# MAC STRELIOFF

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## EXPERIENCE

### Statistical Consulting and Internships

#### Data Science Fellow at Insight Data Science

June 2019 – present                    San Francisco, CA

– Identified free-trial users who were likely to convert to paying users.
– Compared performance of **machine learning algorithms for classification** using a train-test split of user behavior and product performance data.
– Achieved ~89% AUC on a test set with a **random forest classifier**.

#### Visiting Research Assistant at U.S. Army Research Laboratory West

June 2018 - Sept 2018                    Playa Vista, CA

– Programmed **online Bayesian logistic regressions with model averaging** to predict behavioral task performance from brain data in near-real time. Achieved accuracy comparable to standard offline **machine learning models**.
– Validated, through parameter recovery simulations, an implementation of **Bayesian Sparse Reduced Rank Regression** using **R** and **Stan**.

#### Statistical Consultant for UCI Engineering, Sciences, and Technology Programs

Sept 2017 - Dec 2017                    Irvine, CA

– Found higher student performance in a course with pre-recorded lectures compared to an offering of the same course without such recordings.
– Estimated the size of the difference and tested it's significance.
– Identified and communicated limitations with the study design.

### Research Projects at University of California

#### Price Anomalies in Prediction Markets

Aug 2014 – May 2019                    Irvine, CA

– Initiated a collaboration with a large online prediction market servicer, this granted access to all trade-level data in over 1500 markets (5.21GB).
– Acquired additional data through **web scraping** and **API requests**.
– In prediction markets, users trade contracts with payouts that depend on real-world events. The value of a contract is related to the probability of the underlying event through **economic decision theory**.
– Discovered arbitrage opportunities for ~1-5% guaranteed profits by investigating prices in markets related by **probability theory** (e.g. markets for events that were a subset of events in another market).
– Assessed the relationship between price and empirical event probabilities using **Bayesian inference with a custom model**, which revealed a premium of ~100% on low probability events and a discount of ~10% on high probability events.

#### Reinforcement Learning and Decision Making

Aug 2014 – May 2019                    Irvine, CA

– **Designed contextual bandit experiments** to study human decision making.
– Formalized theories of human behavior with **reinforcement learning algorithms**.
– **Designed experiments** to test these accounts of behavior and found that common behavioral data was fit well by either of two algorithms.
– Conducted simulations to find contexts where the algorithms predicted different behavior, and **designed experiments** based on those contexts to arbitrate between the two hypothesized algorithms.

## SKILLS OVERVIEW

### Programming

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|---|---|
| **R** (advanced) | **SQL** (basic) |
| **Python** (intermediate) | **Git** (basic) |
| **MATLAB** (advanced) | **Bash** (basic) |

### Methods

**Experimental Design** (advanced)
**Hypothesis Testing** (advanced)
**Statistical Inference** (advanced)
**Probability Theory** (advanced)
**Bayesian Statistics** (advanced)
**Reinforcement Learning** (advanced)
**Contextual Bandits** (advanced)
**Causal Inference** (intermediate)

## PROJECTS

### YouTube Lessons & Tutorials

Taught statistics and recorded my lessons and tutorials. My recordings have over 9,000 views on YouTube.

### Tweet Frequency Modeling

Developed a model of tweet frequency using conjugacy and Poisson processes.

### Algorithmic Trading

Analyzed stock prices and backtested trading algorithms through Quantopian. Evaluated algorithms using Sharpe ratios and returns relative to the S&P 500.

### Rock, Paper, Scissors AI

Devised and deployed an AI agent that dynamically identifies patterns in user behavior to win rock, paper, scissors games.

### Student's Tea Co-Leader

Facilitated a weekly tea-time between alumni and current students in statistics.

## EDUCATION

Ph.D. Cognitive Sciences
**University of California, Irvine, 2019**

M.S. Statistics
**University of California, Irvine, 2018**

B.S. Psychology, Math Emphasis
**University of California, Davis, 2014**