MARINA KNITTEL

(650) · 575 · 7145 ⋄ mknittel@cs.umd.edu
Iribe 5104, 8125 Paint Branch Dr, College Park, MD, 20740
Website: mknittel.github.io

RESEARCH INTERESTS

My current projects focus on graph algorithms for (1) scalable machine learning, (2) market and diffusion modeling, and (3) classical problems in computer science (i.e., matching, coloring, etc.). Some of my previous works include distributed and streaming edge coloring, distributed and fair hierarchical clustering, and multi-agent games of influence. I am currently working on distributed matching, geometric minimum spanning tree, and a stable marriage model for the faculty hiring market.

EDUCATION

University of Maryland, College Park — College Park, MD
PhD in Computer Science — *Expected: May 2023*
MS in Computer Science, 3.97 GPA — *May 2020*

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
Harvey Mudd College	Class of '94 Award	2018
	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 AND PRESENTATIONS

^{abc}*Denotes that authors are listed* ***alphabetically****. This is convention in theoretical computer science. Computer Science traditionally uses competitive conferences (15-30% accepted) as the main publication venue.*

Conference:

1. *[Submitted]* Marina Knittel, Samuel Dooley, and John P. Dickerson, "The Binary Affiliate Matching Problem: Approval-Based Matching with Applicant-Employer Relations".
2. *[Submitted]* ^{abc}Fotini Christia, Michael Curry, Constantinos Daskalakis, Erik Demaine, John P. Dickerson, MohammadTaghi Hajiaghayi, Adam Hesterberg, Marina Knittel, and Aidan Millif, "Scalable Equilibrium Computation in Multi-agent Influence Games on Networks".
3. *[In Prep]* ^{abc}MohammadTaghi Hajiaghayi, Marina Knittel, Hamed Saleh, and Hsin-Hao Su, "Constant Round Tree Contraction in AMPC".

4. [abc]Sara Ahmadian, Alessandro Epasto, Marina Knittel, Ravi Kumar, Mohammad Mahdian, and Philip Pham. "Fair Hierarchical Clustering". The Conference on Neural Information Processing Systems (NeurIPS), 2020.
5. [abc]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. Extended abstract.
6. [abc]Soheil Behnezad, 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.
7. 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.
8. 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.

Presentations:

1. "Matching Affinity Clustering: Improved Hierarchical Clustering at Scale with Guarantees". AAMAS-20.
2. "Fair Hierarchical Clustering". The Sets & Partitions Workshop at NeurIPS-20.
3. "Trade-offs Between Communication, Rescheduling, and Success Rate in Uncertain Multi-Agent Schedules". IntEX Workshop at ICAPS-18.

Workshop Papers, etc.:

1. [abc]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. Workshop; subsumed by conference submission.
2. [abc]Soheil Behnezad, Mahsa Derakhshan, MohammadTaghi Hajiaghayi, Marina Knittel, and Hamed Saleh, "Edge Coloring: MPC and Streaming Algorithms". The 33rd International Symposium on Distributed Computing (DISC), 2019. Brief announcement; subsumed by ESA-19 paper.
3. 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. Workshop; subsumed by ICAPS-19 paper.

WORK AND ACADEMIC EXPERIENCE

Amazon May 2020 - August 2020
Research Scientist Intern *Seattle, WA*

· Learned and evaluated dense embeddings of ads metadata for click-through rate prediction
· Parsed and vectorized complex boolean expressions as a part of ads metadata

Google LLC May 2019 - August 2019
Software Engineering Intern *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)

Facebook, Inc. May 2018 - August 2018
Software Engineering Intern *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

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

Rutgers University May 2017 - August 2017
REU Scholar 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 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

Bloomberg LP May 2016 - July 2016
Software Engineering Intern *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

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

Napses May 2014 - August 2014
Web Development Intern *Santa Barbara, CA*

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

TEACHING EXPERIENCE

Teaching Assistant September 2018 - December 2019
University of Maryland, College Park *College Park, MD*

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

Grader and Tutor January 2015 - May 2018
Harvey Mudd College *Claremont, CA*

· Courses: Algorithms, Computational Complexity, Machine Learning, Data Structures & Program Development, Introductury Computer Science, Multivariable Calculus

· Responsibilities: Hold tutoring hours, grade homeworks

Homework Hotline Tutor September 2014 - December 2016
Harvey Mudd College *Claremont, CA*

· Provided free over-the-phone tutoring for K-12 students

SERVICE AND LEADERSHIP

University of Maryland	LGBTQ+ Event Coordinator	2019 - Now
	CATS Theory Lecture Organizer	2019 - Now
	Executive Committee Member	2018 - Now
	CS Women Mentor	2018 - 2020
	Graduate Admissions Volunteer	2018-2019
Harvey Mudd College	Committee for Activities Planning Member	2017 - 2018
	Women in Math Club President	2017 - 2018
	LGBTQ+ Club Mentor	2017 - 2018
	Dorm President	2016 - 2017
	Dorm Treasurer	2015 - 2016