

MARINA KNITTEL

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RESEARCH INTERESTS

I study graph algorithms for big data. My current projects focus on distributed and streaming models for hierarchical clustering and classical graph problems. In addition, I am doing a collaboration on creating new formulations of the stable marriage problem to model the faculty hiring market. I am also interested in studying auctions and algorithmic game theory.

EDUCATION

University of Maryland, College Park

College Park, MD

PhD in Computer Science, 3.96 GPA

Expected: May 2023

Advisors: Prof. MohammadTaghi Hajiaghayi and Prof. John Dickerson

Coursework: Approximation Algorithms, Modern Discrete Probability, Algorithms in Machine Learning, Computational Geometry, Algorithmic Lower Bounds, Computational Linguistics, Quantum Information Theory, Computational Genomics

Harvey Mudd College

Claremont, CA

B.S. in Computer Science and Mathematics, 3.75 GPA

May 2018

Advanced Coursework: Advanced Algorithms, Computational Complexity, Graph Theory, Convex Set Theory, Machine Learning, Artificial Intelligence, Logic, Advanced Linear Algebra

HONORS AND AWARDS

University of Maryland	Dean's Fellow	2018-2020
	Class of '94 Award	2018
Harvey Mudd College	High Distinction	2018
	Honors in Computer Science	2018
	Honors in Mathematics	2018
	Dean's List	2015-2018
Palo Alto High School	Sandra Forsythe Memorial Scholarship	2014

PUBLICATIONS

Conference:

1. *[Submitted]* Sara Ahmadian, Alessandro Epasto, Marina Knittel, Ravi Kumar, Mohammad Mahdian, and Philip Pham. "Fair Hierarchical Clustering".
2. *[Submitted]* MohammadTaghi Hajiaghayi and Marina Knittel, "Matching Affinity Clustering: Improved Hierarchical Clustering at Scale with Guarantees".
3. Soheil Behnezhad, Mahsa Derakhshan, MohammadTaghi Hajiaghayi, Marina Knittel, and Hamed Saleh, "Streaming and Massively Parallel Algorithms for Edge Coloring". The 27th Annual European Symposium on Algorithms (ESA), 2019.
4. Jordan R. Abrahams, David A. Chu, Grace Diehl, Marina Knittel, Judy Lin, William Lloyd, James C. Boerkoel Jr., and Jeremy Frank, "DREAM: An Algorithm for Mitigating the Overhead of Robust Rescheduling". The 29th International Conference on Automated Planning and Scheduling (ICAPS), 2019.

5. Hoaxing Du, Yi Sheng Ong, Marina Knittel, Ross Mawhorter, Ivy Liu, Gianluca Gross, Reiko Tojo, Ran Libeskind-Hadas, and Yi-Chieh Wu, “Multiple Optimal Reconciliations with Gene Duplication, Loss, and Coalescence”. The 17th Asia Pacific Bioinformatics Conference (APBC), 2019.

Short Papers, etc:

6. *[Extended Abstract]* MohammadTaghi Hajiaghayi and Marina Knittel, “Matching Affinity Clustering: Improved Hierarchical Clustering at Scale with Guarantees”. The International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2020.
7. *[Workshop]* Sara Ahmadian, Alessandro Epasto, Marina Knittel, Ravi Kumar, Mohammad Mahdian, and Philip Pham. “Fair Hierarchical Clustering”. The Sets & Partitions Workshop at the 33rd Conference on Neural Information Processing Systems (NeurIPS), 2019.
8. *[Brief Announcement]* Soheil Behnezhad, Mahsa Derakhshan, MohammadTaghi Hajiaghayi, Marina Knittel, and Hamed Saleh, “Edge Coloring: MPC and Streaming Algorithms”. The 33rd International Symposium on Distributed Computing (DISC), 2019.
9. *[Workshop]* David A. Chu, Grace Diehl, Marina Knittel, Liam Lloyd, James C. Boerkoel Jr., and Jeremy Frank, “Trade-offs Between Communication, Rescheduling, and Success Rate in Uncertain Multi-Agent Schedules”. The Integrated Planning, Acting and Execution Workshop (IntEx) at The 28th International Conference on Automated Planning and Scheduling (ICAPS), 32-40, 2018.

