

Karthik Abinav Sankararaman

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Department of Computer Science
University of Maryland, College Park

CONTACT INFORMATION

Phone: (+1) 240-715-5910 **Address:** 4120 The Brendan Iribe Center, UMD,
College Park, MD - 20742
Webpage: karthikabinavs.xyz **Email:** kabinav@cs.umd.edu

INTERESTS

Foundations and Applications of Artificial Intelligence
Recent topics: Sequential Decision Problems (*e.g.*, Online Matching, Multi-armed Bandits, SGD),
Discrete and Continuous Optimization, Causality

EDUCATION

University of Maryland, College Park
PhD. in Computer Science **September 2014 - July 2019 (Expected)**
M.S. in Computer Science **December 2016**

Indian Institute of Technology, Madras **August 2010 - July 2014**
B.Tech Honours in Computer Science and Engineering
Minor: Operations Research

AWARDS

- 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.

PUBLICATIONS

(**Authors**
(**mostly**) **ordered**
alphabetically by
last name)

1. “[Adversarial Bandits with Knapsacks](#)” — Joint work with Nicole Immorlica, Robert Schapire, Alex Slivkins
The 60th IEEE Symposium on Foundations of Computer Science (FOCS), 2019
INFORMS workshop on Market Design (with EC 2019)
2. “[Stability of Linear Structural Equation Model of Causal Inference](#)” — Joint work with Navin Goyal, Anand Louis
The 35th Conference on Uncertainty in Artificial Intelligence (UAI), 2019
NeurIPS Workshop on Causality, 2018
3. “[Online Resource Allocation with Matching Constraints](#)” — Joint work with John Dickerson, Kanthi Sarpatwar, Aravind Srinivasan, Kun-Lung Wu, Pan Xu
The 18th Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2019
[Under Review Management Science]
4. “[A Unified Approach to Online Matching with Conflict-Aware Constraints](#)” — Joint work with Hao Cheng, John Dickerson, Yexuan Shi, Aravind Srinivasan, Yongxin Tong, Leonidas Tsepenekas, Pan Xu
The 33rd AAAI Conference on Artificial Intelligence (AAAI), 2019
5. “[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
6. “[Assigning Workers to Tasks in Crowdsourcing Platforms: Two-Sided Online Matching](#)” — Joint work with John Dickerson, Aravind Srinivasan, Pan Xu
The 17th Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2018
[Under review Operations Research (OR)]
7. “[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)
8. “[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)*
[Under review Transactions on Economics and Computation (TEAC)]

N.B.:

CONFERENCES ARE
THE PRIMARY
VENUES OF
PUBLICATION IN
COMPUTER
SCIENCE.

9. “[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
[Under review/major revision at *Transactions of Algorithms (TALG)*]
10. “[Attenuation-based Frameworks for Online Stochastic Matching with Timeouts](#)” — Joint work with Brian Brubach, Aravind Srinivasan, Pan Xu
- *The 16th Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2017*
- *Full version in Algorithmica, 2019*
11. “[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
[Under review *Algorithmica*]
12. “[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

PROFESSIONAL
EXPERIENCE

Microsoft Research New York City, NY

Summer 2018

Managers: Nicole Immorlica, Rob Schapire, Alex Slivkins

IBM Almaden Research Center, San Jose, CA

Summer 2016

Managers: Shivakumar Vaithyanathan, Prithviraj Sen

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

Manager: Anil Kamath

TEACHING
EXPERIENCE

Co-instructor, University of Maryland *CMSC250H - Discrete Structures (Honors) along with Prof. Bill Gasarch*

Responsibilities: Designing the syllabus, homework, exams and grading policy. Weekly lecturing.

Teaching Assistant, University of Maryland

CMSC250 - Discrete Structures (2 sems.), CMSC131- Intro to Programming (2 sems.), CMSC451/651- Advanced Algorithms (5 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

Conference reviewer/program committee. EC, NeurIPS, ICLR, AISTats, ICML, UAI

Journal reviewer. Trans. on Algorithms, Networks, Optimization Letters, JAAMAS, Mathematics of Operations Research, Trans. of Signal Processing

Graduate Admissions Committee: Department of Computer Science, UMD, 2016, 2017, 2018

Graduate Executive Council: Secretary 2017

Capital Area Theory Seminar 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, AAMAS 2019 Student Scholarship

OTHER PA-
PERS/MANUSCRIPTS

1. “[The Impact of Neural Network Overparameterization on Gradient Confusion and Stochastic Gradient Descent](#)” — Joint work with Soham De*, Zheng Xu, Ronny Huang, Tom Goldstein
Under Review NeurIPS 2019
NeurIPS Workshop on Integration of Deep Learning Theory, 2018
2. “Robust Identifiability in Linear Structural Equation Models for Causal Inference” — Joint work with Navin Goyal, Anand Louis
Under Review NeurIPS 2019

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| SELECTED TALKS | <ol style="list-style-type: none"> Online Matching Problems <ul style="list-style-type: none"> IBM Almaden Center, Theory Group IBM Almaden Center, Machine Learning Group Algorithms to Approximate Column-Sparse Packing Problems <ul style="list-style-type: none"> Symposium on Discrete Algorithms (SODA), 2018 Indian Institute of Technology, Madras Combinatorial Semi-Bandits with Knapsacks <ul style="list-style-type: none"> International Conference on Artificial Intelligence and Statistics (AISTATS), 2018 Indian Institute of Science, Bengaluru Indian Institute of Technology, Madras Adversarial Bandits with Knapsacks <ul style="list-style-type: none"> Johns Hopkins Theory Seminar Google Research, NYC Indian Institute of Science, Bengaluru INFORMS Workshop on Market Design, 2019 |
| COLLABORATORS/ CO-AUTHORS | Brian Brubach, Hao Cheng, Mike Curry, Soham De, John Dickerson, Tom Goldstein, Navin Goyal, Ronny Huang, Nicole Immorlica, Stéphane Lafortune, Anand Louis, Kanthi Sarpatwar, Robert Schapire, Prithviraj Sen, Yexuan Shi, Alex Slivkins, Aravind Srinivasan, Yongxin Tong, Leonidas Tsepenekas, Yuhao Wan, Kun-Lung Wu, Yi-Chin Wu, Pan Xu, Zheng Xu |
| PROGRAMMING | C++, Python, Java |
| REFERENCES | References available on request. |