

Karthik Abinav Sankararaman

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Department of Computer Science
University of Maryland, College Park

CONTACT INFORMATION

Phone: (+1) 240-715-5910 **Address:** A.V. Williams Building, UMD,
College Park, MD - 20742
Webpage: karthikabinavs.xyz **Email:** kabinav@cs.umd.edu

INTERESTS

Algorithms, Machine Learning, Artificial Intelligence, Operations Research

EDUCATION

University of Maryland, College Park

PhD. in Computer Science

September 2014 - May 2019 (Expected)

M.S. in Computer Science

December 2016

Advisor: Dr. Aravind Srinivasan

Indian Institute of Technology, Madras

August 2010 - July 2014

B.Tech Honours in Computer Science and Engineering

GPA: 9.01/10

Minor: Operations Research

Thesis: Maximum Flow Problem in Undirected Graphs

Advisor: Dr. N.S. Narayanaswamy

HONORS

- Selected as a *Future Faculty Fellow* UMD, 2018
- **Dean's Fellowship:** University of Maryland, 2014, 2015
- Recipient of the *S.N. Bose Scholarship* 2013 given to **top 50** Indian students.
- Awardee of the *National Talent Search Examination(NTSE)* Scholarship.
- 14th and 16th position in ICPC Mid-Atlantic regionals 2014 and ICPC Asia-Amritapuri regionals 2013 respectively.

SELECTED PUBLICATIONS

(**Author**
ordering
alphabetically by
last name unless
specified by *
which indicates
primary
author(s) by
contribution)

1. "[Matching Workers to Tasks in Crowdsourcing Platforms: Two-Sided Online Matching](#)" — Joint work with John Dickerson, Aravind Srinivasan, Pan Xu
The 17th International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2018 (Acceptance: 151/597 ~ 25%)
2. "[Combinatorial Semi-Bandits with Knapsacks](#)" — Joint work with Alexandrs Slivkins
The 21st International Conference on Artificial Intelligence and Statistics (AISTats), 2018 — (**Invited for Oral Presentation**)
(Acceptance: 29/214/645 ~ 5% (of submissions), 15% (of accepted papers))
3. "[Allocation Problems in Ride-Sharing Platforms: Online Matching with Offline Reusable Resources](#)" — Joint work with John Dickerson, Aravind Srinivasan, Pan Xu
The 32th AAAI Conference on Artificial Intelligence (AAAI), 2018 — (**Invited for Oral Presentation**) (Acceptance: 933/3800 ~ 25%)
4. "[Algorithms to Approximate Column-Sparse Packing Problems](#)" — Joint work with Brian Brubach, Aravind Srinivasan, Pan Xu
The 29th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 2018
(Acceptance: 180/625 ~ 29%)
5. "[Attenuation-based Frameworks for Online Stochastic Matching with Timeouts](#)" — Joint work with Brian Brubach, Aravind Srinivasan, Pan Xu
The 16th International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2017 (Acceptance: 155/595 ~ 26%)
6. "[New Algorithms, Better Bounds, and a Novel Model for Online Stochastic Matching](#)" — Joint work with Brian Brubach, Aravind Srinivasan, Pan Xu
The 24th Annual European Symposium on Algorithms (ESA), 2016
(Acceptance: 76/282 ~ 27%)
7. "Ensuring Privacy in Location-Based Services: An Approach Based on Opacity Enforcement" — Joint work with Yi-Chin Wu, Stéphane Lafortune
The 14th International Workshop of Discrete Event Systems (WODES), 2014

N.B.:
CONFERENCES ARE
THE PRIMARY
VENUES OF
PUBLICATION IN
COMPUTER
SCIENCE.

