

Uthaipon (Tao) Tantipongpipat

Address: ISYE Main 428; Klaus Computing 2124
Georgia Institute of Technology
Atlanta, GA 30332

Phone: +1 (804) 625 7798
Email: tao@gatech.edu
Web: cc.gatech.edu/~uthaipon3/

Education

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| 2016-Now | Ph.D. in Algorithms, Combinatorics, and Optimization (ACO) Minor in computational learning theory. GPA 4.00/4.00 Georgia Institute of Technology, Atlanta, GA, USA Advisor: Mohit Singh |
| 2012-2016 | B.S. in Mathematics (Honors with thesis) Minor in Computer Science. GPA 3.97/4.00 University of Richmond, Richmond, VA, USA |
| 2014-2015 | Study abroad program in Mathematics and Computer Science University of Oxford, Oxford, UK |

Research Interests

Algorithmic and optimization problems in machine learning and statistics. I propose and study theoretical questions well-motivated from practice, and bridge practice and theory by providing theoretical underpinning of commonly used algorithms. Current research projects include: optimal design or design of experiments (DoE), diversity sampling, differential privacy, and fairness in machine learning.

Academic Publications

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| Conferences | Aleksandar Nikolov, Mohit Singh, and Uthaipon Tao Tantipongpipat. Proportional volume sampling and approximation algorithms for A-optimal design. <i>ACM-SIAM Symposium on Discrete Algorithms (SODA)</i> , 2019 Samira Samadi, Uthaipon Tantipongpipat, Jamie Morgenstern, Mohit Singh, and Santosh Vempala. The price of fair PCA: One extra dimension. <i>Thirty-second Conference on Neural Information Processing Systems (NeurIPS)</i> , 2018 Rachel Cummings, Sara Krehbiel, Kevin A Lai, and Uthaipon Tantipongpipat. Differential privacy for growing databases. <i>Thirty-second Conference on Neural Information Processing Systems (NeurIPS)</i> , 2018 |
| Journals | Uthaipon Tantipongpipat. A combinatorial approach to Ebert's hat game with many colors. <i>The Electronic Journal of Combinatorics</i> , 21(4):4-33, 2014 |
| Preprints | Jamie Morgenstern, Samira Samadi, Mohit Singh, Uthaipon Tantipongpipat, and Santosh Vempala. Fair dimensionality reduction and iterative rounding for SDPs. Submitted, 2019 Vivek Madan, Mohit Singh, Uthaipon Tantipongpipat, and Weijun Xie. Combinatorial algorithms for optimal design. Submitted, 2019 |

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| Workshops | Digvijay Boob, Rachel Cummings, Dhamma Kimpara, Uthaipon Tao Tantipongpipat, Chris Waites, and Kyle Zimmerman. Differentially private synthetic data generation via GANs. <i>Theory and Practice of Differential Privacy (TPDP 2018) workshop</i> , 2018 |
| Theses | Uthaipon Tantipongpipat. Cameron-liebler line classes and partial difference sets. <i>Undergraduate Thesis, University of Richmond</i> , 2016 |

Experiences

I will be joining Microsoft Research, Redmond, WA, under the hosts Janardhan Kulkarni and Sergey Yekhanin in the summer of 2019 for differential privacy projects.

Codes

My coauthors and I wrote code for the fair PCA project, which is publicly available at <https://github.com/samirasamadi/Fair-PCA>.

Awards and Fellowships

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| 2018 | First prize winner and people's choice awards (\$20000 total prize), privacy engineering challenge, National Institute of Standards and Technology (NIST), Public Safety Communications Research Divisions (PSCR). https://www.herox.com/UnlinkableDataChallenge |
| 2018 | Algorithm and Randomness Center (ARC) and Transdisciplinary Research Institute for Advancing Data Science (TRIAD) fellowship, Georgia Institute of Technology |
| 2016 | Finalist, ITA Tech Challenge programming competition, Illinois Technology Association, IL |
| 2012-2016 | Robins Science Scholar, University of Richmond (merit scholarship covering full tuition, fees, accommodations, and meals for four years) <i>Undergraduate</i> |
| 2016 | David C. Evans Awards for Outstanding Achievement in Scholarship, Annual Honors Convocation, University of Richmond, VA |
| 2016 | Phi Beta Kappa (most prestigious honor society for liberal arts and sciences) |
| 2015 | Honorable mention (top 2.5%), William Lowell Putnam Mathematical Competition <i>Earlier</i> |
| 2010-2012 | Finalist, International Mathematical Olympiad (IMO) selection, Thailand |
| 2011, 2010 | Honorable mention and bronze medal, Asian Pacific Mathematics Olympiad (APMO) |

Services

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| 2018-Now | Co-organizer of ACO student seminar, Georgia Institute of Technology |
| 2018 | Reviewer, Mathematical Programming journal (MAPR) |

Teaching

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| 2018 | Teaching assistance, CS6550 graduate algorithms, Georgia Institute of Technology |
| 2011-2017 | Teacher and tutor for middle- and high-school competitive mathematics, Bangkok Christian College |

Invited Talks and Presentations

1. The Price of Fair PCA: One Extra Dimension
 - *Poster* Conference on Neural Information Processing Systems (NeurIPS), Montreal, Canada, December 2018
2. Proportional Volume Sampling and Approximation Algorithms for A-Optimal Design
 - *Talk* ACM-SIAM Symposium on Discrete Algorithms (SODA), San Diego, California, January 2019
 - *Talk* Machine learning theory group, Georgia Institute of Technology, November 2018
 - *Poster* Machine Learning in Science and Engineering (MLSE), Carnegie Mellon University, June 2018
 - *Poster* Workshop on Algorithms and Randomness, Algorithms and Randomness Center (ARC), Georgia Institute of Technology, May 2018
 - *Talk* ACO seminar, Georgia Institute of Technology, April 2018
3. Differential Privacy for Growing Databases
 - *Poster* Conference on Neural Information Processing Systems (NeurIPS), Montreal, Canada, December 2018
 - *Talk* Privacy group, Georgia Institute of Technology, February 2018
 - *Poster* Theory and Practice of Differential Privacy workshop (TPDP), Dallas, Texas, October 2017

Related Coursework

Algorithms and optimization courses: Machine Learning Theory, Foundation of Data Privacy, Advanced Algorithms, Combinatorial Optimization, Theory of Linear Inequalities, Probability and Computing, Computational Problems in Social Choice, Data Structure, Software Development

Mathematics courses: Graph Theory, Probabilistic Combinatorics, Combinatorics, Formal Logic, Graduate Algebra, Set Theory, Analytic Topology, Nonlinear Dynamical System, Complex Analysis, Real Analysis, Advanced Calculus

Skills

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| Languages | Thai (Native), English (Fluent) |
| Technical | Java, Mathematica, Python, Matlab, C++, LaTeX, MS Office |

References

Mohit Singh H. Milton Stewart Early Career Professor and Associate Professor, ISyE, Georgia Institute of Technology, mohit.singh@isye.gatech.edu

Rachel Cummings Assistant Professor, ISyE, Georgia Institute of Technology, racheladcummings@gmail.com