Olivia T. Zahn
formerly Olivia T. Thomas
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EDUCATION

UNIVERSITY OF WASHINGTON — Seattle, WA
Ph.D., Physics — *June 2018 – present*
Advisor: J. Nathan Kutz

NORTHERN ARIZONA UNIVERSITY — Flagstaff, AZ
B.S. Physics, Minor Mathematics — *May 2018*
Advisor: Christopher Mann

RESEARCH EXPERIENCE

KUTZ RESEARCH GROUP — UW, Seattle, WA
Thesis Supervisor: J. Nathan Kutz, UW Applied Math and ECE — *January 2019 – present*

Bio-inspired, sparse deep neural networks (DNNs) for animal motion control
Project mentor(s): Thomas L. Daniel, UW Biology, J. Nathan Kutz
- 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.

Sparse neural network connectivity analysis
Project mentor(s): Thomas L. Daniel, UW Biology, J. Nathan Kutz
- Utilizing methods from network sciences (i.e., network motifs) to explore the composition of sparse DNNs trained to control a biological motor control task.

Pruning Neural Implicit Flow (NIF)
Project mentor(s): Shaowu Pan, RPI Aerospace Engineering, J. Nathan Kutz
- Using neural network pruning to reduce the memory footprint of NIF, a mesh-agnostic, hypernetwork for modeling spatio-temporal flow.

PACIFIC NORTHWEST NATIONAL LABORATORY — Richland, WA
Research Mentor: Michael J. Henry — *June – September 2022*

Sparse ResNet-18 for accurate image recognition
- 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 — NAU, Flagstaff, AZ
Supervisor: Christopher Mann — *2015 – 2018*
- Measured optical properties of biological cells by using digital holography techniques and the implementation of polarized light.

RESEARCH 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, and Michael J. Henry. "Model order reduction of ResNet-18 using magnitude-based channel pruning." *In progress.* (exp. 2023)

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

Williams, Jan, **Olivia Zahn**, and J. Nathan Kutz. "Sensing with Shallow Recurrent Decoder Networks." *In progress* (exp. 2023).

INTERNSHIPS

PACIFIC NORTHWEST NATIONAL LABORATORY — Richland, WA
Data Science Training Program & Internship — *June – September 2022*
Supervisor: Brenda L. Tetreault, Research Mentor: Michael J. Henry
Responsibilities: Developed and implemented deep learning research project; attended weekly meetings with supervisor and research mentor.

RESEARCH PRESENTATIONS

Zahn, O., et al. Pruning deep neural networks for bio-inspired insect flight control. — Seattle, WA
Poster; *Inaugural Workshop: AI for Dynamic Systems* — *Mar. 17, 2022*

Zahn, O. General Examination. — Seattle, WA
Research Presentation; *UW Physics Department* — *Jan. 21, 2022*

Thomas, O. Deformation analysis of advanced material using digital holography. — Flagstaff, AZ
Abstract & Poster; *NAPSA STEM Poster Session* — *Sept. 13, 2017*

Thomas, O. Deformation analysis of advanced material using digital holography. — Flagstaff, AZ
Abstract & Poster; *NAU Undergraduate Research Symposium* — *April 28, 2017*

TECHNICAL EXPERIENCE

- Proficient in Python (inc. deep learning libraries: PyTorch, TensorFlow, and JAX), MATLAB
- Experienced in C, Java
- Experienced in using high performance compute cluster to train deep learning models

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 & 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 & VOLUNTEER EXPERIENCE

Directed Reading in Physics — UW, Seattle, WA
Supervisor: Marcel den Nijs — *January 2020 – May 2022*

Graduate Peer Mentor Program — UW, Seattle, WA
Supervisor: Catherine Provost — *September 2020 – May 2021*

Ark Cat Sanctuary — Flagstaff, AZ
Supervisor: Sue Marue — *September 2016 – May 2018*

Second Chance Center for Animals — Flagstaff, AZ
Supervisor: Sue Marue — *Summer 2017*