

Matthew Varona

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Education

University of Toronto

DOCTOR OF PHILOSOPHY, COMPUTER SCIENCE

Toronto, Canada

Beginning September 2024

- Research in data visualization and human-computer interaction
- Primary advisor: Prof. Carolina Nobre

New York University Abu Dhabi

BACHELOR OF SCIENCES, COMPUTER SCIENCE AND INTERACTIVE MEDIA (GPA: 3.7/4)

Abu Dhabi, UAE/New York, USA

2024

- Capstone (honors thesis) advisor: Prof. Enrico Bertini, Northeastern University

Research Experience

Northeastern University - Khoury Visualization Lab

RESEARCH INTERN

Remote

May 2021 - April 2024

- Project: **Visualization of machine learning classifier boundary points**, with Prof. Enrico Bertini
- Built a Python library that computes decision boundary points of classifier models to support model interpretability.
- Designed and implemented novel interactive visualizations of boundary points using d3.js.
- Formalized the conditions necessary for boundary points to be useful assets in visual, example-based model validation.

Hasso Plattner Institute - Human-Computer Interaction Lab

RESEARCH INTERN

Berlin, Germany

May 2022 - August 2022

- Project: **Adaptive vector drawing toolsets for laser cutting**, with Prof. Patrick Baudisch
- Analyzed drawing workflows and interviewed makers to create a taxonomy of drawing paradigms for laser cutting outlines.
- Developed a Typescript+Node app that analyzes a set of laser-cut outlines to generate optimal toolsets for creating similar assets.

NYU Abu Dhabi - Center for Space Science

RESEARCH ASSISTANT

Abu Dhabi, UAE

October 2020 - June 2021

- Conducted linear regression, anomaly detection, and exploratory analysis on solar radiation data from Mars in support of the UAE's first-ever interplanetary space mission (Emirates Mars Mission).

Industry Experience

Sakay.ph

SOFTWARE ENGINEERING INTERN

Remote

September 2020 - October 2020

- Developed customer service chatbot, collaborating with UX and engineering teams.

Sakay.ph

DATA SCIENCE INTERN

Taguig, Philippines

May 2020 - August 2020

- Worked on transit stop data infrastructure and a visualization toolkit for analyzing transit demand vs. coverage.

Teaching Experience

Fall 2020

Teaching assistant for **IM-UH 2310, Decoding Nature** - delivered lectures, assembled readings, and created p5.js code demos

2019-2020

Debate coach at the **NYUAD High School Debate Workshop** - developed lesson plans, interactive workshops, and demo debates to teach public speaking and rhetoric to 50+ high school students

Publications and Presentations

- 2024** Matthew Varona, Daniel Kerrigan, Enrico Bertini. "Fencer: Visual Exploration of Classifier Boundary Points." *Currently under review.*
- 2023** Conrad Lempert, Julian Arnold, Matthew Varona, Patrick Baudisch. "UIGenerator: Generating Specialized Drawing Toolsets for Laser Cutting." *Working paper.*
- 2021** Matthew Varona, Enrico Bertini. "Visualization of Multidimensional Classifier Decision Boundaries." Poster, NYU Tandon Undergraduate Summer Research Symposium 2021.

Personal Projects

Audibird: bird sounds from around the world

TECHNOLOGIES: P5.JS, JQUERY, JAVASCRIPT

May 2022

- Created an interactive visualization that showcases crowdsourced bird sounds submitted by birdwatchers around the globe.
- Developed a web app that aggregates data from the eBird, WikiData, and xeno-canto APIs and displays it on MapboxGL.

AI Got Hands

TECHNOLOGIES: KERAS, PYTHON

November 2021

- Trained a reinforcement learning agent to play the fighting game FightingICE, achieving 70% winrate against other agents.
- Extracted gameplay heuristics from AI behavior to generate tutorials for beginner fighting game players.

postcARds

TECHNOLOGIES: UNITY3D, C#

August 2021

- Developed an augmented reality museum app in collaboration with Berlin's Museum for Communication.
- Designed and built features allowing users to wield their phones as 3D paintbrushes on the museum's historical postcard collection.

Leadership and Extracurriculars

PAUSED: NYUAD Video Game Society

PRESIDENT

2023

- Hosted regular esports tournaments and managed a communal games account where students could vote on new games to buy.

First-Year Dialogue Program

FIRST-YEAR DIALOGUE FACILITATOR

Fall 2020

- Helped a tight-knit group of 10 first-year students adjust to college life through weekly group meetings and one-on-one support.

NYUAD Debate Society

VICE-PRESIDENT

Spring 2020

- Led debate workshops, organized travel arrangements for tournaments, advised junior debaters on argumentation and rhetoric.

CAUSE Philippines

SCHOLARS FOR SCHOLARS SPEAKER AND ADMISSIONS ADVISOR

Summer 2020

- Mentored high school students on the admissions process to international universities.