Duncan Clark

Computational Social Scientist

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Education

University of California, Los Angeles — Los Angeles, CA
Doctor of Philosophy in Statistics GPA: 3.89/4.00 — *Sep. 2017 – June. 2022*

University College London — London, United Kingdom
Combined Bachelors and Masters (MSci) in Mathematics 1st Class Honors — *Sep. 2011 – June. 2015*

Publications

1. Duncan A. Clark and Mark S. Handcock. Comparing the real-world performance of exponential-family random graph models and latent order logistic models for social network analysis. *Journal of the Royal Statistical Society Series A*, 185(2):566–587, April 2022

2. Duncan A. Clark, James Macinko, and Maurizio Porfiri. What factors drive state firearm law adoption? an application of exponential-family random graph models. *Social Science & Medicine*, 305:115103, 06 2022

3. James Macinko, Diana Silver, Duncan A. Clark, and Jennifer L. Pomeranz. The diffusion of punitive firearm preemption laws across u.s. states. *American Journal of Preventive Medicine*, 2023

4. Duncan A. Clark, James Macinko, and Maurizio Porfiri. Modeling state firearm law adoption using temporal network models. *The Milbank Quarterly*

Under Review:

1. Duncan A. Clark and Mark S. Handcock. An approach to causal inference over stochastic networks. *Journal of the Royal Statistical Society Series A* - Under Review, Revision Invited, 2023

Pre Prints:

1. Duncan A. Clark and Mark S. Handcock. Bayesian inference for latent order logistic network models. Preprint, 2022

Presentations and Talks

Summer Institute in Computational Social Sciences at UCLA - Industry Panel: 2023

American Statistical Association (ASA) : Joint Statistical Meetings : Oral Presentation: 2022

International Network for Social Network Analysis (INSNA) : Oral Presentation: 2022

Teaching

University of California, Los Angeles

Statistics 10 Introduction to Statistics: Summer 2019, Fall 2019, Winter 2020, Spring 2020, Fall 2020.

Statistics 12 Introduction to Statistics for Geography and Environmental Studies: Winter 2019

Statistics 13 Introduction to Statistics for the Life Sciences,: Fall 2018, Spring 2019,

Programming Skills

- Python, R, SQL, C++, AWS tools

Awards

- **UCLA Department of Statistics:** Outstanding PhD Dissertation Award 2022

Industry Experience

Atalan Tech Remote

Data Scientist and Engineer *Jun. 2023 - Present*

- **Machine Learning** : Applied modern Machine Learning to prediction of clinician burnout. Framed problem as a survival analysis, and greatly exceeded state of the art model performance. Developed a deep learning based latent procedure code embedding model, to make use of the most granular a data possible in the context of predicting clinician burnout.
- **Data Engineering**: Designed and implemented scalable backed systems in AWS for serving machine learning models. Put in place processes for ensuring data validity, in the face of multple large clients giving extremely heterogeneous data. Coached data science team on how to do scalable, robust and auditable machine learning.
- **Research**: Collaborated with economics research team on statistical methods. Advocated for strong data controls and processes to ensure reproducible researh. Contributed data analyses for conference proceedings.

Meta Platforms, Inc. New York City, NY

Research Data Scientist (Laid off when department disbanded) *Aug. 2022 - Aug 2023*

- **Differentially Private Data Storage**: Advised software engineering team on scope for differentially private aggregation with a meta analysis of SQL queries. Identified common privacy leaks, resulting in improved safeguards to maintain user privacy in the data warehouse.
- **Privacy Footprint**: Assessed the impact of data minimization efforts. Worked cross functionally with privacy experts and software engineers to rapidly ramp up on the domain. Identified 100s of thousands of engineering hours saved. The impact assessment resulted in strategic investment in data minimization, reducing the cost of privacy compliance.
- **Privacy Cost Graph**: Metrics development on the cost of engineering hours to ensure Meta infrastructure is privacy compliant. Proposed graph model of the flow of data in the warehouse with respect to privacy cost. Quantified the hours saved due to deidentification efforts, using causal inference techniques to estimate average treatment effects. These robust analyses drove decision makers to invest in high return areas to maximise cost savings.
- **Differentially Private Neural Network Training**: Ramped up on differentially private deep learning. Implemented a cutting edge differential privacy accountant for the open source private training module Opacus.

Research Data Scientist Intern *Jun. 2021 - Sept. 2021*

- **Classification of semantic data types**: Advised data engineers on sampling methods to achieve unbiased performance estimation. Understood and iterated on in house deep learning model for data type prediction. Proposed simpler alternative model with dramatic training time decrease, whilst improving performance.

Infrastructure Data Scientist Intern *Jun. 2020 - Sept. 2020*

- **App performance prediction**: Predicted production app performance regressions with beta testing data. Adapted quickly to Facebook scale, trillion line data, learned internal tools, machine learning workflows. Built, tested and iterated on predictive models using complex, noisy beta testing data. Communicated and collaborated with to software engineers achieving a false positive reduction of 90%.

Xafinity Consulting Reading, United Kingdom

Actuarial Analyst *Sep. 2015 - Sep. 2017*

- **Pension Scheme Actuarial Work**: General defined benefit pension scheme liability modeling e.g. valuations, severance costs, transfer values, accounting disclosures, assumption derivation.
- **Pension Insurance**: Selected for specialist pension insurance team due to strong understanding of liability models. Rapid turn around on complex data sets and bespoke scheme rules for a wide range of schemes. Communicated, advised and collaborated with pricing actuaries on multiple $> £1$ billion deals.
- **Institute Training**: Part qualified IFoA actuary 60% of exams passed (CT 1-8). Strong understanding of foundational finance concepts.