Kiera McCormick — CV

Johns Hopkins University

3400 N Charles St.

Baltimore, MD 21218

kmccor23@jh.edu

(302) 685-3128

ORCID: 0009-0002-3503-4721

RESEARCH INTERESTS

My research and work focus on the development of Large Language Models for higher scientific research, human and AI comparison and cooperation on Natural Language Processing tasks, advancing open-source science, prompt engineering, evaluating human-computer interactions, question-answer chatbot applications, and more. I am also interested in exploring the possibilities of machine learning for interdisciplinary fields, AI safety, and machine translation.

EDUCATION

Johns Hopkins University   **Baltimore, MD**

Masters of Science in Engineering in Computer Science   Expected Graduation: May 2027

- **Concentration:** Human Language Technology

- **Relevant Coursework:** Machine Learning, Natural Language Processing, Human Language Technology

Loyola University Maryland   **Baltimore, MD**

Bachelor of Science in Engineering   Graduated May 2025

- **Concentrations:** Electrical and Computer Engineering

- **Minor:** Mathematics

- **GPA:** 3.745

- **Dean's List Honors:** Fall 2021, Spring 2022, Fall 2022, Spring 2023, Fall 2023, Spring 2024, Fall 2024, Spring 2025

- **Relevant Coursework:** Physics I & II, Linear Circuit Analysis, Statics, Calculus I, II, III, Electronics, Digital Logic, Quantum Computing, Signals and Systems, Ordinary Differential Equations, Programming Tools, Object-Oriented Engineering Design, Probability and Statistics, FPGA Design, Communications, Linear Algebra, Electromagnetics, Microprocessor-Based Systems, Advanced Linear Algebra, Quantum Computing II, Power Systems, Engineering Systems Analysis

Danish Institute for Study Abroad **Copenhagen, DK**

Core Course: Holocaust and Genocide *Spring 2024*

PROJECTS

Quantum Computer Simulator **Spring 2022**

- Engineered a Quantum Computer simulator in Python, leveraging object-oriented programming principles in a semester-long collaborative project.

Solar Panel Mars Rover **Fall 2023**

- Collaborated within a four-person team to design and construct an autonomous Mars Rover prototype with innovative solar recharging capabilities.

- Spearheaded the development of the rover's motion control system using Arduino programming, optimizing mobility and navigation.

- Engineered a power conversion system to efficiently utilize solar energy for autonomous recharging.

- Implemented an advanced sun-tracking algorithm for the solar panel, maximizing energy collection in variable conditions.

Hotspot Homing Robot **September 2024 – May 2025**

- Developed an autonomous mobile robot designed to detect and localize rogue access points in office environments, sponsored and mentored by members of the Applied Signal Technology sector at Raytheon.

- Integrated wireless signal processing and detection techniques with navigation systems, such as Simultaneous Localization and Mapping, to create a comprehensive security solution.

- Collaborated with an interdisciplinary team to design a user-friendly interface for real-time threat visualization and reporting.

RESEARCH AND WORK EXPERIENCE

Center for Astrophysics | Harvard & Smithsonian **Cambridge, MA**
AstroAI Summer Intern
January 2025 – August 2025
- Engineered prompts to generate concise and discriminative summaries about astrophysical X-ray sources from Chandra Archives data and created visualizations to understand the prompting effects.
- Extracted embedded physical parameters to evaluate LLMs' understanding of scientific knowledge.

- Applied sparse autoencoders to reveal novel patterns and relationships among astrophysical objects.

Space Telescope Science Institute and Johns Hopkins University   **Baltimore, MD**
Summer Astronomy Space Program and the Annual Jelinek Memorial Summer Workshop
May 2024 – August 2024
- Examined the application of Artificial Intelligence and machine learning, particularly Large Language Models (LLMs), in astronomy research. Assessed the potential of LLMs to enhance research efficiency and reliability.
- Designed and implemented LLM-powered chatbots for deployment on Slack, specializing in prompt engineering, conducting comparisons between open and closed-source models, integrating information retrieval pipelines, and creating evaluation benchmark datasets.

Omega Technical Services at Los Alamos National Laboratory   **Los Alamos, NM**
Engineering Intern
May 2023 – August 2023
- Collaborated with the industrial engineering team at the Los Alamos National Laboratory, focusing on task scheduling optimization through databases and automation. Transformed a previously manual task of job scheduling to an automated system.

