Dennis Johan Loevlie

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Education		
	CWI & University of Amsterdam, Amsterdam, Netherlands	August 2026–Present
	Doctor of Philosophy in Computer Science	ELLIS PhD Program

- Advisors: Madelon Hulsebos (TRLab, CWI) & Jan-Willem Van de Meent (AMLab, UvA)
- Focus: Multimodal Tabular Foundation Models

Tufts University, Medford, MA, USA   September 2024–Present
Master of Science in Computer Science   GPA: 3.95 ([transcript](#))

Carnegie Mellon University, Pittsburgh, PA, USA   September 2019–December 2020
Master of Science in Chemical Engineering   GPA: 3.91

West Virginia University, Morgantown, WV, USA   September 2016–August 2019
Bachelor of Science in Chemical Engineering with Honors   Cum Laude

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
Available at: https://arxiv.org/abs/2510.25759

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

Synthetic Data Reveals Generalization Gaps in Correlated Multiple Instance Learning. Poster presentation at Machine Learning for Health (ML4H) 2025 Symposium, San Diego, California, December 2025.

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. Michael 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).
- Published a paper at Machine Learning for Health on generalization gaps in correlated MIL.
- Identified and resolved a quadratic scaling bottleneck in the lab's MIL codebase, enabling experiments on larger datasets
- 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-Present

Work Initially linked to Tufts Reinforcement Learning course.
- Used Group Relative Policy Optimization to improve Qwen2.5-Coder-7B's 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.
- Currently working on understanding the limitations in vision-language models (i.e. Qwen3-VL) and open vocabulary instance segmentation models (i.e. SAM3) ability to count objects in dense scenes.

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.

West Virginia University with Dr. Fernando Lima   April 2017-August 2019

Mathematical modeling and non-linear optimization for chemical process design.
- Modeled, optimized, and economically evaluated a chemical process in MATLAB — Funded by the National Science Foundation.
- Presented my findings at the American Institute of Chemical Engineers conference and was *awarded second place* in the poster competition.

Industry
Experience

KEF Robotics   January 2023-August 2024

KEF Robotics is a Pittsburgh-based company that provides software only integrations 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-May 2021

AithElite is a Pittsburgh-based startup company using AI to improve the college athlete transfer process.

Lead Data Scientist

- 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**.

Internships	**ContentsPal** May 2025-August 2025

MIT professor led AI startup in the insurance space.

Multimodal AI Intern

- Investigated and implemented learning-based duplicate detection and open-vocabulary instance segmentation.
- Worked with React and React Native to test new and existing features.

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**.

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

Awards

2026 **First place** out of 10 teams in the BrainStorm Neural Decoder Challenge, real-time auditory decoding from 1024-channel ECoG; 95% accuracy, sub-ms inference, edge-deployable model.

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)

2018 **2nd place** in the American 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