

Gary Cheng

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www.garycheng.me

Interests

My research interests are broadly in causal inference, optimization, and differential privacy. I am currently working on projects in causal inference and adaptive optimization.

Education

Ph.D. Electrical Engineering, Stanford University

September 2019 - Present

GPA 4.0

Advised by Professor John Duchi, researching topics in optimization and statistics for machine learning. Supported by the 3-year *Professor Michael J. Flynn Stanford Graduate Fellowship*.

B.A. Computer Science, University of California, Berkeley

Highest Distinction (Summa Cum Laude)

GPA 4.0

August 2015 - May 2019

Advised by Professors Laurent El Ghaoui, Jean Walrand, and Kannan Ramchandran. Coursework in machine learning, optimization, statistics, probability, algorithms, signal processing, analysis, abstract algebra, linear algebra, etc.

Experience

Stanford Machine Learning Group, *Research Assistant*

June 2020 - Present

Advised by Professor John Duchi, studying problems in causal inference, optimization, differential privacy, and federated learning. Currently interested in problems related to performative prediction.

Max Planck Institute for Intelligent Systems, *Research Intern*

May 2022 - August 2022

Worked with Moritz Hardt (Director) on the intersection of causal inference and control with applications to recommendation systems and ad platforms. Paper in progress.

Google Research, *Research Intern*

June 2021 - September 2021

Worked with Keith Rush, Zachary Garrett, and Zachary Charles on the Federated Learning Research team to design methods of training larger models in federated learning. Designed baselines showing how a simple ensembling algorithm outperforms Federated Dropout.

Accepted to CVPR FedVision 2022 workshop. Codebase can be found at

https://github.com/google-research/federated/tree/master/shrink_unshrink

UC Berkeley EECS, *Undergraduate Research Assistant*

August 2016 - May 2019

Worked with Professors Laurent El Ghaoui and Kannan to develop a fast Frank-Wolfe algorithm for dataset summarization with runtime guarantees. Worked with Professor Jean Walrand on

developing a novel dynamic appointment scheme and used stochastic gradient descent to find optimal appointment schedules with applications in hospital scheduling.

Amazon.com, Software Engineer Intern

May 2017 - August 2017

Full stack developer on the Forecasting team in Supply Chain Optimization. Implemented graph algorithms to give insight into runtime bottlenecks in forecasting calculations. Created new Java APIs and integrated them into a Ruby on Rails front-end.

Publications

Gary Cheng*, Hilal Asi*, Karan Chadha*, and John Duchi. “Private optimization in the interpolation regime: faster rates and hardness results” Spotlight Presentation at *ICML 2022*. <https://proceedings.mlr.press/v162/asi22a/asi22a.pdf>

Gary Cheng*, Karan Chadha*, and John Duchi. “Accelerated, Optimal, and Parallel: Some Results on Model-Based Stochastic Optimization” Spotlight Presentation at *ICML 2022*. <https://arxiv.org/abs/2101.02696>

Gary Cheng, Zachary Charles, Zachary Garrett, and Keith Rush. “Does Federated Dropout actually work?” Presentation at *CVPR FedVision 2022*. <https://bit.ly/3AxCZMk>

Gary Cheng*, Karan Chadha*, and John Duchi. “Federated Asymptotics: a model to compare federated learning algorithms” *preprint in submission*. <https://arxiv.org/abs/2108.07313>

Tavor Baharav, **Gary Cheng**, Mert Pilanci, David Tse. “Approximate Function Evaluation via Multi-Armed Bandits” Poster at *AISTATS 2022*. <https://arxiv.org/abs/2203.10124>

Gary Cheng*, Hilal Asi*, Karan Chadha*, and John Duchi. “Minibatch Stochastic Approximate Proximal Point Methods” **Spotlight Presentation** at *NeurIPS 2020*. <https://papers.nips.cc/paper/2020/hash/fa2246fa0fdf0d3e270c86767b77ba1b-Abstract.html>

Gary Cheng, Armin Askari, Kannan Ramchandran, and Laurent El Ghaoui. “Greedy Frank-Wolfe Algorithm for Exemplar Selection.” Poster at *BayLearn 2018*. <https://arxiv.org/abs/1811.02702>

Gary Cheng, Kabir Chandrasekher, and Jean Walrand. “Static and Dynamic Appointment Scheduling with Stochastic Gradient Descent.” In *American Control Conference 2019*. <https://ieeexplore.ieee.org/document/8814666>

* denotes equal contribution

Teaching

Teaching Assistant, University of California, Berkeley

EE 126, Probability and Random Processes. Spring 2018 & Spring 2019.

CS 170, Algorithms. Fall 2017.

CS 61B, Data Structures and Algorithms. Spring 2017.

Awards

Prof. Michael J. Flynn Stanford Graduate Research Fellowship. Spring 2019, Awarded by Stanford.

NSF Graduate Research Fellowship Honorable Mention. Spring 2019, Awarded by NSF.

UC Berkeley Campus Outstanding GSI Award. Spring 2019, Awarded by UC Berkeley.

GCURS 2017 Outstanding Presentation Award. Fall 2017, Awarded by Rice University.

Cal Alumni Association Leadership Award. Fall 2015, Awarded by UC Berkeley.

Skills

Proficient in: Python, NumPy, Weights & Biases

Familiar with: PyTorch, TensorFlow, TensorFlow Federated, Java

Hobbies

Cycling, Basketball, Tennis, Volleyball, Watching (most) sports