- Utilized database coding and conducted data analysis using tools such as MicroStrategy, Excel, SQL, Python, VBA, and Confluence, contributing to the creation of metrics and dashboards for effective data visualization.

- Worked towards automating an extract, transform, load (ETL) pipeline through MariaDB, MS Task Scheduler, and Alteryx.

Loyola University Maryland   **Baltimore, MD**
Physics Teaching Assistant and Tutor
September 2022 – May 2025
- Direct students in weekly Physics problems that align with their ongoing coursework.

- Work for two hours weekly in the Physics lab for students seeking help with specific topics.

University of Delaware   **Newark, DE**
Junior Physics Intern
March 2020 – August 2020
- Contributed to an astrophysical research project analyzing the spectral characteristics and luminosity of massive stars. Developed Python scripts using Jupyter Notebook to process and visualize complex stellar data.

- Created data visualizations of spectral lines and magnitude measurements, enhancing the interpretation of stellar properties.

PUBLICATIONS

- *Encoding and Understanding Astrophysical Information in Large Language Model-Generated Summaries*
    - **McCormick, K.,** Martínez-Galarza, J. R., 2025, *NeurIPs: ML4PS*, accepted.
- *From Queries to Criteria: Understanding How Astronomers Evaluate LLMs*
    - **McCormick, K.**, Hyk, A., Zhong, M., Ciucă, I., et al., 2025, *COLM*, accepted.
- *Designing an Evaluation Framework for Large Language Models in Astronomy Research*
    - Wu, J. F., Hyk, A., **McCormick, K.,** Ye, C., et al., 2024, *ICML: AI4Science workshop*, submitted, arXiv:2405.20389.
- *pathfinder: A Semantic Framework for Literature Review and Knowledge Discovery in Astronomy*
    - Iyer, K. G., Yunus, M., O'Neill, C., Ye, C., Hyk, A., **McCormick, K.,** et al., 2024, *ApJS 275 38,* arXiv:2408.01556.

CONFERENCES

Machine Learning conference/workshop paper reviewer for *NeurIPS* for the EvalEval Workshop in 2024.

Volunteer at the *AstroAI Workshop*

Gender Minorities and Women in Physics Summit   **Johns Hopkins University**

Poster Presentation   September 14, 2024

- Discussed work on the application of Large Language Models in Physics and Astronomy.

American Astronomical Society 245   **National Harbor, MD**

iPosters   January 11-16, 2025

- Presented "Evaluating Large Language Models in Astronomy Research" at the Machine Learning Methods session.
- Co-authored "pathfinder: a Semantic Framework for Literature Review and Knowledge Discovery in Astronomy" at the Machine Learning Methods session.

Talks

- Co-authored "Evaluating LLM Tools: Insights from Astronomer Interactions with a RAG-Based Slack Chatbot" at the Technology Developments in Outreach, Education, and Research session.

AstroAI Workshop   **Cambridge, MA**

Poster Presentation   July 7-11, 2025

- Presented "Evaluating Large Language Models in Astronomy Research".

Conference on Language Modeling   **Québec, Canada**

Poster Presentation   October 7-10, 2025
- Presented "From Queries to Criteria: How Astronomers Evaluate LLMs".

TECHNICAL SKILLS

Python, Java, SQL, VBA, C++, Git, MATLAB (certified), Simulink, Raspberry Pis, Arduinos, FPGAs, SolidWorks, LT Spice, Active HDL, familiarity with ML toolkits (PyTorch, TensorFlow, etc.)

Completion of the 2024 Summer School on Human Language Technology at Johns Hopkins University

EXTRACURRICULAR ACTIVITES

Society of Women Engineers   **Baltimore, MD**
President   February 2023 – May 2025
Engineering Industrial Advisory Board   **Baltimore, MD**
Class of 2025 Representative   December 2023 – May 2025
Loyola University Maryland Honors Program   **Baltimore, MD**
Member and Peer Mentor   September 2021 – May 2025
Haig Scholar   **Baltimore, MD**
Member   February 2024 – May 2025
Loyola Women's Club Lacrosse Team   **Baltimore, MD**
Academic All-American   September 2022 – May 2025
Institute of Electrical and Electronics Engineers   **Baltimore, MD**
Member   October 2021 – May 2025