Gary Qian

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Summary

Ph.D. student at Stanford, trained in operations research and currently focused on developing applied mathematical, economic, and machine learning models to drive optimal decisions in health policies. Passionate about using optimization theory to implement scalable solutions in solving complex, real-world problems

Education

- **Stanford University** — Stanford, CA
  Doctor of Philosophy (Ph.D.), Management Science and Engineering — *Mar. 2026 (Anticipated Graduation)*
- **University of Auckland** — Auckland, New Zealand
  Masters of Engineering in Engineering Science Research — *Feb 2020. - May. 2021*
  Bachelor of Engineering in Engineering Science with 1^{st} class honours — *Feb. 2016 - Nov. 2019*

Work Experience

- **Amazon.com, Inc.** — Sydney, Australia
  Operations Analyst Intern: Fulfillment By Amazon (FBA) team — *Nov. 2018 - Feb. 2019*
  - Analysed over 10 years of data, identified seasonal and general trends, and connected with local and global stakeholders to determine how inbound volumes forecasts at Amazon fulfilment centers can be improved
  - Developed an **additive time-series model** that outperformed models used in Australia; increased forecasting accuracy by **30%**; reduced labour cost at fulfilment centers by **$50k** per annum
  - Created an interactive dashboard, and suggested labour planning improvement strategies to senior management
  - Identified, organised, and trained fulfillment center associates with advanced excel skills to automate procedures
  - Voiced with FBA team the difficulty to navigate the seller onboarding tool, leading to a user-interface redesign

Research Experience

- **Stanford University**
  Department of Management Science and Engineering — *Sept. 2021 - Present*

  Adaptive Sampling Methods for Endemic Infectious Disease Surveillance
  - Identified space-time endemic disease surveillance with limited resources to be a *multi-arm quickest change detection problem*. Thompson sampling based methods are widely accepted in literature and industry
  - Showed that Thompson Sampling based algorithms perform poorly in situations where outbreaks occur at locations of low initial prevalence (performance is bounded by random uniform sampling)
  - Proposed a **novel profile likelihood sampling method** which performs competitively against Thompson sampling but more robust to location of outbreaks (*Published in Statistics in Medicine*)
  - Proved that the likelihood function of the problem under a logistic epidemic growth model is concave at each timestep. Solved a **sequence of convex optimization problems** for globally optimal epidemic parameters
  - Advising NYC Department of Health & Mental Hygiene and NYC Health and Hospital officials in **optimal allocation and deployment** of ∼80 mobile testing units for infectious disease

  COVID-19 vaccination reactions monitoring using smartwatches
  - Engaged stakeholders in Israel; accessing patient data collected through existing clinical study
  - Developed custom pipeline to clean time-series smartwatch and survey data for 1000+ participant
  - Implemented a mixed effects model to remove individual-level random effects; identified statistically significant deviation in heart-rate pre and post vaccination for subjects reporting no reaction *(Published in npj Digit.Med.)*

- **University of Auckland**
  Department of Management Science and Engineering — *Feb. 2020 - May. 2021*

  Optical Character Recognition (OCR) Pipeline for Maori Archives
  - Surveyed literature and OCR engines; showed recognition accuracy to be less than 80% with **transfer learning**
  - Exploited the fixed-width document structure for page segmentation using **dynamic programming** (DP) Increased OCR accuracy by **15%** by incorporating DP with state-of-the-art **LSTM based model**
  - Developed an algorithm combining transition probabilities with the *Needleman Wunsch* and *Viterbi* algorithms to reconcile outputs from existing OCR engines

Skills

- **Programming and Computing Skills**: Python, Julia, R, Matlab, SQL, VBA
- **Others**: PyTorch, Keras, Tensorflow, AWS, Docker, CVXPY, Gurobi
- **Course Work**: Machine learning, Deep learning, Integer programming, convex and combinatorial optimization

Publications

Grace Guan, Merav Mofaz, **Gary Qian**, Tal Patalon, Erez Shmueli, Dan Yamin, and Margaret L Brandeau. Higher sensitivity monitoring of reactions to covid-19 vaccination using smartwatches. *npj Digital Medicine*, 5(1):1–9, 2022

Michael Fairley, Isabelle J. Rao, Margaret L. Brandeau, **Gary L. Qian**, and Gregg S. Gonsalves. Surveillance for endemic infectious disease outbreaks: Adaptive sampling using profile likelihood estimation. *Statistics in Medicine*, 41(17):3336–3348, 2022

Gary Qian, Isabelle Rao, Keith Humphreys, , Douglas Owens, and Margaret L Brandeau. Cost-effectiveness of office-based buprenorphine treatment for opioid use disorder. *Under Review by Addiction*