Zenas Boamah

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EDUCATION

Haverford College **Expected Graduation: May 2027**
Bachelor of Science in Computer Science and Applied Mathematics *Haverford, PA*
Extracurricular: Varsity Track Student Athlete, ColorStack, Havercode, Mathematics Inclusions and Diversity Committee

Honors/Awards: John P. Chesick Scholar (for First Generation / Low Income Students), Centennial Conference Winter Academic Honor Roll (2024-25), Charles Apel Robinson 1928 Memorial Scholarship Fund Receiver (Full-ride for 4 years)

Interest: I am a rising Junior at Haverford College interested in human–computer interaction through VLMs, programming languages and compilers, and Machine Learning Systems.

Relevant Coursework

Introduction to Computer Science(CS105), Dynamics and Integration (Math118), Multivariable Calculus(Math121), Data Structures & Algorithms(CS106), Waves and Optics(Phys213), Linear Optimization(MATH H210), Linear Algebra(MATH H215),Principles of Computer Systems (CS251), Differential Equations (MATH H204)

Technical Skills

Programming Languages: Python , Java, C# , HTML, CSS, JavaScript, C++, C
Technologies/Frameworks: ROS, LLVM, Unix, Django, React, Node.js, Git, MongoDB, SQL

Experience

Haverford Robolab **February 2025 – Present**
Undergraduate Researcher (Supervised by Professor Thao Nguyen) *Haverford, PA*
- Calibrated stereo-camera rigs and Intel RealSense depth sensors on a Franka Emika arm, reducing reprojection error by $\approx 15\%$ to improve data quality for the VLM-based system enabling autonomous household task planning.
- Developed a ROS-based perception pipeline in Python integrating RealSense depth data with OpenCV, PCL, and YOLOv5 for real-time object detection ("grinding dino") at 30+ FPS, supporting scene understanding.
- Wrote ROS2 client and server service code to coordinate distributed perception and control modules, facilitating seamless command execution.
- Built coordinate-frame transforms via `tf2` broadcasts to fuse multi-sensor data in the robot's base frame, enhancing VLM-based decision accuracy for end-effector positioning within ± 2 mm of target.

NANOGrav **May 2024 – May 2025**
Undergraduate Researcher (Supervised by Professor Andrea Lommen) *Haverford, PA*
- Worked under Professor Andrea Lommen under the project title, NANOGrav Physics Frontiers Center, funded by the NSF. Built an algorithm to predict lunar occultation events with Python, enhancing autonomous space navigation.
- Used astropy to process FITS files for high-quality astronomical data management
- Leveraged Unix for automating data pipelines, managing astronomical datasets, and running batch processing scripts, ensuring efficient handling of large volumes of observational data.
- Presented my research at the North American Nanohertz Observatory for Gravitational Waves (NANOGrav) meeting.

Haverford Digital Scholarships **December 2023 – May 2025**
Backend Developer *Haverford, PA*
- Designed robust vocabulary support and STATS dashboard using Django, enabling text complexity analysis.
- Implemented readability metrics using PostgreSQL for efficient data handling.
- Developed RESTful APIs to support seamless integration with external applications, improving data accessibility and interoperability. The project can be explored at The Bridge.

Projects

HaverSearch | *Python, LLaMA* **August 2024**
- Developed an intelligent chat system for Haverford College students to easily find and enroll in courses.
- Utilized the LLaMA open-source model for intelligent search query processing and suggestions.
- Leveraged Chainlit for creating interactive user interfaces and facilitating seamless integration with the LLaMA model.

HaverChat | *React, Node.js* **July 2024**
- Developed a chat application for Haverford College students with class channels and study group chats.
- Enhanced communication and collaboration among students through real-time messaging and user-friendly interface.

Trico Hacakathon | *C#, Unity* **November 2023**
- Designed a gamified course visualizer called "TriTrack" for the Trico Hackathon that tracks course and graduation progress throughout the college journey, utilizing C# and Unity.
- Integrated core features for course planning, progress tracking, and graduation requirement management, enhancing the overall student experience.