**“Tao” Uthaipon Tantipongpipat**

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**Summary**

Graduating Georgia Tech PhD student (May 2020) 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-Present

*Code publicly available at* [*https://github.com/sdpforall/*](https://github.com/sdpforall/)*. In MATLAB and CVXOPT on Python.*

*Website:* [*https://sites.google.com/site/ssamadi/fair-pca-homepage*](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*](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-Present

*Code publicly available at* [*https://github.com/DPautoGAN*](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:**

1st 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

2nd 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 Expected May 2020

PhD in Algorithms, Combinatorics, and Optimization (ACO), School of Computer Science  
Minor in Computational Learning Theory. GPA 4.00/4.00   
Thesis: **Machine Learning under Budget and Fairness Constraints**

**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

**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_5FMAAAAJ&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