

# “Tao” Uthaipon Tantipongpipat

Atlanta, GA, USA

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## Summary

Researcher in fairness in machine learning at Twitter (June 2020). Graduated from Georgia Tech PhD in machine learning theory and optimization. Emphasis in mathematics and algorithmic foundations of data science. Hands-on implementations on real-world datasets. Enjoy public speaking. Experienced in leading extremely successful research projects.

## Selected Projects

### Multi-Criteria Optimization for Fair Dimensionality Reduction

Georgia Institute of Technology, GA, USA

2018-2020

Code publicly available at <https://github.com/sdpforall/>. In MATLAB and CVXOPT on Python.

Website: <https://sites.google.com/site/ssamadi/fair-pca-homepage>. Also appears at Georgia Tech news:

<https://www.scs.gatech.edu/news/628783/making-sure-computing-machines-dont-stereotype-people>

- Initiated the study of bias in machine learning during dimensionality reduction preprocessing and identified such bias of commonly used algorithms in real-world datasets
- Developed new heuristics to minimize bias in dimensionality reduction that runs 10x-1000x faster than standard semi-definite programming solver
- Provided thought leadership in the mathematical structure of the optimization program solutions

### Differentially Private Synthetic Data Generation

Georgia Institute of Technology, GA, USA

2018-2020

Code publicly available at <https://github.com/DPautoGAN>, in Python and Pytorch for neural networks.

- Improved privacy protection by 100x compared to a previous work by autoencoder and GAN architecture and new noise injection mechanism
- Developed new statistical and visual evaluation metrics for better understanding of synthetic data

### Research Intern

Microsoft Research, Redmond, WA, USA

2019

- Implemented privacy guarantee on large-scale Natural Language Processing models (RNNs and LSTMs) to protect against personal deidentification due to model usage
- Developed novel correlation clustering algorithm with corresponding privacy analysis
- Researched private submodular optimization and surveyed literature for private stochastic gradient descent best for training deep learning models

## Skills

**Technical:** Python, Pytorch, Pandas, CVXOPT, Java, C++, MATLAB, Mathematica, LaTeX, MS Word, MS Excel, MS PowerPoint

**Communication:** Public speaking – Toastmaster

**Languages:** Thai (native); English (full fluency)

## Awards and Fellowships

### Academic:

- Best Reviewers (top 10%) of NeurIPS (top-tier machine learning conference) 2019
- Robins Science Scholar, University of Richmond (merit scholarship covering full tuition, fees, accommodations, and meals for four years) 2012-2016
- Phi Beta Kappa (most prestigious honor society for liberal arts and sciences) 2016

### Programming Competitions:

- 1<sup>st</sup> Prize and People's Choice Awards (\$20,000 total), Privacy Engineering Challenge, National Institute of Standards and Technology (NIST) 2018
- Finalist, ITA Tech Challenge programming competition, Illinois Technology Association, IL 2016
- 2<sup>nd</sup> Place, Mid-Atlantic Regional ACM Programming Contest, Christopher Newport University 2015

### Mathematics and Economic Competitions:

- Honorable Mention (top 2.5%), William Lowell Putnam Mathematical Competition 2015
- 3-Year Finalist, International Mathematical Olympiad (IMO) selection, Thailand 2010-2012
- Honorable Mention, Finance and Economics National Competition, National Bank of Thailand 2011
- Bronze Medal and Honorable Mention, Asia-Pacific Mathematics Olympiad (APMO) 2010-2011

## Education

**Georgia Institute of Technology**, Atlanta, GA, USA May 2020

PhD in Algorithms, Combinatorics, and Optimization (ACO), School of Computer Science  
Minor in Computational Learning Theory. GPA 4.00/4.00

Thesis: **Fair and Diverse Data Representation in Machine Learning**

**University of Richmond**, Richmond, VA, USA 2012-2016

BS in Mathematics (Honors with Thesis in algebraic combinatorics and discrete geometry)  
Minor in Computer Science. GPA: 3.97/4.00

Full-merit Robins Science Scholarship covering tuition, fees, and living expenses

**University of Oxford**, Oxford, UK 2014-2015

Study Abroad Program in Mathematics and Computer Science  
Grade: first-class level (equivalent to A/A+)

## Academic Publications

I have published several publications and delivered oral presentations at top-tier machine learning and theoretical computer science conferences: 3 in NeurIPS, 1 in COLT, and 1 in SODA. Please visit my website [www.uthaipon.com](http://www.uthaipon.com) or my Google Scholar page

[https://scholar.google.com/citations?user=nzO\\_5FMAAA&hl](https://scholar.google.com/citations?user=nzO_5FMAAA&hl) for more details.

## Academic Service

- Reviewer of NeurIPS (Conference on Neural Information Processing Systems), FOCS (Symposium on Foundations of Computer Science), MAPR (Mathematical Programming Journal) 2018-Present
- Co-organizer of ACO student seminar, Georgia Institute of Technology 2018