

Alexander Skula

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EDUCATION

Massachusetts Institute of Technology (MIT)

Cambridge, MA

B.S. in Computer Science & Engineering, Mathematics

Expected June 2028

- **Relevant Coursework:** Linear Algebra, Differential Equations, Probability & Statistics, Algorithms, Graph Theory, Multivariable Calculus

WORK EXPERIENCE

IBM Watson AI Lab

Cambridge, MA

Software Engineering Intern

Sept 2025 – Present

- Design and develop UI/UX tools for Mellea, an open-source Python library enabling structured, reliable generative AI pipelines for large-scale models and data processing across 50+ enterprise applications.
- Collaborate with IBM Research scientists to diagnose usability bottlenecks and deploy solutions that accelerate adoption among AI/ML practitioners and enterprise developers.

Mantis AI

Cambridge, MA

Platform Technical Lead, Undergraduate Researcher

Sept 2025 – Present

- Lead technical development for a 12-person developer team building a scalable cognitive cartography platform featuring real-time visualization tools for high-dimensional data in science, finance, medicine, and ML.
- Designing and deploying agentic automated meta-Mantis management workflows for team operations, workflow tracking, and task assignment.

Mantis AI, MIT Computer Science & Artificial Intelligence Lab

Remote

Undergraduate Researcher

May 2025 – Aug 2025

- Rebuilt Mantis frontend rendering, semantic/syntax search, and temporal navigation, introducing custom object pooling and streaming, which reduced memory footprint by 90%+ on large-scale embedding landscapes.
- Built an innovation ecosystem mapper for co-embedding patents, startups, financial releases, and research papers.

RESEARCH EXPERIENCE

Independent Research

New Haven, CT

2-Near Perfect Numbers of the Form $2^k p^m$ (Under Review)

Jan 2025 – Aug 2025

- Authored computational number theory paper classifying all 2-near perfect numbers $2^k p^m$ into six cases, proving non-existence for 10+ prime forms and solving open problems in multiplicative number theory.
- Developed optimized C++ algorithm using enhanced Sieve of Eratosthenes, reducing computational search space by 99%+ and enabling verification of theoretical results for numbers up to 10^{12} .

Independent Research

New Haven, CT

Dots and Boxes on Certain Families of Graphs (Under Review)

Jan 2024 – May 2024

- Developed Python/NetworkX algorithm processing 1M+ graph configurations with 95% reduction in redundant calculations, extending PSPACE-complete game classification theory.
- Proved novel theoretical results for specialized graph structures, contributing to computational game theory with applications in algorithmic complexity and graph optimization.

PROJECTS

wBlock | *JavaScript, Swift, SwiftUI*

- Developed the first free and open-source ad blocker for Safari in fully-native SwiftUI, achieving a 60-85% memory reduction compared to JavaScript alternatives and gaining nearly 2,000 GitHub stars.
- Engineered ML-optimized dynamic scriptlets to complement static filter lists on sites with anti-adblock measures.

HandMaestro | *JavaScript, Astro, TensorFlow, MediaPipe*

- Engineered a real-time American Sign Language recognition system using MediaPipe's GestureRecognizer and custom machine learning models with on-device machine learning.

TECHNICAL SKILLS

Programming Languages: Python, C++, Java, Swift, JavaScript, SQL, R, MATLAB, Rust, Bash

Machine Learning & Quantitative: TensorFlow, PyTorch, scikit-learn, NumPy, pandas, Statistical Analysis, Time Series Analysis, Financial Modeling, Monte Carlo Methods, Computer Vision, NLP

Frameworks & Tools: React, Node.js, Django, SwiftUI, Git, Docker, AWS, GCP, PostgreSQL, MongoDB, Jupyter