

Dennis J. Loevlie

COMPUTER VISION ENGINEER · GRADUATE STUDENT RESEARCHER

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Dedicated researcher pivoting from chemical engineering to computer science

Education

Carnegie Mellon University

M.S. IN CHEMICAL ENGINEERING, GPA: 3.91

Pittsburgh, PA

Sep. 2019 - Dec. 2020

- Competed in several hackathons including the Covestro Hackathon, Hack the Northeast, and the Pitt Challenge.

West Virginia University

B.S. IN CHEMICAL ENGINEERING, CUM LAUDE

Morgantown, WV

Sep. 2016 - Aug. 2019

- Graduated with Presidential Honors from the WVU Honors college.

Publications

Demystifying the Chemical Ordering of Multimetallic Nanoparticles [🔗]

Sep. 2022

ACCOUNTS OF CHEMICAL RESEARCH (SUBMITTED, IF: 22.38)

- Developed a novel method for calculating the cohesive energy of a bimetallic nanoparticle that overcomes major weaknesses in previous models. On the systems we investigated, our method led to a 71% reduction in the RMSE compared to the original.
- Generalized this method to be applicable to any number of metals (multimetallic nanoparticles). GitHub - [link](#)

Size-dependent shape distributions of platinum nanoparticles [🔗]

Aug. 2022

NANOSCALE ADVANCES

- Used Boltzmann statistics to support experimental findings on nanoparticle shape and size distributions.
- Selected for the **2022 Popular Advances collection** which includes articles which have been very well received by the community.

Resolving Electrocatalytic Imprecision in Atomically Precise Metal Nanoclusters [🔗]

Nov. 2021

CURRENT OPINIONS IN CHEMICAL ENGINEERING

- Electrocatalysis applications of ligand-protected nanoclusters.
- Prospective section on current and possible future applications of machine learning in the field.

Research Experience

Computer-Aided Nano and Energy Lab (CANELA)

University of Pittsburgh

GRADUATE STUDENT RESEARCHER

June 2021 - PRESENT

- Developed a novel method for calculating cohesive energies of metal nanoparticles that led to a 71% improvement to the previous model.
- Applied quantum/statistical mechanics through Density Functional Theory, Boltzmann statistics, and mixed integer optimization using the genetic algorithm to better understand structure property relationships for metal nanoparticles.
- Organized and presented in several machine learning and software development meetings within the CANELA research group. Notable presentations include: version control using git/GitHub, an introduction to PyTorch and logistic regression, and developing custom Python packages.
- Mentored members of the group (grad and undergrad) about public [🔗] and private code I have developed, ML fundamentals, building models with PyTorch, and evaluating ML results.

The Kitchin Group

Carnegie Mellon University

GRADUATE STUDENT RESEARCHER

Dec. 2019 - Dec. 2020

- 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.

Control, Optimization and Design for Energy and Sustainability (CODES)

West Virginia University

UNDERGRADUATE RESEARCHER

Apr. 2017 - Aug. 2019

- Modeled, optimized, and economically evaluated a chemical process in MATLAB — Funded by the National Science Foundation.

Volunteering and Outreach

2022	Fundraising , Organized a profit sharing event with Chipotle to raise funds for people suffering from the flooding in Pakistan	Leadership
2022	Outreach , Organized outreach events with local public schools to help encourage students to consider STEM	Leadership
2021	STEM Education , Volunteered at the Carnegie Science Center, where I conducted science experiments with and answered questions from elementary students	Volunteering

Work Experience

AithELITE

LEAD DATA SCIENTIST/SOFTWARE ENGINEER

Pittsburgh, PA
May 2021 - PRESENT

- Recruited and interviewed prospective data/software engineers.
- Provide expertise in technical decisions made by the company.
- Communicate with the team and develop code to keep the EliteAI (AithElite's main application) working smoothly.

AithELITE

DATA SCIENTIST/SOFTWARE ENGINEER

Pittsburgh, PA
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 and maintained relational (MySQL) and graph (Neo4J) databases, hosted on AWS.
- Built the frontend and backend of the AithELITE EliteAI website with Django, hosted on AWS.

Projects

SkinsAI [🔗]

Pitt Challenge Hackathon

COMPUTER VISION, DEEP LEARNING

- Developed a free-access diagnosis tool for classifying moles as benign/malignant.
- Classification model was a small CNN built with PyTorch and website was built with Django web-framework and deployed with Heroku.

Question Answering Model [🔗]

CMU Course

NATURAL LANGUAGE PROCESSING

- Developed models using SpaCy that can generate questions from a provided text and also find answers to questions about a given text.

Disparity Map Generation [🔗]

CMU Course

COMPUTER VISION, DEEP LEARNING

- Modified the PSMnet architecture for disparity map generation to be used for 3D object detection.
- Implemented asymmetric convolutions and redesigned the SPP module of the PSMNet using residual blocks.
- Modifications led to a %53.65 reduction in parameters and a higher 3-pixel accuracy on I.R. images.

Speech to Text Transcription [🔗]

CMU Course

DEEP LEARNING

- Implemented a combination of recurrent neural networks (more specifically BLSTMs) and dense networks for speech to text transcription.

American Sign Language (ASL) Active Learning [🔗]

Personal Project

COMPUTER VISION, DEEP LEARNING

- Developed a GUI that uses machine learning techniques such as a vanilla convolutional neural network (CNN) classifier and YOLOv3 object detection to tell a user if they have correctly signed a letter in American sign language.

Honors & Awards & Activities

UNIVERSITY OF PITTSBURGH

2022 **2nd Place**, Built SkinsAI which was awarded 2nd place overall out of 29 teams (from Pittsburgh area schools including CMU) in the Pitt Challenge hackathon (\$2,000 cash prize) Pittsburgh, PA

2022 **GSA President**, Elected President of the Chemical Engineering Graduate Student Association Pittsburgh, PA

CARNEGIE MELLON UNIVERSITY

2020 **3rd Place**, Chemical Engineering Masters Student Association Research Forum, Poster Competition Pittsburgh, PA

2020 **Category Winner**, The Pitt Challenge, "Largest Impact on Healthcare Workers" Category Pittsburgh, PA

WEST VIRGINIA UNIVERSITY

2019 **1st Place**, AVEVA's National Simulation Competition (Advanced Category) Morgantown, WV

2019 **Vice President**, American Institute of Chemical Engineers (WVU Chapter) Morgantown, WV

2018 **2nd Place**, Computing and Process Control Division at the National 2018 AIChE Poster Presentations Morgantown, WV

2018 **Member**, Omega Chi Epsilon Chemical Engineering Honor Society Morgantown, WV

Relevant Courses

2021 **Natural Language Processing**, Carnegie Mellon University (cross-registration), Graduate Pittsburgh, PA

2020 **Introduction to Deep Learning**, Carnegie Mellon University, Graduate Pittsburgh, PA

2020 **Introduction to Machine Learning**, Carnegie Mellon University, Graduate Pittsburgh, PA

2019 **Linear Optimization (supply chain focused)**, Carnegie Mellon University, Graduate Pittsburgh, PA

2017 **Numerical Methods and Optimization**, West Virginia University, Undergraduate Morgantown, WV