

Karthik Abinav Sankararaman

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Department of Computer Science
University of Maryland, College Park

CONTACT INFORMATION

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INTERESTS

Foundations and Applications of Artificial Intelligence
Recent topics: Online Learning, Online Algorithms, Discrete and Continuous Optimization, Randomized Algorithms, Causal Inference.

EDUCATION

University of Maryland, College Park
PhD. in Computer Science **September 2014 - May 2019 (Expected)**
M.S. in Computer Science **December 2016**
Committee: Aravind Srinivasan, Alex Slivkins, John Dickerson

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.

SELECTED PUBLICATIONS (**Authors**

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

1. “Balancing Relevance and Diversity in Online Matching via Submodularity” — Joint work with John Dickerson, Aravind Srinivasan, Pan Xu
The 33rd AAAI Conference on Artificial Intelligence (AAAI), 2019
2. “[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
3. “[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)
4. “[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)
5. “[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
6. “[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
7. “[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
8. “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.

PROFESSIONAL EXPERIENCE	Microsoft Research New York City, NY <i>Mentors: Nicole Immorlica, Rob Schapire, Alex Slivkins</i>	Summer 2018
	IBM Almaden Research Center, San Jose, CA <i>Manager: Shivakumar Vaithyanathan, Mentor: Prithviraj Sen</i> <i>Remote Collaboration Fall 2016/Spring 2017.</i>	Summer 2016
	Technical Report — <i>Karthik Abinav Sankararaman, Prithviraj Sen, Marina Danilevsky, Sanjiv R Das, Seoyoung Kim, Rajasekhar Krishnamurthy, Shivakumar Vaithyanathan</i> “Financial Time-Series Nowcasting with LSTM’s and Imperfect Information”	
RESEARCH EXPERIENCE	Adobe Inc., San Jose, CA <i>Algorithms Team headed by Anil Kamath; Mentor: Fangpo Wang</i>	Summer 2015
	Causal Inference <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.	May 2017 - Present
	Bandit Algorithms and Online Learning <i>University of Maryland, College Park</i> <i>Joint work with Alex Slivkins</i> Working on Bandit algorithms with global budget constraints.	August 2016 - Present
	Stochastic Optimization, Economics and Algorithms, Discrete Optimization in Machine Learning <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.	August 2014 - Present
	Algorithms for Maximum Flow, Graph Sparsification and related problems <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>	Aug 2013 - Aug 2014
TEACHING EXPERIENCE	Privacy in Location Based Services <i>University of Michigan, Ann Arbor</i> <i>Area of Work: Cyber Security</i> <i>Joint work with Yi-Chin Wu, Stéphane Lafortune</i>	May - July 2013
	Teaching Assistant, University of Maryland <i>CMSC250 - Discrete Structures (2 sems.), CMSC131- Intro to Programming (2 sems.), CMSC451/651- Advanced Algorithms (5 sems.)</i> <i>Responsibilities: Guest Lectures, Conducting Discussion Sessions, Office Hours, Grading</i>	
	Teaching Assistant, Indian Institute of Technology, Madras <i>Paradigms of Programming</i> <i>Responsibilities: Grading Programming Assignments</i>	
MISCELLANEOUS	External Reviewer: Transactions on Algorithms (TALG), Networks, Optimization Letters, AA-MAS, EC, NIPS, ICLR, AISTats, ICML 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	<ol style="list-style-type: none"> 1. New Algorithms for Online Stochastic Matching <ul style="list-style-type: none"> - IBM Almaden Center, Theory Group - IBM Almaden Center, Machine Learning Group 2. Algorithms to Approximate Column-Sparse Packing Problems <ul style="list-style-type: none"> - Symposium on Discrete Algorithms (SODA), 2018 - Indian Institute of Technology, Madras 3. Bandits with Knapsacks <ul style="list-style-type: none"> - International Conference on Artificial Intelligence and Statistics (AISTATS), 2018 - (parts of this work) Indian Institute of Science, Bengaluru - Indian Institute of Technology, Madras - Johns Hopkins Theory Seminar
WORKING PAPERS/MANUSCRIPTS	<ol style="list-style-type: none"> 1. “Adversarial Bandits with Knapsacks” — Joint work with Nicole Immorlica, Robert Schapire, Alex Slivkins <i>Under Review STOC 2019</i> 2. “Stability of Linear Structural Equation Model of Causal Inference” — Joint work with Navin Goyal, Anand Louis <i>Under Review AISTATS 2019</i> 3. “Mix and Match: Markov Chains and Mixing Times for Matching in Rideshare” — Joint work with Mike Curry, John Dickerson, Aravind Srinivasan, Yuhao Wan, Pan Xu <i>Manuscript</i> 4. “On the convergence of SGD on neural nets and other over-parameterized problems” — Karthik A Sankararaman*, Soham De*, Zheng Xu, Ronny Huang, Tom Goldstein <i>Preliminary version at NIPS Workshop on Integration of Deep Learning Theory, 2018</i> <i>In preparation for ICML 2019</i> 5. “Online Stochastic Matching: New Algorithms and Bounds” — Joint work with Brian Brubach, Aravind Srinivasan, Pan Xu <i>Under review Algorithmica — Short version previously appeared at ESA-2016</i> 6. “Algorithms to Approximate Column-Sparse Packing Problems” — Joint work with Brian Brubach, Aravind Srinivasan, Pan Xu <i>Under review Transactions of Algorithms (TALG) — Short version appeared in SODA-2018</i> 7. “Attenuation-based Frameworks for Online Stochastic Matching with Timeouts” — Joint work with Brian Brubach, Aravind Srinivasan, Pan Xu <i>Under review Algorithmica — Short version appeared in AAMAS-2017</i>
COLLABORATORS/ CO-AUTHORS	Brian Brubach, Mike Curry, Soham De, John Dickerson, Tom Goldstein, Navin Goyal, Ronny Huang, Nicole Immorlica, Stéphane Lafortune, Anand Louis, Robert Schapire, Prithviraj Sen, Alex Slivkins, Aravind Srinivasan, Leonidas Tsepenekas, Yuhao Wan, Yi-Chin Wu, Pan Xu, Zheng Xu
PROGRAMMING	C++, Python, Java
REFERENCES	Available on Request.