

Sean Metzger

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Summary

Engineer with expertise in deep learning, optimization, machine learning, and sustainability.

Education

Stanford University, BS (2017), MS (2018), Electrical Engineering. *Tau Beta Pi*, GPA 3.8/3.9, respectively

- Relevant Coursework: Green Electronics, Applied Quantum Mechanics 1 & 2, Device Physics, Solar Cells Fuel Cells and Batteries, Energy Storage Integration, Understanding Energy, Physics, Machine Learning, Deep Learning, Probability, Signal Processing

UC Berkeley/UC San Francisco, PhD candidate, Bioengineering, Fall 2019-present GPA: 4.0

- Computational neuroscience research in Chang Lab. Coursework: Deep Reinforcement Learning, Deep Unsupervised Learning, Convex Optimization, Adv. Controls, Optimization Models in Engineering

Experience

Researcher, Chang Lab

San Francisco, CA

UC San Francisco – Computational Neuroscience Research

Fall 2018 - present

- First author publication on first ever neural speech decoding in a patient with severe paralysis who cannot speak, developed neural network decoders/interpretability analyses for paper.
- Responsible for majority of deep learning/ML/stats analyses for collaboration with Facebook Reality Labs and Facebook AI Research with work on feature analysis/interpretability, seq-2-seq models, etc.
- Developing novel deep learning based approaches for low dimensional analysis of neural population dynamics.

Computer Vision Research

Berkeley, CA

UC Berkeley

Spring/Summer 2020

- Worked with researchers from Berkeley AI Research to finalize a manuscript that came from my final project in deep unsupervised learning. We were able to automatically select data augmentations for contrastive learning without using labels, yielding results comparable to and better than hand selected augmentations using labels for feedback.
- Conducted experiments on a follow up project on Hierarchical pretraining using contrastive learning
- Both projects being submitted to CVPR this year.

Freelance Data Science Work

San Francisco, CA

Generate Capital

Spring/Summer 2020

- Contracted by Generate Capital for data science work to compile and understand datasets detailing the performance of a portfolio of renewable energy assets.

Research Assistant, Hansen Experimental Physics Lab

Stanford, CA

Laboratory of Daniel Palanker

Jan 2018 – June 2018

- Developed a fabrication and characterization processes for high capacitance, transparent 10-um electrodes for retinal prosthetics.
- Created computational simulations of electrode-neuron interactions in MATLAB.

Research Assistant with Bill Dally

Stanford, CA

Stanford EE Department

Fall 2018

- Development of a novel DC-AC converter that will operate at 75kHz for low cost, and efficient solar to grid power conversion. Implemented C code for microcontrollers to operate a high voltage setup, redesigned PCB.

Healyx Labs

TomKat Center for Sustainable Energy Summer Fellow

Stanford, CA

Summer 2016

- Developed solar charging system for off-grid usage of medical device in countries without reliable electricity. Prototyped low-cost negative pressure wound therapy system with 10% of costs of competing devices.

Stanford Plasma Physics Lab

Summer Researcher

Stanford, CA

Summer 2014

- Researched control of conformal surface plasmon flow on metamaterials using plasma for applications in high speed circuitry. Designed and fabricated metamaterials. Automated data collection using LabView to control biaxial motor setup to collect data.

Publications under review

- D. Moses*, **S. Metzger***, J. Liu*, G. Anumanchipalli, J. Makin, PF. Sun, J. Chartier, P. Liu, G. Abrams, A. Tu-Chan, K. Ganguly, E.F. Chang. *A Speech Neuroprosthesis for Decoding Words in a Person With Severe Paralysis*. Under review.
- C. Reed*, **S. Metzger***, A. Srinivas, T. Darrell, K. Keutzer. *SelfAugment, Self-Supervised Data Augmentation Policies for Instance Contrastive Learning*. ArXiv preprint: <https://arxiv.org/pdf/2009.07724.pdf>.

*=equal contribution

Other Experiences

Stanford Sierra Camp, Summer 2015, 2017

- Photographer (2017), kids counselor (2015). Developed programming and sold over \$10k of photos. Organized and edited pictures in Lightroom. Self taught photography/editing skills. Worked with large team of 60 counselors in a collaborative environment.

NASA Lunar Science Institute/Colorado Center for Lunar Dust and Atmospheric Studies, Summer 2012

- Designed software in LabView for a computer interface for a particle steerer used in a 3MeV linear dust accelerator. Conceptualized and designed parts using SolidWorks. Developed plasma experiment tube.

Backcountry Access Inc, Summer 2011

- Quantified signal overlap during multi-burial rescues with 457kHz avalanche transceivers. Results drove the design of the Tracker 3 beacon's multiburial software and were published in *The Avalanche Review*.

Skills, Language

Computer: Python, Pytorch, Tensorflow/Keras, CVXPY, sklearn, XGBoost, Pandas, Numpy, Scipy, Ray, Excel, Labview MATLAB, C, C++, LT Spice, Verilog, Solidworks, Microsoft Office, Java.

Languages: native English speaker, fluent in Spanish, proficient in French

Outreach/Volunteering: Bay Area Scientists in Schools: teach lessons to 3rd graders about Newton's laws, volunteer for national and local political campaigns.

Other: In my free time enjoy playing jazz saxophone (5 citations at jazz festivals for outstanding musicianship), cycling, soccer, and reading.