



# Jonathan Gu

## Senior Machine Learning Engineer & Economist II

 (510) 333-5539

 jonathangu@gmail.com

 San Francisco, CA

 [LinkedIn](#)

### SUMMARY/OBJECTIVE



Jonathan has many years of experience implementing novel Machine Learning algorithms designed for maximizing both ads and transaction revenue by interacting with advertisers and users at Instacart.

He has developed and implemented many new systems that are robust and can be managed with minimal oncall support. Jonathan specializes in maximizing the efficiency of spend by measuring the causal effect of an intervention and optimally allocating resources to maximize an objective.

Jonathan has a PhD in Economics from UCLA, where he focused on estimating the causal effects in a general equilibrium setting using real-world empirical data.

### WORK EXPERIENCE



#### Senior Machine Learning Engineer & Economist II

##### Instacart | San Francisco | 2020 – Present

- Created, developed, and implemented Instacart's Ads Optimized Bidding Algorithm, which directly controls more than 60% of all advertiser spend at Instacart, and indirectly informs another 20% of ads revenue. Advertisers don't have to worry about individually bidding on every ad impression. Instead, they only need to specify their objective and their budget, and Instacart will take care of spending the budget to maximize their objective.
- Created, developed, and implemented the machine learning algorithm for Instacart's customer coupons email system, which measures the causal effect of a variety of coupons on the behavior of Instacart customers. After proper measurement, the system automatically reallocates spending across email coupons.
- Created, developed, and implemented Instacart's in-app marketing system, which allows both advertisers and internal teams at Instacart to directly market to customers within the Instacart app. This system handles a complex action space where many interventions may happen to users at the same time, therefore resulting in potential issues with small data, despite having many millions of customers in every experiment.

##### Microsoft Research New England | Boston | 2013 – 2014

- Acted as a Research Analyst analyzing Bing search auctions under Economics Professor Susan Athey (Current chief economist at the Department of Justice and Professor of Economics at Stanford.)
- Analyzed the counterfactual outcomes of a variety of Auction mechanisms under Bing Search ads to show that advertisers can boost their revenue by manipulating the formula that determines the way ads are ranked.

##### Horse Race Predictionist | Hong Kong | 2006 – Present

- Helped Professor Ming Gao Gu (Retired Statistics Professor from McGill University and the Chinese University of Hong Kong – also Jonathan's Father) to predict the outcome of Horse Races, and place bets accordingly.
- Implemented the statistical likelihood model that determines the chance of any variety of outcomes of horse races. Implemented the data pipeline, and created custom features to feed into the statistical model. Implemented the mechanism that actually placed bets.

### SKILLS



- **Hard Skills:**
  - Python, Tensorflow, Pytorch
  - SQL, Airflow
  - Java, Scala, Julia, Ruby
  - Stata, R
- **Soft Skills:**
  - Gains Trust: by giving accurate time estimates and delivering on time.
  - Creates Alignment: by setting up small focused meetings looking for specific feedback and action items.
  - Mitigates Risk: by calling out potential blockers early, while also adjusting the tone to reflect the urgency.

## LEGAL STATUS



US Citizen

## EDUCATION



- **UCLA (University of California, Los Angeles)**  
**Degree:** PhD in Economics, **Years:** (2014-2020)
- **UC Berkeley (University of California, Berkeley),**  
**Degree:** BA in Statistics and Economics, **Years:** (2007-2011)

## PATENTS FILED



Auction for Double Wide Ads

- Describes how to implement an algorithm that can compare ads that take up different sizes on the user interface.

Synthetic Treatment Effects for Targeting

- Describes how to rank users generally by their “causal”/ “incremental” response to marketing materials.

A Reinforcement Learning Algorithm for Optimized Bidding

- Describes how to adjust advertisers' bids day to day based on feedback from real-world performance. This is done in a transparent – “non-blackbox” manner.

Dynamic Offer Targeting

- Describes how to target marketing materials to customers based the response of users with similar purchase behavior

Bucketing Likelihoods from Targeting

- Describes how to construct confidence intervals in a believable, distribution-free manner using bootstrapping and empirical data.

Retailer Classification Using Sales Data and Large Language Models

- Describes how to automatically group retailers into explainable groups by analyzing their sales data and passing through to a large language model.

## RELEVANT RESEARCH ARTICLES



[Auction for Double Wide Ads \(Link\)](#)

[The Impact of Grants on Schools and Students \(Link\)](#)

[The Economic Impact of the City of Pasadena's Minimum Wage Ordinance \(Link\)](#)

[Credible Inference for Heterogeneous Returns to Schooling \(Link\)](#)

[Updating the Update Rule in Reinforcement Learning \(Link\)](#)