



Carson McNeil

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SEEKING a full-time research or research director position in machine learning applications, particularly in medical imaging or neuroscience.

EXPERIENCE

Senior Data Scientist, Verily Life Sciences

South San Francisco, CA — 2019-2024

- Verily's Pathology ML Team. Helped develop [Virtual Stainer](#). Published extensively on this research.
- Developed Machine Vision models for microscopy medical imaging data, from deep learning to classical non-ML techniques.
- Executed on tough independent research problems, such as virtual stain validation. Developed experiment and analysis techniques.
- Primary technical contact point for several MM\$ partnerships.
- Created analysis standards and accompanying libraries for other teammates to use.
- Mentored/managed junior Data Scientists and Interns.

Graduate Student Researcher, Gallant Lab@UCB under the Berkeley Artificial Intelligence Research lab (BAIR)

Berkeley, CA — 2016-2019

- Open-ended research in computational/cognitive neuroscience.
- Application of deep learning techniques to problems in brain imaging, particularly in the study of human vision.
- fMRI scanning, pulse sequence optimization
- Data analysis, computing cluster management.
- Geometric analyses across 3d models of cortex.
- Experience with teaching, mentoring, presentation, and grantwriting.

EDUCATION

California Institute of Technology -
BS in Computation and Neural
Systems, Minor in Computer
Science - 2013

University of California Berkeley -
Masters in Computational
Neuroscience - 2019, 4.0 GPA

Most Relevant Classes

Neural Computation, Machine Learning, High Dimensional Data Analysis with Low Dimensional Models, MRI Physics, Data Structures and Algorithms, Vision: From Computational Theory to Neuronal Mechanisms, Computer Graphics, Advanced Neurobiology, Advanced Systems Neuroscience, Cerebral Cortex, Computing Systems, Cellular and Systems Neuroscience Lab, Comparative Nervous Systems, Advanced Functional Programming, Decidability and Tractability, Signals Systems and Transforms, Complex Analysis, Discrete Math, ODEs, PDEs, Stats and Prob., Statistical Computation.

SWE (Human Sensing), Google Research

Venice, CA — January 2016-June 2016

- Collaborate with Berkeley on affective computing/machine emotion recognition using Convolutional Neural Nets. [Blog Post](#). This work led to a [publication in Nature](#).
- Use of machine vision tools to investigate gender bias in YouTube content.

Software Engineer, Google Inc.

San Bruno, CA — 2013-2016

- Third engineer (eventually the most senior) on the YouTube Mix team, a collaboration between Google Research and YouTube. Mentored several Nooglers.
- Responsible for a large scale machine learning system used to generate long sequences of recommendations(particularly music).
- Highly collaborative. I often worked with a team to carry features from design to launch.
- Promoted from T3(entering BS) to T4(entering PhD)

Concept Prototyping Intern, Synaptics Inc.

San Jose, CA — Summer 2013

- Created prototypes to demo new technologies.
- Wrote firmware, participated in architecture discussions, and brainstormed features for various devices.
- Working with STM32F103, ATMega32a, RN42, Synaptics ASICs. Firmware, soldering, hardware debugging.

Rita A. and Oistein Skjellum SURF, Burdick Lab @ Caltech

Pasadena, CA — Summer 2012

- Worked on simulations for investigating improvements to a 28-electrode epidural stimulating array, to help SCI(spinal complete injury) patients to walk again.
- Very varied work, literature research, physics proofs, electrical calculations, signal processing, and programming in many environments.(Python, Matlab, COMSOL Multiphysics 3d models etc.)

Software Engineering Intern, IGN Entertainment

San Francisco, CA — Summer 2011

- Created an OAuth 2.0 Server and related services for IGN's primary site using Scala, Scalatra.

NASA JPL SURF, Image Processing Group @ NASA Jet Propulsion Lab

Teaching

Functional Programming TA
Google Android Bootcamp TA
Neuroscience Bootcamp Instructor
Drugs and the Brain GSI

TOOLS/SKILLS

Programming Languages

- Very Strong in Python, Java, C/C++, Go
- Strong in Haskell, Matlab, Scala
- Good in Scheme, PERL, Assembly, CUDA
- I pick up new languages very fast.

