

Karthik Abinav Sankararaman

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Department of Computer Science
University of Maryland, College Park

CONTACT INFORMATION

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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

Part of this project conducted as a visitor to Indian Institute of Science and Microsoft Research, Bangalore during May-July 2017

Joint work with Navin Goyal, Anand Louis

Working on algorithmic problems in theory of causal inference.

Bandit Algorithms and Online Learning

August 2016 - Present

University of Maryland, College Park

Joint work with Alex Slivkins

Working on Bandit algorithms with global budget constraints.

Stochastic Optimization, Economics and Algorithms, Discrete Optimization in Machine Learning

August 2014 - Present

University of Maryland, College Park

Joint works on multiple projects with Brian Brubach, John Dickerson, Aravind Srinivasan, Pan Xu

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

Indian Institute of Technology, Madras

Area of Work: Spectral Graph Theory, Convex Optimization

Joint work with Narayanaswamy N.S.

Privacy in Location Based Services

May - July 2013

University of Michigan, Ann Arbor

Area of Work: Cyber Security

Joint work with Yi-Chin Wu, Stéphane Lafortune

PROFESSIONAL
EXPERIENCE

IBM Almaden Research Center, San Jose, CA

Summer 2016

Manager: Shivakumar Vaithyanathan, Mentor: Prithviraj Sen

Remote Collaboration Fall 2016/Spring 2017.

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

Algorithms Team headed by Anil Kamath; Mentor: Fangpo Wang

TEACHING
EXPERIENCE

Teaching Assistant, University of Maryland

CMSC250 - Discrete Structures (2 sems.), CMSC131- Intro to Programming (2 sems.), CMSC451/651- Advanced Algorithms (4 sems.)

Responsibilities: Guest Lectures, Conducting Discussion Sessions, Office Hours, Grading

Teaching Assistant, Indian Institute of Technology, Madras

Paradigms of Programming

Responsibilities: Grading Programming Assignments

MISCELLANEOUS

External Reviewer: Transactions on Algorithms (TALG), Networks, Autonomous Agents and Multi-agent System (JAAMAS), Conference on Economics and Computation (EC)

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. “Balancing Relevance and Diversity in Online Matching via Submodularity” — Joint work with John Dickerson, Aravind Srinivasan, Pan Xu
Under Review 2018
2. “Mix and Match: Markov Chains and Mixing Times for Matching in Rideshare” — Joint work with John Dickerson, Aravind Srinivasan, Pan Xu
Under Review 2018
3. “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
4. “[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
5. “[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
6. “[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-2018