

# Dennis Johan Loevlie

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Education	<p><b>Tufts University</b>, Medford, MA, USA Masters of Science Specialization: Computer Science September 2024-Present Expected Graduation: Spring 2026</p> <p><b>Carnegie Mellon University</b>, Pittsburgh, PA, USA Masters of Science Specialization: Chemical Engineering GPA: 3.91 September 2019-December 2020 Graduation: December 2020</p> <p><b>West Virginia University</b>, 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: <a href="https://doi.org/10.1021/acs.accounts.2c00646">https://doi.org/10.1021/acs.accounts.2c00646</a> Code available at: <a href="https://github.com/mpourmpakis/CANELa_NP">https://github.com/mpourmpakis/CANELa_NP</a></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: <a href="https://doi.org/10.1021/acs.jpcc.3c05827">https://doi.org/10.1021/acs.jpcc.3c05827</a></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: <a href="https://pubs.rsc.org/en/content/articlelanding/2022/na/d2na00326k">https://pubs.rsc.org/en/content/articlelanding/2022/na/d2na00326k</a></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: <a href="https://www.sciencedirect.com/science/article/abs/pii/S2211339821001167">https://www.sciencedirect.com/science/article/abs/pii/S2211339821001167</a></p>
Presentations	<p><i>Computer Vision for UAVs</i>. XChangeIdeas Pittsburgh, 2023.</p> <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><b>Tufts University</b> with Dr. Mike Hughes Improving on the performance of deep learning models in situations with limited data quantity or quality. August 2024-Present</p> <ul style="list-style-type: none"><li>Applying deep learning to 3D image data (MRI and CT scans) to predict precursors of dementia and stroke.</li></ul> <p><b>University of Pittsburgh CANELa</b> with Dr. Giannis Mpourmpakis Applied machine learning, Boltzmann statistics, and mixed-integer optimization to predict material properties of metal nanoparticles. June 2021-January 2023</p> <ul style="list-style-type: none"><li>Contributed to neural architecture design, hyper-parameter optimization, and fair assessment of ML models on <a href="#">Salem et al.</a></li><li>Proposed a novel method to initiate model weights from <a href="#">Yihao et al.</a> that led to a <b>71% reduction in the RMSE</b> on the datasets investigated in <a href="#">Loevlie et al.</a></li><li>Wrote the ML applications and background section in the <a href="#">Nagarajan et al.</a> review article.</li><li>Collaborated with experimental research groups by using Boltzmann statistics to explain their findings in <a href="#">Ding et al.</a></li></ul>

**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`, 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. 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**.

Other Experience	WVU ChemE Reaction Engineering, <i>Student Grader</i>	Spring 2019
Awards	<p>2022 <b>2nd place</b> out of 24 teams in The Pitt Challenge Hackathon for building SkinsAI</p> <p>2020 <b>3rd place</b> in the Chemical Engineering Masters Student Association Research Forum, Poster Competition</p> <p>2020 <b>Category winner</b> in The Pitt Challenge Hackathon "Largest impact on healthcare workers" category</p> <p>2019 <b>1st place</b> in AVEVA's National Simulation Competition (advanced category)</p> <p>2019 <b>2nd place</b> 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><b>Dr. Michael Hughes</b> Assistant Professor of Computer Science at Tufts University, <b>Email:</b> mike@michaelchughes.com</p> <p><b>Dr. John Kitchin</b> Professor of Chemical Engineering at Carnegie Mellon University, <b>Email:</b> jkitchin@andrew.cmu.edu</p> <p><b>Dr. Giannis Mpourmpakis</b> Professor of Chemical Engineering at the University of Pittsburgh, <b>Email:</b> gmpourmp@pitt.edu</p>	