Sean Metzger

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UC Berkeley/UC San Francisco PhD student with experience in machine learning, optimization, signal processing, brain machine interfaces, and neuroscience.

Education

University of California – Berkeley / University of California - San Francisco – PhD, Bioengineering – August 2019 – Present , 4.0 GPA

Stanford University MS, Electrical Engineering, June 2018, 3.88 GPA

Stanford University, BSE, Electrical Engineering, June 2017, 3.79 GPA, *Tau Beta Pi*

Fairview High School, Boulder, Colorado – June 2013 4.8/4.0 GPA, *Summa Cum Laude*
Concurrent courses at the University of Colorado – Boulder; Vector Calculus, Diff. Eqns, App. Probability (4.0)

Courses – Machine Learning, Deep Learning, Convex Optimization, Advanced Controls, Statistical Signal Processing, Brain Machine Interfaces, Neuroelectrical Engineering, , Brain Decoding, Neuromorphics, Neurobiology, Cognitive & Computational Neuroscience.

Awards, Honors, Membership

Stanford University - Tau Beta Pi Engineering Honor Society
IB Diploma, *Summa Cum Laude*
AP Scholar with Distinction
National Honor Society
National Merit Scholarship Finalist
Society of Latino Engineers

Experience

Chang Lab, Center for Integrative Neuroscience - UC San Francisco, San Francisco, CA **–** Oct 2018 – present
Conducting full time research on brain machine interfaces for speech and language using ECoG arrays in human patients with Professor Edward Chang. Designed various deep learning models in Tensorflow for neural speech production decoding and interfaced them with a realtime platform for realtime speech decoding. Developed novel time series data augmentation techniques for deep learning. Also using sequential variational autoencoders to try to understand speech dynamics in the brain.

Hansen Experimental Physics Laboratory, Stanford CA**–**Jan-Jun 2018
Developed characterization methods for 3-dimensional photovoltaic retinal prosthesis with Professor Daniel Palanker as Research Assistant. Developed new high capacitance metamaterial fabrication processes for 10-μm microelectrodes for single cell stimulation and ran *in vivo* tests with spiking HEK cells.

Electrical Engineering Department, Stanford, CA - Fall 2017
Redesigned DC-to-AC converter to operate at 75kHz for lower cost and more efficient solar-to-grid power conversion as Research Assistant. Coded microcontrollers and reworked elements of the PCB and system design after running tests at high voltage. Worked with Profs. William Daly and John Fox.

Kalman and Weiner Filters for Neural Prostheses; Stanford, CA - Winter 2016
Implemented signal processing algorithms to take data from the motor cortex in monkeys and output cursor movements and positions for neural prostheses using state-of-the-art filters and techniques in Neuroelectrical Engineering course project taught by Professor Krishna Shenoy.

Healyx Labs; Stanford, CA - Summer 2016
Prototyped low-cost negative pressure wound therapy system at 10% the cost of competing devices for use in developing countries. Developed solar charging system for off-grid usage and created a microchip testing device. Third employee. Startup has since raised over $1M.

Stanford Sierra Camp South Lake Tahoe, CA-Summer 2017 & 2015
Photographer and counselor. Took over 30k photos, orchestrated over $10k in sales. Guided mountain bike rides. Conducted star tours and astrophysics discussions. Orchestrated programming for 20+ 7-8 yr. olds

Stanford Plasma Physics Lab; Stanford, CA — Summer 2014
Researched the control of conformal surface plasmon flow on metamaterials using plasma for applications in high-speed circuitry as a research fellow. Designed and fabricated metamaterials using a copper etch method I customized. Automated data collection using LabView to control an oscilloscope and biaxial stepper motor setup.

Colorado Center for Lunar Dust and Atmospheric Studies; Boulder, CO — Summer 2012
NASA Lunar Science Institute Team. Designed software in LabView for a computer interface for a particle steerer used in a 3MeV linear dust accelerator by a team of 14 scientists and engineers. Conceptualized and designed parts using SolidWorks. Developed plasma experiment tube.

Backcountry Access; Boulder, CO – Summer 2011
Experimentally quantified signal overlap in 457 kHz avalanche beacons during multi-burial rescues, published results in *The Avalanche Review.* Results drove design of *Tracker 3* avalanche beacon.

Residential Education; Stanford, CA – September 2015 – June 2017
Staff member of Stanford Outdoor House. Organized large trips to Tahoe, Yosemite, Santa Barbara and smaller bi-weekly trips for 60+ students as academic theme associate (2015-16). Also planned community bonding events. Coordinated 12 meals a week for 65 students as Kitchen Manager (2016-17) and oversaw food budget. Worked with Diversity and First-Gen Office to engage and promote diversity in our house and the greater outdoor community.

Citizenship, Language, Skills

U.S. Citizen, native English speaker, fluent in Spanish, proficient in French.

Computer: MATLAB, Python, Tensorflow, Keras, C, C++, LabView, LT Spice, Solidworks, Verilog.

Technical: linear algebra, machine learning, probability, signal processing, strong math background, neuroscience, neuroanatomy, logic, research methods, circuits.

Extracurricular: Volunteer outreach via Bay Area Scientists in Schools, doing outreach to bring science to underserved 3rd graders in the bay area.