

# Karthik Abinav Sankararaman

May 2018

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*  
*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*

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

1. “Online Multi-Budgeted Resource Allocation Problem” — Joint work with John Dickerson, Kanthi Sarpatwar, Aravind Srinivasan, Kun-Lung Wu, Pan Xu  
*Manuscript 2018*
2. “Balancing Relevance and Diversity in Online Matching via Submodularity” — Joint work with John Dickerson, Aravind Srinivasan, Pan Xu  
*Under Review 2018*
3. “Mix and Match: Markov Chains and Mixing Times for Matching in Rideshare” — Joint work with John Dickerson, Aravind Srinivasan, Pan Xu  
*Under Review 2018*
4. “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*
5. “[Online Stochastic Matching: New Algorithms and Bounds](#)” — Joint work with Brian Brubach, Aravind Srinivasan, Pan Xu  
*Manuscript 2018 — Short version previously appeared at ESA-2016*
6. “[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*
7. “[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*