Aidan Matthews

aidanjm@princeton.edu | (973) 769-6885

Education

Princeton University, Princeton, NJ *Expected Graduation May 2024*

GPA: 3.96 | Tau Beta Pi Engineering Society

Bachelor's of Science in Engineering in **Civil and Environmental Engineering**

Relevant Coursework (*-graduate course)

— Hydrology + Fluid mechanics: Ecohydrology*, Theory of Groundwater Flow*, Boundary Layer Meteorology*, Physical Hydrology*

— Math: Probability and Stochastic Systems, Engineering Math II (PDES), Applied Network Analysis,* Stanford Coursera game theory, Self studied: Mean field theory, stochastic differential equations

— Data science: Introduction to Data Science, Algorithms and Data Structures, Big Data, MIT edX machine learning certificate, commodities and energy markets

Experience

Independent Researcher, High Meadows Environmental Institute *Summer 2023 - present*

— Independent research project. Developed a novel model combining long and short term time horizons to predict plant traits under different climates.

— Lead author on a paper which predicts functional plant responses to water stress based on economic optimization theory and risk management.

— Advisor: Professor Amilcare Porporato, Princeton University.

Technical Lead - Engineers Without Borders, Princeton Chapter *Fall 2020 - present*

— Traveled to Isibania, Kenya to work with community members to sustainably manage the solar powered borehole used by over a hundred people.

— Leading water flow calculations and talks with the local utility in Kenya to plan a large capacity water tower (>250,000L) to serve the Nyabohanse school and neighborhood.

— Leading, coordinating, and teaching a group of 20 undergraduates to perform relevant pipe flow, GIS, CAD and water pollution tasks.

WARREDOC Ecohydrology Graduate Summer School, Palermo University *Summer 2023*

— Weeklong intensive graduate program on ecohydrology taught by leading experts.

— Gave a schoolwide lecture on a soil-plant-atmosphere continuum and model implementation

Community Researcher at Moonshot Missions, Washington DC *Summer 2022*

— Worked with leading water utility consultants to help low income utilities handle crises and improve operations at a rapidly growing non-Profit, Moonshot Missions.

— Authored and organized reusable templates for dealing with widespread problems of water utilities.

— Gained an in depth knowledge of water and sewage utilities in the US, financially and technically.

Research Internship – NITSAN Labs, Tel Aviv University *Summer 2021*

— Analyzed hundreds of GB of data from the Indian census and cross-referenced with satellite data.

— Used econometric techniques and GIS mapping software to analyze trends relating to water usage, wealth inequality, and climate.

Treasurer–ASCE Princeton Chapter, Princeton, NJ *Fall 2021 - Spring 2021*

— American Society of Civil Engineers (ASCE). Organize finances for projects, events, and speakers.

McGraw Tutoring, Princeton, NJ *Fall 2021 - Fall 2022*

— Tutor Princeton students in multivariable calculus, linear algebra, and physics.

Verizon Wireless Zone, Madison, NJ *Spring 2018 - Fall 2019*

— Repaired and replaced screens, batteries, speakers, and other hardware issues.

Engineering Tour Guide, Princeton, NJ *Fall 2022 - Present*

— Give tours to groups of interested undergraduate applicants on a regular basis.

Other Research Projects

— Developed a combined plant-atmosphere model to analyze feedback effects between the atmospheric boundary layer and plants to look at impact of CAM plants and nocturnal transpiration.

— Long term prediction of Lakes Mead + Powell water levels under different climate scenarios and management plans

— Hydrograph streamflow prediction using neural network machine learning in python.

— Modeled soybean prices using weather, fertilizer price, oil price, and other measures of demand

— Current Thesis: modeling coupled soil nutrients cycles using network reaction theory

Skills and Interests

— Complex environmental systems: e.g., nonlinear dynamics, chaotic systems, noise-induced phenomena in systems, ecosystems, weather systems

— Optimization: optimal control theory, evolutionary game theory, optimization under uncertainty

— Data science and ML: Physics informed ML, model calibration and data assimilation