

# Tarek Sallam

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## Education

**Carleton University**  
*Bachelor of Computer Science*

**Expected Graduation: May 2027**  
*Ottawa, Canada*

- Concentrations: Artificial Intelligence and Machine Learning, Mathematics minor
- Relevant coursework: Probability & Statistics, Multi-Variable Calculus, Numerical Linear Algebra

## Experience

**Carleton University**  
*Teaching Assistant - Discrete Structures I, II*

**May 2024 – Current**

- Guided students through mathematics proofs during weekly tutorial sessions to reinforce and solidify their understanding of the material by providing hands-on practice and personalized support
- Offered one-on-one assistance during office hours to help students enhance their understanding of the material by addressing their questions.

**Carleton University, Teaching & Learning Services**  
*XR Technology Assistant*

**September 2023 – May 2024**

- Streamlined the process of searching for and locating equipment, by developing automation scripts with Python to organize equipment for over 100 professors, instructors, and team members.
- Configured and maintained various sets of equipment, including Oculus Quest 3 and HTC Vive, by installing drivers and updating software, allowing professors and instructors to use them effectively.

## Personal Projects

**ML Models From Scratch**  
*Developer*

**December 2024**

A variety of classical machine learning algorithms built purely with NumPy

- Implemented Linear/Polynomial regression, Logistic regression, Softmax regression and the Support Vector Machine algorithm using only NumPy to understand the inner-workings of machine learning with a focus on the mathematical foundations.
- Documented all mathematical derivations behind each model, including the gradients and probabilistic reasoning. This provides a comprehensive resource for others who want to learn, by clearly explaining each step of the derivations with both math and code snippets.

**Fantasy Football Drafter**  
*Developer*

**August 2024**

A deep reinforcement learning model to draft a roster of players in a fantasy football draft

- Scraped average draft position and projection data using BeautifulSoup to support the custom draft environment and player valuation, then used Pandas and NumPy to sort, filter, and aggregate the data for the environment.
- Implemented a Monte Carlo policy gradient algorithm with a neural network policy using TensorFlow and Keras to maximize projected points by drafting the top-valued player in each position, with an epsilon-greedy approach to ensure all roster spots are effectively filled.

**Dynamic Web Orrery (NASA Space Apps Hackathon 2024 Local Winner)**  
*Developer*

**October 2024**  
*Ottawa, Canada*

A dynamic web orrery to visualize planets and their orbits

- Collected Keplerian data for various planets and used NumPy to sort and clean it. The refined data was then processed through a series of matrix calculations to determine planetary positions keyframes at a specific time.
- The processed keyframe data was integrated into the frontend using three.js, applying a scaling factor and linear interpolation between keyframes to precisely render planetary positions.

## Skills

**Languages:** Python, C, C++, Java, JavaScript, SQL, HTML/CSS

**Libraries/Tools:** Scikit-learn, NumPy, Pandas, Matplotlib, TensorFlow, Keras, Jupyter, Git

**Platforms:** Linux, MacOS, Windows