with Expert Advice", December 2014.
23. Stanford University Theory Seminar, "Perfect Bayesian Equilibria in Repeated Sales", September 2014.
24. Stanford University RAIN Seminar, "Towards Optimal Algorithms for Prediction with Expert Advice", September 2014.
25. Microsoft Research Redmond (Theory seminar and Machine Learning lunch), "Towards Optimal Algorithms for Prediction with Expert Advice", August 2014.
26. ACM SIGecom Doctoral Dissertation Award Talk, "Prior Robust Optimization", June 2014.
27. Dagstuhl Seminar on Electronic Markets and Auctions, "Cost-Recovering Bayesian Algorithmic Mechanism Design", November 2013.
28. Microsoft Research Redmond, "Revenue Maximization and Prophet Inequalities", September 2013.
29. Georgia Institute of Technology, "Prior Robust Optimization", March 2013.
30. Microsoft Research Redmond, "Prior Robust Optimization", February 2013.
31. Microsoft Research Silicon Valley,, "Prior Robust Optimization", January 2013.
32. Experience Theory Project (Univ. of Washington and MSR Redmond), "Auctions vs Negotiations for Irregular Markets", August 2012.
33. Barbados, Bellairs Workshop on Algorithmic Game Theory, "Bayesian multi-parameter scheduling", April 2012.
34. Stanford University Theory lunch, "Optimal crowdsourcing contests", January 2012.
35. Microsoft Research Silicon Valley, "Bayesian multi-parameter scheduling", January 2012.
36. Northwestern University, Theory seminar, "Near optimal online algorithms and fast approximation algorithms for resource allocation problems", September 2011.
37. University of Washington, Theory seminar, "Near optimal online algorithms and fast approximation algorithms for resource allocation problems", September 2011.
38. Microsoft Research, Redmond, "Near optimal online algorithms and fast approximation algorithms for resource allocation problems", August 2011.
39. Greece Economics and Algorithmic Theory (GREAT) workshop, "Optimal Crowdsourcing Contests", July 2011.
40. Midwest Theory Day, Toyota Technological Institute, Chicago, "Single-call mechanisms", December 2010.
41. Northwestern University, Theory of Computing seminar, "The power of randomness in Bayesian optimal mechanism design", May 2010.
42. Bertinoro workshop on frontiers in mechanism design, Italy, "The power of randomness in Bayesian optimal mechanism design", March 2010.