

# RYLAN SCHAEFFER

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## Skills

### Languages

Python  
R  
Go  
MATLAB  
C/C++

### Libraries

PyTorch  
NumPy  
Pandas  
SciPy  
HuggingFace  
TensorFlow  
Jax

### DB & Querying

Postgres  
Presto  
Hive  
MySQL  
SQLite

### OS

Linux  
macOS  
Windows

### Cognitive Neuroscience

DataJoint  
SPM  
Amazon MTurk  
Gorilla

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## Contact

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## Education

### Stanford University

PhD, Computer Science

Sep 2021 - Present

### Harvard University

MS, Computational Science & Engineering (4.0 GPA)

Teaching Assistant: AM207 Bayesian Methods (Graduate), CS181 Machine Learning

Sep 2019 - Dec 2020

### University College London

MRes, Cognitive Neuroscience (Distinction = British 4.0 GPA)

Sep 2017 - Sep 2018

### University of California, Davis

BS, Computer Science Engineering & BS, Computational Statistics

Outstanding Senior Award, Department of Computer Science and Engineering

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

Sep 2011 - Jun 2016

## Publications

**Schaeffer, Khona**, et al. Self-Supervised Learning of Efficient Algebraic Codes Generates Grid Cells. *In Prep. & Under Review @ NeurIPS 2022 Workshops NeurReps, SSL, InfoCog.*

**Schaeffer**, et al. No Free Lunch from Deep Learning in Neuroscience: A Case Study through Models of the Entorhinal-Hippocampal Circuit. *NeurIPS 2022.*

**Schaeffer**, et al. Streaming Inference for Infinite Feature Models. *ICML 2022.*

**Schaeffer**, et al. No Free Lunch from Deep Learning in Neuroscience: A Case Study through Models of the Entorhinal-Hippocampal Circuit. *ICML 2022 Workshop: AI for Science.*

**Schaeffer**, et al. Streaming Inference for Infinite Non-Stationary Clustering. *Conference on Lifelong Learning Agents (CoLLAs) 2022.*

**Schaeffer**, et al. Streaming Inference for Infinite Non-Stationary Clustering. *ICLR 2022 Workshop: Agent Learning in Open-Endedness.*

**Schaeffer**. An Algorithmic Theory of Metacognition in Minds and Machines. *NeurIPS 2021 Workshop: Metacognition in the Age of AI.*

**Schaeffer**, et al. Efficient Online Inference for Nonparametric Mixture Models. *UAI 2021.*

**Schaeffer** et al. Neural network model of amygdalar memory engram formation and function. *COSYNE 2021.*

**Schaeffer** et al. Reverse-engineering Recurrent Neural Network solutions to a hierarchical inference task for mice. *NeurIPS 2020.*

## Professional Experience

### Stanford University

Graduate Student Researcher (Rotating)

Exploring research directions including pretrained representation distillation, sample-efficient large language models, and improved scene understanding.

Sep 2021 - Present

### Massachusetts Institute of Technology

Senior Research Associate & Graduate Student Researcher

Conducted research in machine learning and computational neuroscience on topics including deep learning, variational inference, Bayesian nonparametrics and reinforcement learning. Published at ICML 2022, CoLLAs 2022, UAI 2021, NeurIPS 2020 and workshops.

Jan 2020 - Present

### Google DeepMind

Research Engineer Intern

Trained hierarchical reinforcement learning agents on AndroidEnv using Acme, XManager, etc.

May 2021 - Jul 2021

### Uber

Data Scientist, Intelligent Decision Systems

Placed 3rd out of 217 teams in Uber's multi-week Machine Learning Hackathon.

Oct 2018 - Sep 2019

## 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

Finalist for Mentor of the Year, Harvard Women in STEM	Apr 2020
Patent LT01372PCT Deep Basecaller for Sanger Sequencing	Dec 2019
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

## Teaching

**Harvard Computer Science Department** Jan 2021 - May 2021  
Teaching Assistant, AM181 Machine Learning  
Served as teaching assistant for upper division computer science course covering machine learning fundamentals.

**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.

## 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.

## 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