Dennis Johan Loevlie

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Education

Tufts University, Medford, MA, USA — September 2024-Present
Masters of Science — GPA 3.93 (unofficial transcript)
Specialization: Computer Science — Expected Graduation: Spring 2026

Carnegie Mellon University, Pittsburgh, PA, USA — September 2019-December 2020
Masters of Science — GPA: 3.91
Specialization: Chemical Engineering

West Virginia University, Morgantown, WV, USA — September 2016-August 2019
Bachelor of Science with Honors — Cum Laude
Specialization: Chemical Engineering

Publications

Ethan Harvey, Dennis Johan Loevlie, and Michael C. Hughes. Synthetic Data Reveals Generalization Gaps in Correlated Multiple Instance Learning. ML4H 2025 Symposium, Findings Track. Under review.

Dennis Johan Loevlie, Brenno Ferreira, and Giannis Mpourmpakis. Demystifying the chemical ordering of multimetallic nanoparticles. Accounts of Chemical Research, 56(3):248–257, 2023.
Available at: https://doi.org/10.1021/acs.accounts.2c00646
Code available at: https://github.com/mpourmpakis/CANELa_NP

Salem, M., Loevlie, D. J., Mpourmpakis, G. (2023). Single Atom Alloys Segregation in the Presence of Ligands. The Journal of Physical Chemistry C, 127(46), 22790-22798. DOI: 10.1021/acs.jpcc.3c05827
Available at: https://doi.org/10.1021/acs.jpcc.3c05827

Ruikang Ding, Ingrid M. Padilla Espinosa, Dennis Loevlie, Soodabeh Azadehranjbar, Andrew J. Baker, Giannis Mpourmpakis, Ashlie Martini, and Tevis D. B. Jacobs. Size-dependent shape distributions of platinum nanoparticles. Nanoscale Adv., 4:3978–3986, 2022.
Available at: https://pubs.rsc.org/en/content/articlelanding/2022/na/d2na00326k

Anantha Venkataraman Nagarajan, Dennis Johan Loevlie, Michael J Cowan, and Giannis Mpourmpakis. Resolving electrocatalytic imprecision in atomically precise metal nanoclusters. Current Opinion in Chemical Engineering, 36:100784, 2022.
Available at: https://www.sciencedirect.com/science/article/abs/pii/S2211339821001167

Presentations

Computer Vision for UAVs. XChangeIdeas Pittsburgh, 2023.

Software Development for HER High-Throughput Experiments. Carnegie Mellon University Chemical Engineering Masters Student Association Research Forum, 2020.

Mathematical Modeling and Optimization of an Ion Transport Membrane for Oxygen Separation from Air. American Institute of Chemical Engineers National Research Conference. Computing and Process Control Division, 2018.

Research Experience

Tufts University with Dr. Mike Hughes — August 2024-Present

Improving the performance of deep learning models in situations with limited data quantity or quality.

- Using attention-based multiple instance learning (MIL) to predict precursors of dementia and stroke from 3D image data (MRI and CT).
- Submitted a paper to ML4H 2025 on generalization gaps in correlated MIL.
- Developing a regularization method to encourage more interpretable attention scores.
- Trained 3D CNN and Transformer models with multiple GPUs using the Tufts HPC.
- Implemented methods for supervised learning with noisy labels.

Tufts University with Dr. Jivko Sinapov January 2025-May 2025
Work linked to Tufts Reinforcement Learning course.

- Used Group Relative Policy Optimization to improve LLMs ability to generate SVGs from text descriptions. Drawing inspiration from recent works such as; DeepSeek-R1 and AlphaMaze.
- Achieved a **18% improvement** on a benchmark evaluating SVG aesthetics, alignment, and code validity.

University of Pittsburgh CANELa with Dr. Giannis Mpourmpakis June 2021-January 2023
Applied machine learning, Boltzmann statistics, and evolutionary optimization to predict material properties of metal nanoparticles.

- Contributed to neural architecture design, hyper-parameter optimization, and fair assessment of ML models on Salem et al.
- Proposed a novel method to initiate model weights from Yihao et al. that led to a **71% reduction in the RMSE** on the datasets investigated in Loevlie et al.
- Wrote the ML applications and background section in the Nagarajan et al. review article.
- Collaborated with experimental research groups by using Boltzmann statistics to explain their findings in Ding et al.

