

# RYLAN SCHAEFFER

---

## Skills

### Languages

Python  
R  
Go  
MATLAB  
C/C++

### Libraries

PyTorch  
NumPy  
Pandas  
SciPy  
TensorFlow  
Jax  
Neural Tangents

### DB & Querying

Presto  
Hive  
MySQL  
Postgres  
SQLite

### OS

Linux  
macOS  
Windows

### Neuroscience

DataJoint  
SPM  
Amazon MTurk  
Gorilla

---

## Contact

+1 (650) 450-3013  
rylanschaeffer@gmail.com  
linkedin.com/in/rylanschaeffer  
rylanschaeffer.github.io

## Education

### Harvard University

Sep 2019 - May 2021 (Expected)

Master of Engineering, Computational Science and Engineering  
4.0 GPA

Teaching Assistant: AM207 Bayesian Methods (Graduate), CS109a Data Science (Upper Div)

### University College London

Sep 2017 - Sep 2018

Master of Research, Cognitive Neuroscience

Distinction (British Equivalent of 4.0 GPA)

Founded and managed UCL Artificial Intelligence Journal Club arranging 25 speakers from DeepMind, OpenAI, Uber AI Labs, Toronto, MILA, Stanford, Berkeley, Princeton and more.

### University of California, Davis

Sep 2011 - Jun 2016

Bachelor of Science, Computer Science Engineering

Bachelor of Science, Computational Statistics

Outstanding Senior Award, Department of Computer Science and Engineering

University of California Regents Scholar

Designed and taught 3 courses: Cryptocurrency Technologies, History of CS, Davis Hacks

## Publications

Rylan Schaeffer, Mikail Khona, Leenoy Meshulam, International Brain Laboratory, Ila Rani Fiete. Reverse-engineering Recurrent Neural Network solutions to a hierarchical inference task for mice. *Neural Information Processing Systems* (2020).

Rylan Schaeffer, Nimrod Shaham, Gabriel Kreiman, Haim Sompolinsky. Neural network model of amygdalar memory engram formation and function. Submitted, *CoSyNe* (2021).

Rylan Schaeffer, Niki Kim, Mikail Khona, International Brain Laboratory, Ila Rani Fiete. Mechanistic neural circuit models of hierarchical inference. Submitted, *CoSyNe* (2021).

Rylan Schaeffer, Aída Picatto, Ila Rani Fiete. Recovering low dimensional, interpretable mechanistic models via Representations and Dynamics Distillation. In preparation (2021).

Rylan Schaeffer, International Brain Laboratory, Ila Rani Fiete. Distributed codes for hierarchical inference in the mouse brain. In preparation (2021).

## Experience

### Massachusetts Institute of Technology

Dec 2019 - Present

Graduate Student Researcher, Fiete Lab, Brain and Cognitive Sciences

Characterized how recurrent neural networks perform hierarchical inference using PyTorch. Invented novel distillation technique called Representation And Dynamics Distillation (RADD).

### Harvard University

Sept 2020 - Present

Graduate Student Researcher, Pehlevan Lab, Applied Math

Researching distributional reinforcement learning to explain why distributional learning causes agents to learn faster and perform better asymptotically and propose how to use the return distribution more intelligently to select actions.

### Harvard University

Oct 2019 - Present

Graduate Student Researcher, Sompolinsky Lab, Center for Brain Science

Modeled memory engram formation and function during associative using bespoke rate-based neural network and Bayesian nonparametric model (distance-dependent Chinese Restaurant Process). Demonstrated consistency with key experimental phenomena.

### Uber

Oct 2018 - Sep 2019

Data Scientist, Time Series Forecasting and Anomaly Detection Platform

Placed 3rd out of 217 teams in Uber's Machine Learning Hackathon. Increased accuracy of Uber's anomaly detection platform in Go from 67% to 81% (precision 0.957 to 0.917; recall 0.247 to 0.618) by adding outlier removal preprocessing. Guided long-range budget planning and future efficiency efforts for Uber's data, storage and compute platforms using statistical forecasting models (Theta, ETS, ARIMA). Enabled model routing for anomaly detection by refactoring Metric Reliability Service.

## Experience Continued

### **UCL Wellcome Trust Centre for Human Neuroimaging** **Sep 2017 - Sep 2018**

Graduate Student Researcher, Fleming Lab

- Researched how stability of beliefs influences subjectively-reported confidence via novel human behavioral experiment. Collected data via Gorilla and Amazon MTurk. Analyzed results using two-way mixed-effects repeated measures ANOVA and mixed-effects regression in R.
- Developed novel model to explain metacognitive experimental findings, including the dissociability of action from evaluation, the ubiquity of hyper-metacognitive sensitivity and the response-locked error-related negativity. Implemented modified Advantage-Actor Critic architecture in TensorFlow.

