

EDUCATION

Purdue University

West Lafayette, IN

Bachelor of Science in Theoretical Mathematics (GPA: 3.00)

Class of 2024

Minor: Earth, Atmospheric, and Planetary Sciences (EAPS)

- Data Science certificate (Expected Dec. 2024)
- Relevant Coursework: Differential Equations, Statistics, Probability, Linear Algebra II, Abstract Algebra

EXPERIENCE

Research Assistant

West Lafayette, IN

Purdue University

June 2023 – Present

Notions of Positivity and Complexity in Quantum Information Theory (*Supervised by Professor Thomas Sinclair*):

- Exercised problem-solving in various math disciplines to prove Farkas' lemma (using hyperplane separation) and conjectures on classifiers.
- Utilized linear programming optimization to create 100k matrices and support vector machines to classify them based on certain criteria. Visualized and interpreted data using 3D-plots and statistical methods.
- Presented findings to a group of 40 students and faculty.

Research Assistant

West Lafayette, IN

Purdue University

May 2022 – Dec 2022

Exoplanetary Atmospheres & Atmospheric Dynamics (*Mentored by Professor Lei Wang of Purdue University and Michael Battalio of Yale University*):

- Conducted in-depth research on Martian mid-latitude jetstream and storm track variability using Mars reanalysis datasets (MACDA, EMARS).
- Formulated research questions to understand the large-scale waves present in the Martian atmosphere. Presented on Rossby Waves and Annular Modes to my research group.
- Collaborated with a team of undergraduate researchers, developed Python scripts for data analysis, and participated in an informal boot camp for Geophysical Fluid Dynamics.

CODING PROJECTS | github.com/karim-sharkawy

Class Project (*An Analysis of Trending Videos and COVID-19*)

- Programmed two large data sets in R, analyzing trending YouTube videos during COVID-19. Wrote a 37-page paper on our findings.
- Utilized statistical methods including, two sample t-tests, ANOVA and linear regression tests, confidence intervals, and the Central Limit Theorem.

Purdue Data Mine (PDM) & Sprachen Karte

- Implemented data science strategies including scraping and parsing websites using XML, manipulating data using PANDAS, and accessing and extracting information from large data sets using Selenium.
- Created "Sprachen Karte", an interactive language diversity visualization tool. Parsed 7,700 languages from Ethnologue and fetched their properties. Applied their coordinates to a map for users to visualize.
- Cleaned the data to account for interpretation and utilized data visualization and analysis techniques, creating pie charts, geospatial distributions, and other graphs.

EXTRACURRICULARS

Clubs

Purdue University

West Lafayette, IN
Sep 2020 – Present

- Global Science Partners
Mentored international students in the College of Science.
- Muslim Student Association
Vice President and religious chair
- Meteorological Association
Secretary

Outreach

Purdue University and outside community

West Lafayette, IN
Oct 2019 – Present

- Recorded a video during Purdue EAPs passport week teaching children about exoplanets and climate change for Earth Day.
- Served as camp counselor for an elementary school in Troy, Michigan and led a group of 12 children.

SKILLS

Programming Skills	Python, SQL, R, XML
Libraries	NumPy, SciKit-learn, Matplotlib, TensorFlow/PyTorch
Management/Typeset	Git, LaTeX
Languages	Arabic (fluent), German (intermediate), Korean (basic)
Interests	Applied linear algebra, climate change mitigation, climate informatics