Olivia T. Zahn

Seattle, WA — otthomas@uw.edu — oliviatessa.github.io

EDUCATION

University of Washington, Seattle, WA — June, 2018 — Expected: Dec., 2023
Ph.D. Physics — Advisor: J. Nathan Kutz

Northern Arizona University, Flagstaff, AZ — Aug,, 2014 — May, 2018
B.S. Physics, Minor Mathematics — Advisor: Christopher Mann

RESEARCH EXPERIENCE

GLOBAL HEALTH LABS — Bellevue, WA
Machine Learning Research Engineer — June, 2023 — Present

- Researched off-the-shelf explainable AI tools and evaluated their validity and usefulness in the context of AI-assisted medical diagnosis.
- Designed and trained novel deep learning architectures for use in affordable and portable medical imaging technologies.

KUTZ RESEARCH GROUP — Seattle, WA
Graduate Research Assistant — Jan., 2019 — Present

- Implemented neural network pruning to find a sparse computational model for controlling a biological motor task (insect flight). Project associated w/ Neural-inspired Sparse Sensing and Control for Agile Flight MURI and co-mentored by Thomas L. Daniel.
- Characterized the topological structure of sparse DNNs trained to control a biological motor control task using tools from network theory (i.e., network motifs).

PACIFIC NORTHWEST NATIONAL LABORATORY — Seattle, WA
Data Science Research Intern — June, 2022 — Sep., 2022

- Implemented magnitude-based channel pruning to reduce the number of channels needed in image classification tasks. Performed tests on canonical datasets (MNIST, CIFAR-10, CIFAR-100).

OPTICAL METROLOGY LABORATORY — Flagstaff, AZ
Undergraduate Research Assistant — Jan., 2015 — May, 2018

- Measured optical properties of biological cells by using digital holography techniques and the implementation of polarized light.

PUBLICATIONS

Zahn, Olivia, Jorge Bustamante Jr, Callin Switzer, Thomas L. Daniel, and J. Nathan Kutz. "Pruning deep neural networks generates a sparse, bio-inspired nonlinear controller for insect flight." *PLoS Computational Biology* 18.9 (2022): e1010512. https://doi.org/10.1371/journal.pcbi.1010512

Zahn, Olivia, Thomas L. Daniel, and J. Nathan Kutz. "Motif distribution and function in sparsified deep neural networks." In progress. (exp. 2023).

Williams, Jan, **Olivia Zahn**, and J. Nathan Kutz. "Sensing with Shallow Recurrent Decoder Networks." *Nature Communications*. Under review. https://arxiv.org/abs/2301.12011

Williams, Jan, **Olivia Zahn**, and J. Nathan Kutz. "Data-driven sensor placement with shallow decoder networks." **arXiv preprint arXiv:2202.05330** (2022). https://arxiv.org/abs/2202.05330

TECHNICAL SKILLS

- **Machine Learning skills**: explainable AI, convolutional neural nets, contrastive learning, additive and multiplicative attention mechanisms, transformer models, self-attention, multi-headed attention, model evaluation, DNN sparsification techniques (inc. pruning), model optimization and hyper-parameter tuning, custom DNN training pipelines.
- **Engineering skills**: software development, collaborative use of Git, configuring and using containerized environments for GPU experiments (i.e., Docker).
- **Tools and frameworks**: PyTorch, PyTorch Lightning, Weights and Biases, Tensorboard, TensorFlow, and JAX
- **Soft skills**: worked in team of 5 at Global Health Labs, contributed to goals important for stakeholders.
- Proficient in Python
- Experienced in C, Java, MATLAB
- Experienced in using high performance compute clusters to train deep learning models
- Experience with medical image data pipelines

RELEVANT COURSEWORK

- CSE 546: Machine Learning, UW — Autumn 2020
- CSE 599: Deep Learning, UW — Autumn 2020
- AMATH 582: Computational Methods in Data Analysis, UW — Winter 2019
- AMATH 581: Scientific Computing, UW — Autumn 2019

AWARDS AND HONORS

Achievement Rewards for College Scientists (ARCS) Foundation Fellowship — 2018 — 2020

Henley Fellowship, UW Physics Dept. — 2018

Northern Arizona University Lumberjack Scholarship — 2014 — 2018

Arthur B. Adel Scholarship, NAU Physics and Astronomy Dept. — 2017

NAU NASA Space Grant — 2016

Junior Slipher Scholar, NAU Physics and Astronomy Dept. — 2016

Chair's Scholar, NAU Physics and Astronomy Dept. — 2015

MENTORSHIP AND VOLUNTEER EXPERIENCE

Directed Reading in Physics — Jan., 2020 — May, 2022
Supervisor: Marcel den Nijs — UW, Seattle, WA

Graduate Peer Mentor Program — Sep., 2020 — May, 2021
Supervisor: Catherine Provost — UW, Seattle, WA

Ark Cat Sanctuary — Sep., 2016 — May, 2018
Supervisor: Sue Marue — Flagstaff, AZ