

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.
- 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
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

N.B.:
CONFERENCES ARE
THE PRIMARY
VENUES OF
PUBLICATION IN
COMPUTER
SCIENCE.

RESEARCH EXPERIENCE	Causal Inference May 2017 - Present <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.
	Bandit Algorithms and Online Learning August 2016 - Present <i>University of Maryland, College Park</i> <i>Joint work with Alex Slivkins</i> Working on Bandit algorithms with global budget constraints.
	Stochastic Optimization, Economics and Algorithms, Discrete Optimization in Machine Learning August 2014 - Present <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.
	Algorithms for Maximum Flow, Graph Sparsification and related problems Aug 2013 - Aug 2014 <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>
PROFESSIONAL EXPERIENCE	Privacy in Location Based Services May - July 2013 <i>University of Michigan, Ann Arbor</i> <i>Area of Work: Cyber Security</i> <i>Joint work with Yi-Chin Wu, Stéphane Lafortune</i>
	Microsoft Research New York City, NY Summer 2018 <i>Mentors: Nicole Immorlica, Rob Schapire, Alex Slivkins</i>
	IBM Almaden Research Center, San Jose, CA Summer 2016 <i>Manager: Shivakumar Vaithyanathan, Mentor: Prithviraj Sen</i> <i>Remote Collaboration Fall 2016/Spring 2017.</i>
	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”
TEACHING EXPERIENCE	Adobe Inc., San Jose, CA Summer 2015 <i>Algorithms Team headed by Anil Kamath; Mentor: Fangpo Wang</i>
	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:</i> Guest Lectures, Conducting Discussion Sessions, Office Hours, Grading
	Teaching Assistant, Indian Institute of Technology, Madras <i>Paradigms of Programming</i> <i>Responsibilities:</i> Grading Programming Assignments
MISCELLANEOUS	External Reviewer: Transactions on Algorithms (TALG), Networks, Optimization Letters, AA-MAS, EC, NIPS, ICLR 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. Combinatorial Semi-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
WORKING PAPERS/MANUSCRIPTS	<ol style="list-style-type: none"> 1. “Adversarial Bandits with Knapsacks” — Joint work with Nicole Immorlica, Robert Schapire, Alex Slivkins <i>To be submitted to STOC 2019</i> 2. “Stability of Linear Structural Equation Model of Causal Inference” — Joint work with Navin Goyal, Anand Louis <i>To be submitted to AISTats 2019</i> 3. “Online Resource Allocation in Matching-type problems” — Joint work with John Dickerson, Kanthi K Sarpatwar, Aravind Srinivasan, Kun-Lung Wu, Pan Xu <i>Under Review AAAI 2019</i> 4. “Balancing Relevance and Diversity in Online Matching via Submodularity” — Joint work with John Dickerson, Aravind Srinivasan, Pan Xu <i>Under Review AAAI 2019</i> 5. “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>Under Review AAAI 2019</i> 6. “Why is SGD so fast for neural nets and other over-parameterized problems?” — Karthik A Sankararaman*, Soham De*, Zheng Xu, Ronny Huang, Tom Goldstein <i>In preparation for ICML 2019</i> 7. “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> 8. “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> 9. “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, Kanthi K Sarpatwar, Robert Schapire, Prithviraj Sen, Alex Slivkins, Aravind Srinivasan, Leonidas Tsepenekas, Yuhao Wan, Kun-Lung Wu, Yi-Chin Wu, Pan Xu, Zheng Xu
PROGRAMMING	C++, Python, Java