Andre Mello

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EDUCATION

- **University of British Columbia** Vancouver, BC
  Bachelor of Physics; Average: B+ *Sept. 2019 – Dec 2022*
  Relevant courses: Object Oriented Programming, Algorithms and Data Structures, Software Construction, Machine Learning and Data Mining, Computational Physics, Numerical Computational Physics, Embedded Systems Programming, Lab Data analysis, Error Correcting Code, Combinatorics, Signal Processing

SKILLS

- **Programming:** Python, Javacript, Golang, Git, SQL, Postgres, Linux, HTML, CSS, Docker, GraphQL
- **Soft Skills:** Experienced communicator, Experience writing quantitative reports
- **Math:** Coding Theory, Linear Algebra, Combinatorics, Probability and Statistics, Multivariate Calculus, Partial Differential Equations, Time Series Analysis, Numerical Methods for Differential Equations

WORK EXPERIENCE

- **Python and Algorithms Instructor** Vancouver, BC
  Sager Education *June 2022 - December 2022*
  - Taught Python and other peripherals such as Git and MySQL.
  - Taught algorithm classes with the goal of preparing students for the Waterloo Canadian Computing Competition.

- **Research Assistant** Vancouver, BC
  UBC Park Lab *May 2022 - December 2022*
  - The UBC Park Lab focuses on improving and developing methods in privacy-preserving machine learning, which aims at facilitating data analyses without sacrificing privacy.
  - Worked on a project to create a provably private technique to reduce the size of a dataset while maximizing the accuracy of different classifier models.
  - Trained and tested fully connected and convolutional neural networks to test the generalization of the distilled dataset produced by the aforementioned technique.

SOFTWARE PROJECTS

- **TikTok-like App Backend** Golang, MongoDB, GraphQL, Docker, NGINX
  - Implemented the backend CRUD API with user authentication where users can sign up, post, see other user's posts, like and dislike posts, and update their own posts.
  - The backend was designed to be secure, running on a docker image with all the passwords being hashed, salted, with pepper and only one port exposed to the outside world.
  - Modular design makes the backend easily extensible, and it is currently being extended to collect data and make use of a modular recommender system.

- **Private Graph Neural Network Metrics** PyTorch
  - Collaborated with two members of the UBC research community to implement a novel graph neural network from architecture named GAP by Sajadmanesh et al and test different components to optimize it.
  - Implemented different aggregation functions based on similarity metrics and modified the graph structure to improve privacy for nodes with few neighbors.
  - Wrote a paper on the different techniques and their quantitative impacts on data privacy and classification rate.

- **Galaxy Simulation** Matlab, Differential Equations
  - Simulated galaxy interactions with over 20,000 stars. Implemented a differential equation solver with time complexity that grows linearly with the number of stars in order to make it possible.
  - Implemented and tested a differential equation solver using the RK4 algorithm. Tested the solver for accuracy using the expected error function.
  - Wrote a report on the interactions between the galaxies and the formation of spiral arms and the relationships between the distance, radius, mass, angular momentum, and spiral arm formation.

LEADERSHIP POSITIONS

- **Treasurer and Social Coordinator** Vancouver, BC
  UBC Physics Society *Sept. 2020 - Sept. 2022*
  - Managed club finances, applied for grants, created club budget, and ended the year with a small surplus.
  - Organized and prepared social events so students could meet each other and interact during lockdown.