

# Karthik Abinav Sankararaman

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Department of Computer Science  
University of Maryland, College Park

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## CONTACT INFORMATION

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

## 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
- **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*
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)*
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)*
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*
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, Stéphane Lafortune  
*The 14th International Workshop of Discrete Event Systems (WODES), 2014*

# MANUSCRIPTS

1. “Online Multi-Budgeted Assignment in Matching Markets with Historical Data” — Joint work with Kanthi Sarpatwar, Aravind Srinivasan, Kun-Lung Wu, Pan Xu  
*Under Review IJCAI 2018*
2. “Online Submodular Bipartite Matching” — Joint work with John Dickerson, Aravind Srinivasan, Pan Xu  
*Under Review ICML 2018*
3. “[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, Stéphane Lafortune*

# 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*

# 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, 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)

COLLABORATORS    Brian Brubach (UMD), Yi-Chin Wu (UMich), John Dickerson (UMD), Navin Goyal (Microsoft Research), Stéphane 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)