

MICHAL BOREK

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EDUCATION

Michigan State University, College of Engineering (Honors College)
Bachelor of Science, Computational Data Science, Minor in Mathematics.

Expected May 2026
GPA: 3.84

EXPERIENCE

Institute for Cyber-Enabled Research (ICER), Michigan State University

Software Engineer Intern (HPC / ML Tooling)

East Lansing, MI
June 2023 - Present

- Shipped a **SLURM job-script validator/assistant** combining custom #SBATCH checks, ShellCheck, and **LLM review via Ollama**, reducing submission errors and improving cluster triage.
- Built a Python AI agent that parses SLURM scripts, fixes errors, and predicts CPU/GPU/memory requests; reduced average queue wait **~30%** across monthly jobs.
- Deployed a **Flask service + CLI** on **Open OnDemand** with live editor + real-time analysis + SLURM chat assistant; reachable by the HPCC community (**~200+ accounts**) and tested on **H200 GPUs** for inference throughput.
- Wrapped tooling into an OnDemand interface; onboarded **40+ researchers** in the first month; packaged LLM workflows into one-command launch scripts.

Institute for Quantitative Health Science & Engineering (IQ)

Research Assistant (Medical Imaging ML)

East Lansing, MI
November 2023 - Present

- Built a **modular PyTorch** pipeline for **ordinal** medical image grading with **fully reproducible runs** (data curation → training/eval → automatic report bundles).
- Owned hyperparameter optimization + model selection (held-out metrics + calibration); executed sweeps and tracked performance.
- Scaled training via **PyTorch DDP on SLURM/CUDA**, cutting wall-time from **8h → 3h**; added further gains using Lanczos resizing.
- Supported clinical review using Captum saliency / interpretability; contributed to SPIE 2025 paper + Radiology: AI submission (under review).

Department of Computer Science at Michigan State University

Undergraduate Teaching Assistant

East Lansing, MI
December 2022 - December 2023

- Led weekly recitations for ~40 students; aligned lesson plans with instructor + TA team; boosted average exam scores **12%**.
- Built an auto-graded lab suite (unit-test harness + rubric); reduced grading turnaround **30%** and reinforced clean-code + complexity principles.

PROJECTS

Medical Imaging Inference Platform (AWS)

In progress

- Designed and built a **job-based model prediction pipeline** for asynchronous DICOM inference using **S3** (DICOM + outputs), **RDS PostgreSQL** (metadata + job/status pointers), and **SQS Standard** (work queues).
- Implemented **GPU worker execution + failure handling**, with workers polling SQS on **ECS (EC2 GPU) / EKS**, plus **retry + DLQ** routing for poison messages and stuck jobs.

DarkVision - Nighttime Animal Classification (Driver Safety)

February 2025 – April 2025

- Improved test accuracy 14.27% → 92.62% on an 8-class 16.9k-image dataset via data curation + ResNet-18 fine-tuning; validated with class-imbalance controls, per-class F1, and confusion-matrix review.
- Ran low-light stress testing; compared Cross-Entropy vs Focal Loss trade-offs; removed mislabeled “night” images to prevent class collapse and scoped detection-first (YOLO-style) next step.

TECHNICAL SKILLS

Languages: Python, C++, SQL, Bash

ML/DS: PyTorch, scikit-learn, TorchXRayVision, Captum, NumPy, Pandas

Systems/Distributed: CUDA, PyTorch DDP, SLURM, Linux, Singularity

MLOps/Cloud/Tools: Docker, Git, Weights & Biases, TensorBoard, Jupyter, PostgreSQL, ShellCheck, Ollama, AWS (S3, SQS, RDS/Postgres, ECS/EKS)

PUBLICATIONS

- Liu, M., Loveless, I., Huang, Z., **Borek, M.**, Rosenman, K., Alessio, A., Wang, L., “Ordinal classification framework for multiclass grading of pneumoconiosis,” in *SPIE Medical Imaging 2025: Computer-Aided Diagnosis*, vol. 13407, 134072Q, Apr. 2025. doi:10.1117/12.3046353
- Wang, L., Liu, M., Huang, Z., Loveless, I., **Borek, M.**, Rosenman, K., Alessio, A. “Pneumoconiosis Multi-task Screening and Classification using Fine-Tuned Deep Learning Models.” *Radiology: Artificial Intelligence*, under review, 2025.