Karthik Abinav Sankararaman

Department of Computer Science
University of Maryland, College Park

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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 - August 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 for the *Future Faculty Fellow* program, UMD, 2018
- Nominated by the UMD CS department for IBM PhD fellowship, 2017
- **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 (**As per tradition, author names are ordered alphabetically by last name**)

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 — (Oral)
2. "Combinatorial Semi-Bandits with Knapsacks" — Joint work with Alexandrs Slivkins
   The 21st International Conference on Artificial Intelligence and Statistics (AIStats), 2018
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 — (Oral)
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
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 — (Oral)
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
7. "Ensuring Privacy in Location-Based Services: An Approach Based on Opacity Enforcement" — Joint work with Yi-Chin Wu, Stèphane Lafortune
   The 14th International Workshop of Discrete Event Systems (WODES), 2014

Manuscripts

1. "Online Multi-Budgeted Assignment in Crowdsourcing Markets: Benefits of Incorporating Historical Data" — Joint work with Kanthi Sarpatwar, Aravind Srinivasan, Kun-Lung Wu, Pan Xu *Manuscript 2017*
2. "Online Stochastic Matching: New Algorithms and Bounds"— Joint work with Brian Brubach, Aravind Srinivasan, Pan Xu
   Under review Mathematics of Operations Research — Short version previously appeared at ESA-2016

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, Stèphane Lafortune

Teaching Experience

Teaching Assistant, University of Maryland

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

Professional Experience

IBM Almaden Research Center, San Jose, CA **Summer 2016**

Manager: Shivakumar Vaithyanathan, Mentor: Prithviraj Sen
Inter-disciplinary project on Algorithms, Machine Learning and Finance

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
Database algorithms

MISCELLANEOUS

External Reviewer: Transactions on Algorithms (TALG), Networks
Graduate Admissions Comittee: 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

COLLABORATORS

Brian Brubach (UMD), Yi-Chin Wu (UMich), John Dickerson (UMD), Navin Goyal (Microsoft Research), Stèphane Lafortune (UMich), Anand Louis (IISc), Kanthi K. Sarpatwar (IBM Research), Prithviraj Sen (IBM Research), Aleksandrs Slivkins (Microsoft Research), Aravind Srinivasan (UMD), Kun-Lung Wu (IBM Research), Pan Xu (UMD)