

Christopher J. Warner II, Ph.D.

Portfolio Website: chris-warner-ii.github.io

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US Citizen

Neuroscientist — ML Engineer — Data Scientist

Technical Skills Summary

Expertise: Data science, machine learning (neural networks, regression, classification, clustering, dimensionality reduction), predictive modelling, image processing, signal processing, time-series analysis, visual & auditory neuroscience, dynamical systems simulation

Languages: Python, MATLAB, C++, Shell, Slurm, SQL, HTML, Labview, Mathematica

ML Frameworks: Pytorch, Keras, Tensorflow, Tensorboard, WandB

Libraries: Scikit-learn, Pandas, NLTK, NetworkX, OpenCV, Numpy, Scipy, etc ...

Cloud Computing & Collaboration: Git, Docker, AWS (EC2, S3, RDS, SageMaker), Apache Airflow

Professional Experience

Lawrence Berkeley National Laboratory

Oct 2023 - Present

Postdoctoral ML Researcher & Data Scientist, Neural Systems Data Science Lab

- Built automatic speech recognition (ASR) model in PyTorch to perform multiclass classification of spoken phonemes based on CNN architecture operating on spectrograms
- Extracted insights from spectrogram data with UMAP and t-SNE dimensionality reduction methods
- Leveraged cloud computing with massively parallel compute clusters using Slurm and Shell scripting

CODA Biotherapeutics

Jul 2021 - Mar 2022

ML Engineer & Data Scientist, Receptor Modeling Group (Consulting Contract)

- Developed ML model to predict interactions between lab synthesized proteins and pharmaceutical drugs that leveraged transfer learning from pretrained transformer model - leveraging Python, Keras & SQL
- Collaborated closely with biology team - communicating results to guide protein synthesis; incorporating their feedback to guide model development
- Transitioned project pipeline into production by leveraging AWS cloud computing, Docker containerization and process engineering with Apache Airflow

University of California, Berkeley

Sep 2011 - Sep 2019

Doctoral Biophysicist & ML Researcher, Redwood Center for Theoretical Neuroscience

- Built Bayesian latent variable model in Python to infer noisy hidden structure in binary neural data and applied it to spike trains recorded from retina
- Pioneered retina-inspired image segmentation ML algorithm in MATLAB based on community detection and clustering in phase space using dynamical system simulation
- Mentored undergraduate students, meeting with them regularly and guiding them in projects analyzing real world social graph data using Python and NetworkX
- Taught undergraduate courses in mathematics, biology, neuroscience, numerical modeling, statistical data analysis, computational models of cognition

University of Arizona

Sep 2010 - Jul 2011

Robotics & Computer Vision Researcher, Electrical & Computer Engineering

- Developed computer vision algorithm based on visual odometry and Nelder-Mead optimization to precisely geolocate ground objects from aerial images, implemented in OpenCV and C++
- Designed, built operated and maintained robot rover platforms used in tier-scalable reconnaissance paradigm for autonomous space exploration

Massachusetts Institute of Technology, Lincoln Laboratory

Sep 2005 - Feb 2009

Signal Processing Engineer, Advanced RF Techniques & Systems Group

- Spearheaded daily operations of first-of-kind radar project through entire project lifecycle; from hardware and software development to data analysis and results communication
- Created combined signal processing and machine learning analysis pipeline in MATLAB to detect and classify moving targets under foliage from reflected radar energy
- Obtained and maintained SECRET level DOD security clearance

Ohio State University

Mar 2004 - Sep 2005

Undergraduate Geophysics Researcher, Geodesy & Geodynamics Group

- Collected high-precision geolocation data from waypoint sites using Trimble GPS units to study movement of tectonic plates in Western US and South America
- Aided construction and integratration of 40 node Linux computer cluster to analyze GPS data and fit geophysical models
- Designed and managed scalable database system to track, test and maintain laboratory equipment fielded worldwide

Education

University of California, Berkeley

Ph.D., Biophysics and Computational Neuroscience

Berkeley, CA

Sep 2011 – Sep 2019

University of Arizona

pursuit of M.S., Electrical & Computer Engineering

Tucson, AZ

Sep 2010 – Aug 2011

Ohio State University

B.S., Physics

Columbus, OH

Sep 2001 – Jul 2005

Selected Publications

Warner, C., Sommer, F.: *A Model for Image Segmentation in Retina*. (2020) [arXiv:2005.02567](https://arxiv.org/abs/2005.02567)

Warner, C., Ruda, K., Sommer, F.: *Probabilistic latent variable model to detect structure in binary data*. (2022) [arXiv:2201.11108](https://arxiv.org/abs/2201.11108)

Warner, C., Sommer, F.: *Cell Assembly Model for Retinal Ganglion Cell population*. COSYNE 2019.

Warner, C., Sommer, F.: *Retinal circuits for image segmentation and coding*. COSYNE 2016.

Blejer, D., Jao, J., Warner, C., Evans, P.: *Multistatic Polarimetric Radar for Moving Target Discrimination in Foliage*. Tri-Service Radar Symposium (2008).

Warner, C., Bruno, D.: *Ku-Band Moving Target Simulator Units*. MIT Lincoln Laboratory Project Memorandum (Mar 2008).

Personal Focus

Creative & Technical: Self-published an album of original music I wrote, performed recorded and produced in Logic Pro, leveraging both creative drive and signal processing skills

Self-starter: Launched and operated stealth startup exploring computational linguistic analysis of poetry and song lyrics in phoneme space using Natual Language Processing tools and Python

Intentional: Passionate about mindfulness, communication and embracing challenge with a growth mindset