### **Thermo Fisher Scientific** **May 2017 - Sep 2017**

Deep Learning Research Intern

Created provisionally-patented DNA sequencing algorithm using a sequence-to-sequence recurrent neural network-based model with 99.24% test accuracy, surpassing previous gold standard. Identified missing TensorFlow functionality and implemented own solution.

### **UC Davis Department of Computer Science** **Sep 2015 - Jun 2016**

Python Developer

Led team to develop an online testing platform for use in UC Davis classes. Deployed in two courses to approximately 75 undergraduates. Built server to push test problems client-side and to accept student submissions.

### **Associated Students of UC Davis** **Apr 2014 - Feb 2015**

Chief Financial Officer & Chief Operating Officer

Authored and executed \$12 million budget of UC Davis student government. Solved \$100,000 structural annual deficit. Managed and improved operating efficiency of 26 businesses and services to better serve UC Davis undergraduates. Hired unit directors and new ASUCD staff advisor. Accomplishments include merging Campus Copies/Classical Notes with the Post Office to halve labor costs and restructuring Experimental Colleges and Whole Earth Festivals operating models for future stability.

### **UC Davis Chancellor's Undergraduate Advisory Board** **Oct 2012 - Jun 2014**

Board Member

Researched, proposed and implemented a program to enable undergraduate students to design and teach courses on topics of their choosing to fellow undergraduates. Worked with Academic Senate and Administration. Subsequently taught three courses and helped seven students teach their courses.

## Awards and Honors

3rd Place, Uber (Internal) Machine Learning Hackathon	Mar 2019
1st Place, SunCode Hackathon (\$4000 Prize, 23 teams)	Apr 2017
UC Davis Department of Computer Science Outstanding Graduating Senior	Jun 2016
UC Davis College of Engineering Student Commencement Speaker	Jun 2016
Tau Beta Pi Engineering Honor Society	Jun 2013
Phi Kappa Phi Honor Society	Jun 2013
University of California Regents Scholarship	Sep 2011
Premier Distinction (2,990 points), National Forensic League	Jun 2011
Congressional Debate Champion, 2011 Tournament of Champions	May 2011
Eagle Scout, Boy Scouts of America	May 2011
Party Chairman, California Boys' State	Jun 2010

## Blog

Published explanations of exciting new papers in artificial intelligence research. Posts surpassed twenty thousand unique readers in a month and topped HackerNews. Examples:

- Neural Episodic Control by Pritzel et al.
- Neural Turing Machine by Graves et al.
- Early Visual Concept Learning with Unsupervised Deep Learning by Higgins et al.
- Overcoming Catastrophic Forgetting in Neural Networks by Kirkpatrick et al.

## Teaching

### Harvard Applied Math Department

Sep 2020 - Dec 2020

Teaching Assistant, AM207 Bayesian Methods for Data Analysis, Inference and Optimization  
Served as teaching assistant for graduate applied math course on Bayesian methods covering exact inference in conjugate distributions and approximate inference using sampling and variational methods.

### Harvard Computer Science Department

May 2020 - Aug 2020

Teaching Assistant, CS109A Introduction to Data Science  
Served as teaching assistant for upper division computer science course on data science covering regression, classification, unsupervised dimensionality reduction and regularization.

### Harvard Computer Science Department

Jan 2020 - May 2020

Teaching Assistant, CS10 Elements of Data Science  
Served as teaching assistant for lower division computer science course on data science covering Python numeric computing (primarily Pandas).

### UC Davis Computer Science Department

Jan 2016 - Jun 2016

Undergraduate Student Instructor, Cryptocurrency Technologies  
Designed and taught seminar to 23 students on leveraging distributed consensus protocols and cryptographic primitives to create decentralized digital cash. Covered advanced topics including Zerocoin, Enigma and the Bitcoin Lightning Network. Wrote programming assignments and grading scripts. Rated 4.3 out of 5 by students.

### UC Davis Computer Science Department

Jan 2015 - Jun 2015

Undergraduate Student Instructor, History of Computer Science  
Designed and taught seminar to 15 students on the history of computer science, focusing on the historical convergence of electrical engineering and mathematical theory. Rated 4.72 out of 5 by students.

### UC Davis University Honors Program

Jan 2014 - Jun 2014

Undergraduate Student Instructor, Davis Hacks  
Designed and taught seminar on optimizing the undergraduate experience at UC Davis.

## Service

UC Davis College of Engineering Dean Recruitment Advisory  
Committee (Undergraduate Representative)

Oct 2014 - Jun 2015

UC Davis Chancellor's Ambassador

Oct 2012 - Jun 2014

KDVS Radio Host on Davis Now! A Current Events Talk Show

Jul 2014 - Oct 2014