Relevant Skills

- An expert in deep learning for vision/convolutional neural nets, with a strong background in other machine learning techniques.
- Research planning, writing scientific publications.
- Managing the technical side of industry research partnerships.
 - Heavy Pytorch, Tensorflow, and Keras experience.
- GPU programming experience, for both graphics and parallel scientific computing.
 - Using Pytorch via Python, as well as CUDA via C/C++
- Experienced in analysis of neural data, both fMRI in humans and electrophysiological recordings in animals.
- Experience in signal processing, particularly of audio streams and biophysical data.
- Distributed Computing experience, cluster management.
- Soldering, electronics, firmware at the hobbyist/intern level.
- World-class expertise in fMRI imaging and pulse-sequence optimization.

- Created an approach for using statistical methods to correct International Space Station EarthKAM images.

Publications

Carson McNeil, Pok Fai Wong, Niranjana Sridhar, Yang Wang, Charles Santori, Cheng-Hsun Wu, Andrew Homyk, et al. 2023. “An End-to-End Platform for Digital Pathology Using Hyperspectral Autofluorescence Microscopy and Deep Learning Based Virtual Histology.” *bioRxiv*.
<https://doi.org/10.1101/2023.04.10.23288259>.

Wong, Pok Fai, Carson McNeil, Yang Wang, Jack Paparian, Charles Santori, Michael Gutierrez, Andrew Homyk, et al. 2024. “Clinical-Grade Validation of an Autofluorescence Virtual Staining System with Human Experts and a Deep Learning System for Prostate Cancer.” *Modern Pathology: An Official Journal of the United States and Canadian Academy of Pathology, Inc* 37 (11): 100573.

McNeil, Carson, Pok Fai Wong, Niranjana Sridhar, Yang Wang, Charles Santori, Cheng Hsun Wu, Andrew Homyk, et al. 2023. “AI-Enabled Virtual Hematoxylin and Eosin and Masson’s Trichrome Staining for Non-Alcoholic Fatty Liver Disease Activity Scoring from Single Unstained Slide.” *Journal of Hepatology* 78 (June): S671–72.

Robbins, Marc, Jessica Loo, Saurabh Vyawahare, Yang Wang, Carson McNeil, Sudha Rao, Pok Fai Wong, Ehud Rivlin, Shamira Weaver, and Roman Goldenberg. n.d. “Prediction of KRAS Mutation Status from H&E Foundation Model Embeddings in Non-Small Cell Lung Cancer.”

Shor, Joel, Carson McNeil, Yotam Intrator, Joseph R. Ledsam, Hiro-O Yamano, Daisuke Tsurumaru, Hiroki Kayama, et al. 2024. “Predicting Generalization of AI Colonoscopy Models to Unseen Data.” *arXiv [Eess.IV]*. arXiv.

Sridhar, Niranjana, Michael Elad, Carson McNeil, Ehud Rivlin, and Daniel Freedman. 2024. “Diffusion Models for Generative Histopathology.” In *Deep Generative Models*, 154–63. Lecture Notes in Computer Science. Cham: Springer Nature Switzerland.

Wang, Yang, Saurabh Vyawahare, Carson McNeil, Jessica Loo, Marc Robbins, and Roman Goldenberg. 2024a. “Prediction of MASH Features from Liver Biopsy Images Using a Pre-Trained Self-Supervised Learning Model.” *J Hepatol* 80 (S1): S592.

———. 2024b. “THU-284 Prediction of MASH Features from Liver Biopsy Images Using a Pretrained Self-Supervised Learning Model.” *Journal of Hepatology* 80 (June): S592.

PROJECTS - A recent sampling

- Reconstructing Viewed Video from fMRI subjects using GANs as distribution modellers, and viewing the problem as an im2im translation problem. [Presentation](#).
- Use of deep learning in a compressed sensing setting via Magnetic Resonance Fingerprinting. [Presentation](#).
- Multiband Imaging evaluation.
- Predicting Human Intermediate Visual Cortex from Deep Neural Features.
- Verily's Virtual Stainer. [Blog Post](#)
- Machine Emotion Recognition. Blog Post.

Patents

- Platform Based Predictions Using Digital Pathology Information USPTO Serial Number: PCT/US2023/075723
- A Hybrid Approach To Using Autofluorescence Data to Improve Classification of Disease Features in Unstained Tissue Samples VER-39987-00-PR
- Detecting Abormal Cells Using Autofluorescence Microscopy PCT/US2022/081820