Sean Lo

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Education, Awards

- **MIT Operations Research Center** — Cambridge, MA, United States
  PhD Student in Operations Research — *Sep 2022 – Present*
  - **Research**: Developing analytics-based solutions for electrification of long-haul logistics, via vehicle-routing algorithms and optimizing the deployment of dedicated charging stations, advised by Prof. Alexandre Jacquillat and funded by MIT Climate and Sustainability Consortium
  - **Coursework**: Introduction to Math Programming, Fundamentals of Probability
- **MIT Sloan School of Management** — Cambridge, MA, United States
  Master of Business Analytics, Operations Research Center — *Sep 2021 – Aug 2022*
  - **Awards**: Academic award (2022) to the top student in academic achievement
  - **Research**: Developing custom branch-and-bound algorithms for low-rank matrix optimization problems, via matrix perspective relaxations and disjunctions, with Prof. Dimitris Bertsimas (MIT), Ryan Cory-Wright (IBM), Jean Pauphilet (LBS)
  - **Capstone**: Developed an anomaly detection model for preemptive quality control in BMW's production operations (Munich)
  - **Coursework**: Machine Learning under an Optimization Lens, Optimization Methods, Integer Optimization, Robust Optimization
- **Imperial College London** — London, United Kingdom
  Bachelor of Science in Mathematics; First Class Honours — *Sep 2017 – Jun 2020*
  - **Awards**: Governors' BSc Prize in Mathematics (2020) to the top graduating BSc Mathematics student; Ken Allen Prize (2019) and G-Research Prize (2018) for academic excellence; Dean's List (2020, 2019, 2018) to the top 10% of undergraduates
  - **Research**: Second-year group project on commutative algebra and algebraic geometry; wrote report titled "Primary Decomposition of Ideals of Affine Varieties", and gave 20-minute presentation to faculty
  - **Research**: First-year project "Circle Inversion and the General Möbius Group" on inversive geometry and Möbius transforms
  - **Coursework**: Algebra, Algebraic Combinatorics, Multivariable Calculus, Analysis, Complex Analysis, Numerical Analysis, Number Theory, Stats Modelling, Methods for Data Science, Scientific Computing
  - **Leadership**: Singapore Society treasurer (2019), managing £5,000 annual budget to organize student cohesion events
  - **Activities**: Orchestra member and horn player (2017 - 2020), performing in termly concerts

Experience

- **Defence Science and Technology Agency** — Singapore, Singapore
  Engineer (Trainee), Information PC — *Aug 2020 – Aug 2021*
  - Characterized social media activity on Twitter using information cascades, constructed on the follower network and interaction network, and extracted structural and temporal cascade features to build models predicting cascade popularity
  - Created Python package performing automatic content detection and retrieval from news article webpages
- **Defence Science and Technology Agency** — Singapore, Singapore
  Intern, Centre for Operations Research, DSTA Masterplanning and Systems Architecting PC — *Jun 2020 – Aug 2020*
  - Explored group testing schemes for COVID-19 detection, and simulated the PCR testing process through ExtendSim
- **Defence Science and Technology Agency** — Singapore, Singapore
  Intern, Cybersecurity PC — *Jul 2019 – Sep 2019*
  - Investigated Android malware detection using feed-forward neural networks on features extracted from method call graphs — graph representations of applications, with methods (function calls) as nodes

Interests and Skills

- **Modern Statistical Methods**: Theoretical knowledge and practical experience in Python for:
  - **Supervised methods**: Linear and regularized regression, support vector machines (SVMs), basis expansions, splines, wavelets, classification/regression trees, bootstrap aggregation for random forests, deep neural networks (feedforward and convolutional)
  - **Unsupervised methods**: Clustering algorithms, matrix methods (matrix decomposition, low-rank matrix approximation and matrix reconstruction), anomaly detection
- **Optimization**: Linear optimization, mixed-integer linear optimization, and algorithmic techniques for solving, and the formulation of machine learning problems in an optimization framework, with experience in Julia
- **Statistical Modelling and Inference**: Mathematical derivation and practical application in R of linear models, generalized linear models, and normal linear mixed models; including: model fitting, point estimation, estimation of uncertainty, and model comparison
- **Discrete Mathematics**: Content knowledge in number theory, graph theory, and algebraic combinatorics
- **Programming Languages**: Python, Julia, R, SQL