ACADEMIC EXPERIENCE

NASA Ames & Harvey Mudd College

August 2017 - June 2018

Senior Capstone Project Manager and Member

Claremont, CA

- Led a team of 5 in a research-based project in scheduling algorithms
- Researched new methods for optimizing multi-agent system rescheduling with limited communication
- Theoretically and experimentally verified effect of communication on success

Harvey Mudd College

August 2016 - May 2018

Researcher in Computational Biology

Claremont, CA

- Developed a new algorithm for fast and effective reconciliation for non-binary phylogenetic trees
- Proved various mathematical properties of a data structure used in phylogenetic reconciliation research
- Analyzed effectiveness of the binary phylogenetic tree reconciliation algorithm

Rutgers University

May 2017 - August 2017

Researcher in Theoretical Computer Science

Piscataway, New Jersey

- Summer 2017 NSF-funded REU position under Professor Eric Allender at DIMACS
- Studied the Minimum Circuit Size Problem, Kolmogorov Random Strings and the Polynomial Hierarchy
- Modified the Turing machine to produce a hierarchy almost isomorphic to the Polynomial Hierarchy

Harvey Mudd College

June 2015 - May 2016

Researcher in Web Development

Claremont, California

- Improved a research websites appeal and functionality (HTML, CSS, Javascript, PHP and Drupal)
- Trained new researchers in web development and coding practices to join the web development team

WORK EXPERIENCE

Google LLC*Software Engineering Intern*

May 2019 - August 2019

Seattle, WA

- Developed and bounding efficient algorithms for hierarchical clustering without over-representation
- Migrated and improved open sourced tools for graph regularization using Keras (TensorFlow)
- Got a workshop paper at NeurIPS and submitted a conference paper to ICML

Facebook, Inc.*Software Engineering Intern*

May 2018 - August 2018

Menlo Park, CA

- Developed, trained, and tuned new neural network models for suggesting Instagram accounts to follow
- Incorporated handling for sparsed, crossed, and bucketized features in the training pipeline

Bloomberg LP*Software Engineering Intern*

May 2016 - July 2016

New York City, NY

- Built a service to assume a front end process and lighten client machine processing load
- Gained a deeper understanding of computer systems, C++, and elegant and adaptable coding practices

Napses*Web Development Intern*

May 2014 - August 2014

Santa Barbara, CA

- Programmed a blog in JavaScript (jQuery), HTML, and CSS, using Bootstrap for a start-up

TEACHING EXPERIENCE

Teaching Assistant*University of Maryland, College Park*

September 2018 - Now

College Park, MD

- Courses: Discrete Structures, Cryptography
- Responsibilities: Lead recitations, hold tutoring hours, grade tests

Grader and Tutor*Harvey Mudd College*

January 2015 - May 2018

Claremont, CA

- Courses: Algorithms, Computational Complexity, Machine Learning, Data Structures & Program Development, Introductory Computer Science, Multivariable Calculus
- Responsibilities: Hold tutoring hours, grade homeworks

Homework Hotline Tutor*Harvey Mudd College*

September 2014 - December 2016

Claremont, CA

- Courses: topics in K-12 education
- Responsibilities: provide free over-the-phone tutoring for K-12 students

SERVICE AND LEADERSHIP

External**University of Maryland**

Algorithmica Reviewer

2019 - Now

CATS Theory Lecture Organizer

2019 - Now

Executive Committee Member

2018 - Now

CS Women Mentor

2018 - Now

Harvey Mudd College

Committee for Activities Planning Member

2017 - 2018

LGBT+ Club Mentor

2017 - 2018

Women in Math Club President

2017 - 2018

Dorm President

2016 - 2017

Dorm Treasurer

2015 - 2016