

Dennis Johan Loevlie

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Education	<p>Tufts University, Medford, MA, USA Masters of Science Specialization: Computer Science September 2024-Present Expected Graduation: Fall 2025</p> <p>Carnegie Mellon University, Pittsburgh, PA, USA Masters of Science Specialization: Chemical Engineering GPA: 3.91 September 2019-December 2020 Graduation: December 2020</p> <p>West Virginia University, Morgantown, WV, USA Bachelor of Science with Honours Specialization: Chemical Engineering September 2016-August 2019 Graduation: August 2019</p>
Publications	<p>Dennis Johan Loevlie, Brenno Ferreira, and Giannis Mpourmpakis. Demystifying the chemical ordering of multimetallic nanoparticles. <i>Accounts of Chemical Research</i>, 56(3):248–257, 2023. Available at: https://doi.org/10.1021/acs.accounts.2c00646 Code available at: https://github.com/mpourmpakis/CANELa_NP</p> <p>Salem, M., Loevlie, D. J., Mpourmpakis, G. (2023). Single Atom Alloys Segregation in the Presence of Ligands. <i>The Journal of Physical Chemistry C</i>, 127(46), 22790–22798. DOI: 10.1021/acs.jpcc.3c05827 Available at: https://doi.org/10.1021/acs.jpcc.3c05827</p> <p>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. <i>Nanoscale Adv.</i>, 4:3978–3986, 2022. Available at: https://pubs.rsc.org/en/content/articlelanding/2022/na/d2na00326k</p> <p>Anantha Venkataraman Nagarajan, Dennis Johan Loevlie, Michael J Cowan, and Giannis Mpourmpakis. Resolving electrocatalytic imprecision in atomically precise metal nanoclusters. <i>Current Opinion in Chemical Engineering</i>, 36:100784, 2022. Available at: https://www.sciencedirect.com/science/article/abs/pii/S2211339821001167</p>
Presentations	<p><i>Software Development for HER High-Throughput Experiments</i>. Carnegie Mellon University Chemical Engineering Masters Student Association Research Forum, 2020.</p> <p><i>Mathematical Modeling and Optimization of an Ion Transport Membrane for Oxygen Separation from Air</i>. American Institute of Chemical Engineers National Research Conference. Computing and Process Control Division, 2018.</p>
Research Experience	<p>Tufts University with Dr. Mike Hughes August 2024-Present Improving on the performance of deep learning models in situations with limited data quantity or quality.</p> <ul style="list-style-type: none">Applying deep learning to 3D image data (MRI and CT scans) to predict precursors of dementia and stroke. <p>University of Pittsburgh CANELa with Dr. Giannis Mpourmpakis June 2021-January 2023 Applied machine learning, Boltzmann statistics, and mixed-integer optimization to predict material properties of metal nanoparticles.</p> <ul style="list-style-type: none">Contributed to <i>neural architecture design, hyper-parameter optimization</i>, and fair assessment of ML models on Maya 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. 2024Researched and wrote the ML 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.Mentored members of the group (grad and undergrad) about public [https://tinyurl.com/mme2v6fr] and private code I have developed, as well as, building and evaluating ML models.

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 and deployed a convolutional neural network classifier to extract valuable information from experimental image data.
- Developed a Python package, `nb_search` [- <https://tinyurl.com/yzpperdc>], 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.

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.md file and suggest code improvements for any GitHub repository.
- Supports running with cloud based LLMs or running locally with open-source LLMs.
- Support 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**.

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.
- Successfully showcased these capabilities at two in-person demos.
- Enhanced hazard detection for UAVs with Mask2Former, a transformer-based universal image segmentation model. After fine-tuning the model using **PyTorch** and an in-house dataset of simulation images, it successfully segmented challenging thin obstacles (e.g. power lines) in real-world infrared (IR) images. Power line detection and avoidance was an unsolved problem at KEF before I integrated this network into our software.
- Implemented a solution that made our transformer-based image segmentation model compatible with PyTorch 2.0. This enhancement, coupled with my integration of a custom backbone, led to 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 working on 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**.

Other Experience	WVU ChemE Reaction Engineering, <i>Student Grader</i>	Spring 2019
Awards	<p>2022 2nd place out of 24 teams in The Pitt Challenge Hackathon for building SkinsAI</p> <p>2020 3rd place in the Chemical Engineering Masters Student Association Research Forum, Poster Competition</p> <p>2020 Category winner in The Pitt Challenge Hackathon "Largest impact on healthcare workers" category</p> <p>2019 1st place in AVEVA's National Simulation Competition (advanced category)</p> <p>2019 2nd place in the Americal Institute of Chemical Engineers National Poster Competition, Computing and Process Control Division</p>	
Community Involvement	<p>Youth robotics team working on tools for blind soccer players, <i>Industry Volunteer</i></p> <p>Organized a profit sharing event to raise funds for the flooding in Pakistan, <i>Leadership</i></p> <p>Volunteered at an outreach event to help encourage students to pursue STEM, <i>Leadership</i></p> <p>Volunteered to conduct science experiments with elementary students, <i>STEM Education</i></p>	<p>2024</p> <p>2022</p> <p>2022</p> <p>2021</p>
References	<p>Dr. Michael Hughes Assistant Professor of Computer Science at Tufts University, Email: mike@michaelchughes.com</p> <p>Dr. John Kitchin Professor of Chemical Engineering at CMU, Email: jkitchin@andrew.cmu.edu</p> <p>Dr. Yanni Mpourmpakis Professor of Chemical Engineering at the University of Pittsburgh, Email: gmpourmp@pitt.edu</p>	