RESEARCH EXPERIENCE	Causal Inference May 2017 - Present <i>Part of this project conducted as a visitor to Indian Institute of Science and Microsoft Research, Bangalore during May-July 2017</i> <i>Joint work with Navin Goyal, Anand Louis</i> Working on algorithmic problems in theory of causal inference.
	Bandit Algorithms and Online Learning August 2016 - Present <i>University of Maryland, College Park</i> <i>Joint work with Alex Slivkins</i> Working on Bandit algorithms with global budget constraints.
	Stochastic Optimization, Economics and Algorithms, Discrete Optimization in Machine Learning August 2014 - Present <i>University of Maryland, College Park</i> <i>Joint works on multiple projects with Brian Brubach, John Dickerson, Aravind Srinivasan, Pan Xu</i> Working on multiple problems such as crowdsourcing algorithms, budgeted allocation and matching problems, sub-modular optimization.
	Algorithms for Maximum Flow, Graph Sparsification and related problems Aug 2013 - Aug 2014 <i>Indian Institute of Technology, Madras</i> <i>Area of Work: Spectral Graph Theory, Convex Optimization</i> <i>Joint work with Narayanaswamy N.S.</i>
PROFESSIONAL EXPERIENCE	Privacy in Location Based Services May - July 2013 <i>University of Michigan, Ann Arbor</i> <i>Area of Work: Cyber Security</i> <i>Joint work with Yi-Chin Wu, Stéphane Lafortune</i>
	Microsoft Research New York City, NY Summer 2018 <i>Mentors: Nicole Immorlica, Rob Schapire, Alex Slivkins</i>
	IBM Almaden Research Center, San Jose, CA Summer 2016 <i>Manager: Shivakumar Vaithyanathan, Mentor: Prithviraj Sen</i> <i>Remote Collaboration Fall 2016/Spring 2017.</i>
	Technical Report —Karthik Abinav Sankararaman, Prithviraj Sen, Marina Danilevsky, Sanjiv R Das, Seoyoung Kim, Rajasekhar Krishnamurthy, Shivakumar Vaithyanathan “Financial Time-Series Nowcasting with LSTM’s and Imperfect Information” Adobe Inc., San Jose, CA Summer 2015 <i>Algorithms Team headed by Anil Kamath; Mentor: Fangpo Wang</i>
TEACHING EXPERIENCE	Teaching Assistant, University of Maryland <i>CMSC250 - Discrete Structures (2 sems.), CMSC131- Intro to Programming (2 sems.), CMSC451/651- Advanced Algorithms (4 sems.)</i> <i>Responsibilities:</i> Guest Lectures, Conducting Discussion Sessions, Office Hours, Grading
	Teaching Assistant, Indian Institute of Technology, Madras <i>Paradigms of Programming</i> <i>Responsibilities:</i> Grading Programming Assignments
MISCELLANEOUS	External Reviewer: Transactions on Algorithms (TALG), Networks, Optimization Letters, AA-MAS, EC, NIPS, ICLR Graduate Admissions Committee: Department of Computer Science, UMD, 2016, 2017, 2018 Graduate Executive Council: Secretary 2017 CATS organizer: 2016-2017 Grants: FOCS 2016 Travel Award, UMD CS Travel Award (2017), SODA 2018 Travel Award, Goldhaber Travel Award (2018), ICSSA Travel Award (2018), AISTATS 2018 Travel Grant

SELECTED TALKS

1. New Algorithms for Online Stochastic Matching
 - IBM Almaden Center, Theory Group
 - IBM Almaden Center, Machine Learning Group
2. Algorithms to Approximate Column-Sparse Packing Problems
 - Symposium on Discrete Algorithms (SODA), 2018
 - Indian Institute of Technology, Madras
3. Combinatorial Semi-Bandits with Knapsacks
 - International Conference on Artificial Intelligence and Statistics (AISTATS), 2018
 - (parts of this work) Indian Institute of Science, Bengaluru
 - Indian Institute of Technology, Madras

WORKING PAPERS/MANUSCRIPTS

1. “Adversarial Bandits with Knapsacks” — Joint work with Nicole Immorlica, Robert Schapire, Alex Slivkins
In preparation 2018
2. “Stability of Linear Structural Equation Model of Causal Inference” — Joint work with Navin Goyal, Anand Louis
In preparation 2018
3. “Online Resource Allocation in Matching-type problems” — Joint work with John Dickerson, Kanthi K Sarpatwar, Aravind Srinivasan, Kun-Lung Wu, Pan Xu
Under Review 2018
4. “Balancing Relevance and Diversity in Online Matching via Submodularity” — Joint work with John Dickerson, Aravind Srinivasan, Pan Xu
Under Review 2018
5. “Mix and Match: Markov Chains and Mixing Times for Matching in Rideshare” — Joint work with John Dickerson, Aravind Srinivasan, Pan Xu
Under Review 2018
6. “Why is SGD so fast for neural nets and other over-parameterized problems?” — Karthik A Sankararaman*, Soham De*, Zheng Xu, Ronny Huang, Tom Goldstein
Under Review 2018
7. “[Online Stochastic Matching: New Algorithms and Bounds](#)” — Joint work with Brian Brubach, Aravind Srinivasan, Pan Xu
Under review Algorithmica — Short version previously appeared at ESA-2016
8. “[Algorithms to Approximate Column-Sparse Packing Problems](#)” — Joint work with Brian Brubach, Aravind Srinivasan, Pan Xu
Under review Transactions of Algorithms (TALG) — Short version appeared in SODA-2018
9. “[Attenuation-based Frameworks for Online Stochastic Matching with Timeouts](#)” — Joint work with Brian Brubach, Aravind Srinivasan, Pan Xu
Under review Algorithmica — Short version appeared in AAMAS-2017