

# John Mihal

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## EDUCATION

### Rochester Institute of Technology

Rochester, NY

*Bachelors of Science in Computer Science, Minor in Quantum Information Science and Technology*

*2020 - 2024*

## TECHNICAL SKILLS

**Languages:** Java, Python, MatLab, C, C++, C#, SQL, HTML, CSS, JS, Perl, AWS (Amazon Web Service); Lambda, CloudFormation, S3, API Gateway, State Machine

**Concepts:** Agile, SCRUM, Databases, ML/AI, Embedded Programming, Optics, Quantum, Computer Vision

## EXPERIENCE

### Machine Learning Engineer

October 2024 – Present

*Penn State Applied Research Laboratory*

*Washington, DC*

- Developed **ML/AI** foundation models to process **multimodal geospatial data**, including satellite imagery.
- Implemented **deep learning models** such as **transformers**, **convolutional neural networks (CNN)** and **fusion models** using **Python** and **PyTorch**.
- Utilized **PyTorch Lightning** to allow for efficient **distributed training** across **CUDA GPU nodes**.
- Conducted reviews of scientific literature and presented key actionable insights to enhance team expertise.

### Machine Learning Engineer Intern

May 2024 – August 2024

*Penn State Applied Research Laboratory*

*Washington, DC*

- Developed **ML/AI** foundation model to process geospatial data.
- Researched and utilized Barlow Twins loss from **Meta** and **NYU** to train a robust **convolutional neural network (CNN)**.
- Implemented a foundation model leveraging **PyTorch**, **NumPy**, **SciKit**, **Pandas**, **Polars** with **GPU acceleration (CUDA)** in a **Dockerized AWS** environment.
- Cleaned and prepared geospatial data using **SQL**, **GeoPandas**, and **Matplotlib** for storage in **AWS S3**.

### Research Assistant

September 2023 – May 2024

*RIT Quantum Imaging Laboratory*

*Rochester, NY*

- The Quantum Imaging Laboratory focuses on designing and testing integrated photonics chips.
- Simulated light propagation on a star coupler component using the **Meep Python** library for **FDTD electromagnetic simulation**.

### Research & Pre-clinical Development IT Coop

January 2023 - August 2023

*Regeneron Pharmaceuticals*

*Tarrytown, NY*

- Worked to create integrations between scientific systems such as BioBank, Clarizen, and other laboratory information management systems (**LIMS**) using **Python** and **AWS Lambda**.
- Designed and implemented an internal **SwaggerHub** replacement using **AWS S3**, **AWS API Gateway**, **SwaggerUI** and **JS** which saved over \$20,000 in yearly licensing costs.
- Translated business requirements to develop a Dotmatics to CoreLIMS molecule synchronization system and coordinated testing with Senior Developers, Principal Business Analysts and Consultants.
- Deployed continuous integration and continuous deployment (**CICD**) pipelines by configuring **Jenkins CloudBees** and installing Jenkins shell scripts in repositories using **Perl**.

## PROJECTS

### Autonomous Vehicle Point Cloud Alignment | C++, PCL, LiDAR

Spring 2024

- Developed a pipeline to integrate point clouds from multiple autonomous vehicles into a cohesive scene by utilizing only the data points within each cloud.
- Researched and implemented algorithms such as ICP and ground registration to achieve near real time performance.

### Clash Stats | JS, Node.js, MongoDB, Express, Pug, Clash Royale API, Bootstrap CSS

Summer 2023

- Created a website where users can make shareable dashboards to view and compare live in game statistics with friends for the mobile game Clash Royale.

## EXTRACURRICULARS

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**Multidisciplinary Robotics Club:** Designing and building a robot to autonomously navigate a set course. The robot uses LiDAR, a camera and a Nvidia Jetson computer for navigation. *Fall 2023 - May 2024*

## ADDITIONAL PROJECTS

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- Dice Counter** | *Matlab* Winter 2024
- Produced a Matlab project which received pictures of dice on a table and counted the number of dice.
- Sticky Site** | *JS, Python, Flask, MongoDB, Jinja2* Winter 2024
- A public sticky note board where users can draw a sticky note and post it to the site for all to see.
- Servo Drivers** | *C, HAL, STM32 Nucleo-L476RG Micro-controller, Oscilloscope, Servo, PWM* Winter 2024
- Designed a system to feed two PWM servos rotation instruction sets and user input instruction commands which can pause the instruction sets and modify the servos directly.
- AI Language Model** | *Python, TensorFlow* Fall 2023
- Generated 4 language models trained off of scripts from the show “My Little Pony”.
  - Models used were LSTM, RNN, Two Layer Linear Model, Single Layer Linear Model, these were evaluated using perplexity, and cosine similarity between related words.
- AI Number Classifier** | *Python, TensorFlow* Fall 2023
- Implemented 8 different models (Single vs Double Layer, Linear vs Convolution, ReLU, maxPool variants and combinations) to classify pictures of handwritten numbers from the MNIST dataset.
- Frequency Reader** | *C, HAL, STM32 Nucleo-L476RG Microcontroller, Oscilloscope, Wave Generator* Winter 2024
- Wrote code which enabled the microcontroller to receive a wave and count the period of the wave with microsecond accuracy before outputting a histogram of period times.
- Weather Web App** | *JS, HTML, CSS, API's* Summer 2022
- Learned JS to formulate and develop a JS web app where users can look up the weather of a city.
- Meal Hub** | *SQL, Relational Databases, Java, Java Fx, Gluon Scene Builder, R, Kaggle, Indexes* Spring 2022
- Designed and implemented a SQL database and Java database management application.
  - The application allowed users to manage a virtual pantry, search recipes and receive recommendations.