Carnegie Mellon University with Dr. John Kitchin December 2019-December 2020
Developed software tools to improve and automate experiment design and evaluation.

- Recreated image analysis tools in Python (originally in Mathematica) to be interactive, fast, and intuitive.
- Trained a convolutional neural network classifier to extract valuable information from experimental image data.
- Developed a Python package, nb_search, to efficiently sort through, locate and open Jupyter Notebook files.
- Regressed parameters and used them to cluster different bimetallic catalysts.

Industry Experience

KEF Robotics January 2023-August 2024
KEF Robotics is a Pittsburgh-based company that provides software only integration's enabling aerial autonomy on any unmanned aerial vehicle (UAV).
Senior Computer Vision and Machine Learning Engineer (2024), Computer Vision Engineer (2023)

- Led a team of five engineers on a one-year, $500K project where I was responsible for task breakdown, budgeting, and advanced ML research and implementation.
- Led the development of efficient on-device object detection, monocular depth prediction, and 3D map generation from monocular camera images. Showcased these capabilities at two in-person demos.
- Enhanced hazard detection for UAVs with Mask2Former, a transformer-based universal image segmentation model. Fine-tuned the model to segment a new class (power lines) and generalize to a new image modality (infra-red) using **transfer learning**.
- Optimized our image segmentation neural network architecture, resulting in a significant **45% boost in inference speed** with only a 1% loss in accuracy.

AiThElite December 2020-January 2023
AithElite is a Pittsburgh-based startup company using AI to improve the college athlete transfer process.
Lead Data Scientist (May 2021 - Jan 2023), Data Scientist (Dec. 2020 - May 2021)

- Developed web scraping scripts using **Beautifulsoup** and **Selenium** to automate data retrieval and updating
- Developed and automated the feature engineering with **Numpy** and **Pandas**.
- Applied machine learning algorithms using **Numpy** and **SkLearn** to generate intelligent predictions and insights from the data.
- Built the frontend and backend of the AithELITE EliteAI website with **Django**, hosted on **AWS**.

Projects

GPT4Readability Natural Language Processing, Deep Learning, Open-Source — Summer 2023

- Developed a Command Line Interface (CLI) that leverages large language models (LLMs) and vector databases with **LangChain** and **llama.cpp** to generate a comprehensive README file and suggest code improvements for any GitHub repository.
- Supports running with cloud-based LLMs or running locally with open-source LLMs.
- Supports 15 different programming languages.

SkinsAI Computer Vision, Deep Learning, Hosted — Fall 2022

- Developed a free-access, diagnosis tool for classifying moles as benign or malignant.
- The convolutional neural network classification model was written, trained, and evaluated using **PyTorch**.

American Sign Language Active Learning Object Detection, Open-Source — Fall 2020

- Developed a GUI that uses a vanilla convolutional neural network classifier and YOLOv3 object detection to classify ASL.

Technical Skills

Languages Python • MATLAB • Java • JavaScript • C++

ML & AI PyTorch • TensorFlow • Scikit-learn • Computer Vision • Transformers • LLMs • Reinforcement Learning • Graph Neural Networks • Optimization

Computing NumPy • Pandas • SciPy • Matplotlib • HPC Clusters • TensorRT

Other Experience

WVU ChemE Reaction Engineering, *Student Grader* — Spring 2019

Awards

2024 **Awarded Community Grant** from **Hugging Face** to demonstrate Depth Anything results on videos.
2022 **2nd place** out of 24 teams in The Pitt Challenge Hackathon for building SkinsAI
2020 **3rd place** in the Chemical Engineering Masters Student Association Research Forum, Poster Competition
2020 **Category winner** in The Pitt Challenge Hackathon "Largest impact on healthcare workers" category
2019 **1st place** in AVEVA's National Simulation Competition (advanced category)
2019 **2nd place** in the Americal Institute of Chemical Engineers National Poster Competition, Computing and Process Control Division

Community Involvement

Youth robotics team working on tools for blind soccer players, *Industry Volunteer* — 2024
Organized a profit sharing event to raise funds for the flooding in Pakistan, *Leadership* — 2022
Volunteered at an outreach event to help encourage students to pursue STEM, *Leadership* — 2022
Volunteered to conduct science experiments with elementary students, *STEM Education* — 2021