Jacob Raoul Molnia

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EDUCATION

Worcester Polytechnic Institute **Worcester, MA, USA**
Computer Science (BS/MS); Mathematical Science (BS) *Aug 2023 - Present (May 2027)*

- Relevant Coursework: Object-Oriented Programming, Systems Programming, Discrete Optimization, Combinatorics, Linear Algebra, Ordinary Differential Equations, Topology, Real Analysis
- Relevant Graduate Coursework: Algorithms, Artificial Intelligence, Operating Systems, Machine Learning, ML DevOps, Deep Learning, Foundations of Computer Science

Privates Gymnasium Huber (German Primary School) **Munich, Bav, DE**
Abitur Degree - Bavaria (German Pre-College Diploma) *Sept 2014 - June 2022*

WORK EXPERIENCE (WPI)

Research Assistant - Professor Murai **May 2025 - *Present***

- Poster accepted to MIT IEEE URTC 2025 on LLM-guided feature selection for time series forecasting.
- Paper submitted to IEEE Semantic Computing 2026: LLM-guided feature selection in time series models for migration flow prediction in small-data regimes.
- Research focus on TSFM, LLM-based feature selection, RAG, and prefix-tuning.

Research Assistant - Professor Paffenroth **May 2025 - *Present***

- Active research with focus on Dynamical Systems, Reinforcement learning, iterative and non-iterative neural nets. Work promoted to ongoing MS thesis.

Undergraduate Research Assistant - TMS Lab **May 2024 - January 2025**

- Consolidated multiple paper-specific software toolkits into unified MATLAB framework, improving maintainability and scalability.
- Implemented comprehensive unit testing framework for CI/CD and robust software development.
- Applied unit testing methodologies, version control systems, and object-oriented programming techniques.

Teaching Assistant; Academic Tutor & ARC Resource Coordinator **May 2024 - *Present***

PROJECTS

- **Dual Major Qualifying Project (BS Computer Science & Math)** - *In Progress*
  - Built custom embedded Linux distribution and ROS2 node manager for humanoid robotics lab. Deployed 2-server Kubernetes cluster with Jenkins CI/CD, ArgoCD, and Cloudflare tunnels.
  - Developing RL-based neural network pruning algorithm using persistent homology on activation spaces. Analyzing topological invariants to guide compression while preserving model performance.
- **Lasker Morris Challenge**
  - Designed game referee system for 9 Men's Morris variant supporting 60+ student AI agents. Created testing framework for minimax algorithm evaluation and tournament management.
- **NERD: Neural Educational Response Development**
  - Fine-tuned large language model for personalized tutoring tasks. Adapted training methodology from educational AI research to improve student engagement and learning outcomes.
- **Traceface: Real-time Facial Recognition System**
  - Built real-time facial recognition pipeline using YOLOv8 and DeepFace achieving 15+ FPS with 97.35% accuracy on LFW dataset. Integrated ChromaDB for scalable embedding storage and retrieval.
- **Email Priority Ranking with Neural Networks**
  - Developed email prioritization system using CNN ensemble and SimCSE-BERT to classify messages by urgency and sentiment. Trained on 500K Enron emails with auto-labeling via BART-MNLI and VADER. Achieved modular architecture with tunable priority weighting.

SKILLS

Programming Languages: C/C++, Python, golang, Rust, LaTeX
Libraries: torch, tensorflow, pandas, numpy
Tools: git, wandb, huggingface, nix, grafana, prometheus, uv, k3s, docker
Software: KICAD, MATLAB, Overleaf, proxmox
Languages: German (native), English (native), Latin (Basic)

HONOURS

- **Deans List** Worcester Polytechnic Institute
- **Best TA Computer Science** (undergraduate) Worcester Polytechnic Institute - 2024/2025