

Dennis J. Loevlie

COMPUTER VISION ENGINEER · GRADUATE STUDENT RESEARCHER

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"If you invent a breakthrough in artificial intelligence, so machines can learn, that is worth 10 Microsofts." - Bill Gates at CMU

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.

Skills

Machine Learning

Computer Vision, Natural Language Processing, Deep Learning

Data Science

Feature Engineering, Data Visualization, Database Design

Software

Git/GitHub, PyTorch, Tensorflow, OpenCV, SpaCy, Sklearn, BeautifulSoup, Selenium, Numpy, Matplotlib, Pandas

Programming Languages

Python, MATLAB, JavaScript, HTML, CSS, SQL, LaTeX

Soft Skills

Leadership, Problem Solving, Communication, Academic Writing

Publications

Demystifying the Chemical Ordering of Multimetallic Nanoparticles [🔗]

Sep. 2022

ACCOUNTS OF CHEMICAL RESEARCH (SUBMITTED)

- Developed a novel method for calculating the cohesive energy of a bimetallic nanoparticle that overcomes major weaknesses in previous models. Generalized this method to be applicable to any number of metals (multimetallic nanoparticles). Submitted to Accounts of Chemical Research (Impact Factor: 22.38), 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.

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 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.

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

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

DEEP LEARNING

- Modified the PSMnet architecture for disparity map generation to be used for 3D object detection.
- Implemented asymmetric convolutions that led to a 25% reduction in the model parameters with negligible change in the 3-pixel accuracy.

Speech Recognition [🔗]

CMU Course

DEEP LEARNING

- Implemented a feed forward neural network for speech recognition on audio recordings (utterances) of variable length.

Speech to Text Transcription [🔗]

CMU Course

DEEP LEARNING

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

American Sign Language (ASL) Active Learning [🔗]

Personal Project

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

Pittsburgh, PA

CARNEGIE MELLON UNIVERSITY

2020 **3rd Place**, Chemical Engineering Masters Student Association (ChEMSA) Research Forum, Poster Competition

Pittsburgh, PA

2020 **1st Place**, 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