

Jonathan Gu

Senior Machine Learning Engineer & Economist II · Experimentation, Causal Inference, Production ML

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Senior machine learning engineer and PhD economist who builds production ML systems from rigorous experiments. I define measurable product objectives, design credible tests, analyze causal and economic effects, and turn the results into algorithms, controls, and decision rules that ship.

EXPERIENCE

Instacart

2020 – Present · San Francisco

Senior Machine Learning Engineer & Economist II

- **Uplift Growth Targeting:** built the MVP for growth targeting from causal experiment outcomes, prioritizing users by expected incremental treatment effect instead of naive conversion propensity.
- **Causal Marketing Measurement:** measured incrementality for coupon and marketing campaigns, separating observed conversions from true lift and connecting results to budget allocation and in-app decisioning.
- **Ads Optimized Bidding:** built Instacart's first optimized ads automated bidding system, replacing manual product-keyword bids with weekly-budget bidding across roughly 70% of Sponsored Products spend (~\$700M annualized).
- Translated economic objectives into production controls: advertiser value, ROAS targets, pacing, auction guardrails, revenue/user-value tradeoffs, marketplace trust, and monitored rollout.
- Owned the full experimentation-to-production loop: problem framing, metrics, data contracts, model/control design, pipelines, experiment readouts, dashboards, alerting, migration, and rollback.
- Built availability and fulfillment decision systems from noisy catalog, store, shopper, and operational signals, including real-time LightGBM serving, calibrated thresholds, and customer-facing item decisions.
- Applied PhD economics training in production: causal inference, counterfactuals, experiment design, auctions, constrained optimization, forecasting, calibration, and selection-bias-aware metrics.

Microsoft Research New England

2013 – 2014 · Boston

Research Assistant (Prof. Susan Athey)

- Studied Bing search-auction counterfactuals and revenue effects under alternative ranking rules; contributed to research on auction design, ranking rules, and causal effects in marketplaces.

SELECTED SYSTEMS

Experiment-Based Growth Targeting · causal ML

Converted randomized experiment outcomes into uplift models and production targeting policies for incremental marketing impact.

Coupon and Marketing Incrementality · economics and measurement

Designed measurement to distinguish lift from selection and connect campaign diagnosis to allocation decisions.

Automated Ads Bidding · marketplace decision system

ROAS estimation, advertiser targets, pacing, bid simulation, auction guardrails, production monitoring, and rollback.

Availability and Fulfillment Decisions · calibrated product ML

Real-time availability scores, thresholding, operational signals, critical-item prioritization, and customer-facing decisions under uncertainty.

PATENTS

Issued: US 12,511,677 B2, Automated Policy Function Adjustment Using Reinforcement Learning Algorithm. **Additional portfolio:** double-wide ad auctions, causal targeting, dynamic offers, retailer classification, fulfillment routing, replacement agents, and item display decisions.

EDUCATION

PhD Economics — UCLA

2014 – 2020

BA Statistics & Economics — UC Berkeley

2007 – 2011

Experimentation & Economics: causal inference, A/B testing, uplift modeling, incrementality, unit economics, forecasting, counterfactuals, auctions, constrained optimization, calibration

Production ML: growth targeting, ads bidding, availability prediction, ranking, retrieval and memory systems, evaluation, reinforcement learning, marketplace decisioning

Engineering: Python, SQL, TypeScript, Go · LightGBM, TensorFlow · Airflow, DBT, Snowflake, Kafka, Flink SQL, MLflow, Datadog, Arize