LAURA MADRID

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EDUCATION

University of Toronto - Honours Bachelor of Science (HBSc) Sep 2019 − Jun 2024
Department of Mathematical & Computational Sciences: Computer Science Specialist *Mississauga, Ontario*

- **Relevant courses:**

  CSC420: Introduction to Image Understanding CSC376: Fundamentals of Robotics
  CSC384: Introduction to Artificial Intelligence CSC379: Introduction to Medical Robotics
  CSC311: Introduction to Machine Learning CSC477: Introduction to Mobile Robotics
  CSC413: Neural Networks and Deep Learning

HONOURS & SCHOLARSHIPS

Summer Undergraduate Research Fair (SURF) - Featured Oral Presentation ⬀ Aug 2024
- Independently delivered an oral presentation on the Indoor Rock Climbing Assistance Tool (**IRCAT**) at the 2024 University of Toronto Summer Undergraduate Research Fair.

1ˢᵗ Place - 2024 UTMSU'S Undergraduate Research Symposium Apr 2024
- Our team won first place in the competition for our **poster** and presentation. Award Value: $1,000.

UTM Undergraduate Research Grant Nov 2023
- Our team received a UTM Undergraduate Research Grant to support our research on the Indoor Rock-Climbing Assistance Tool (**IRCAT**). Award Value: $1,500.

C Magazine Award for Excellence in DRAWING 1 - 2022 Annual Awards Gala ⬀ Nov 2022

UTM News Article Feature ⬀ Sep 2022
- Featured in *'It's a really cool place': UTM undergrads get hands-on experience with new robotics teaching lab.*

2ⁿᵈ Place - Zillow's Internal Yearly Hackathon Apr 2022
- Our team won second place in the Product Features & Business Ideas category for introducing the RoomPlan API.

Palantir's Women in Technology Scholarship - North America Apr 2021
- Scholarship to support and celebrate women who are beginning careers in technology. Award Value: $7,000.

Artwork Featured at The Take Action Gallery ⬀ Apr 2021
- My artwork, **Pattern of Life - Space, Egg, Eye Continuum**, was featured for the entire month of April at the Take Action Gallery.

RESEARCH EXPERIENCE

Research Assistant - Medical Computer Vision & Robotics Lab Jan 2024 − Present
Supervisors: Professor Lueder Kahrs and Julia Wiercigroch

- Developing an internal application to analyze vocal fold movement in laryngoscopies using **OpenCV** and **SciPy**, enabling automatic identification of larynx and trachea landmarks with HSV color masks, a **DeepLabCut** model for annotation, and a **segmentation model** to focus on specific anatomical regions.

Computer Vision for Assisted Indoor Climbing Project ⬀ ⬀ Sep 2023 − Present
Supervisors: Professor Lisa Zhang and Professor Daniel Zingaro —— Teammates: Asad Khan, Lucas Noritomi-Hartwig

- Developed the Indoor Rock-Climbing Assistance Tool (IRCAT) using **OpenCV** for pose estimation and **YOLOv8** for rock hold detection to guide visually impaired climbers throughout their ascent of the route.
- Managed HSV values for **route classification** and created a user-friendly interface.
- Submitted a **poster** to NVIDIA GTC 2025.

Brain Tumor Classification Model - Capstone Design Course ⬀ ⬀ Sep 2023 − Dec 2023
Supervisor: Professor Anthony Bonner —— Teammates: Lucas Noritomi-Hartwig, Keshav Worathur

- Developed a classification model for glioma, meningioma, and pituitary tumors shown in MRI scans, enhancing diagnostic accuracy through data augmentation and interpretability techniques like **saliency maps**.

Integration of Ethics into the Computer Science Program Jan 2023 − Apr 2023
Supervisor: *Professor Micheal Pawliuk —— Teammates: Zosia Kniter, Nikki Smith*

- Conducted interviews with faculty members from the Computer Science and CCIT departments from the University of Toronto Mississauga and researched various university ethics programs in Computer Science to propose an **ethical framework** for teaching ethics to Computer Science students.

Work Experience

Graduate Research Assistant - UTM Co-op Internship Program (UTMCIP) Sept 2024 − Present
University of Toronto - Experiential Education Unit *Mississauga, Ontario*
- Support the launch of the UTMCIP by providing disciplinary expertise and assisting in the delivery and evaluation of Work-Readiness Modules.

Computer Vision Software Engineering Intern May 2024 − Nov 2024
AIRY3D - Core Team *Montreal, Quebec*
- Researched and implemented SOTA **outlier removal** methods for captured point clouds in **C++** and integrated the best method into the AiryApp with **CUDA** achieving a 1,000x speedup.
- Developed an **ISP** (Image Signalling Processor) pipeline in **C++** using **OpenCV**.

Teaching Assistant Sep 2021 − Apr 2024
University of Toronto - Department of Computer Science *Mississauga, Ontario*
- I conducted tutorials for 20-40 students, co-created slides, held office hours, assisted students on discussion boards, and graded assignments, midterms, and exams.
- **Courses Taught:**

CSC 343: Introduction to Databases	(Winter 2023)
CSC 398: Current Approaches to Ethics for Computer Scientists	(Fall 2023)
CSC 108: Introduction to Computer Programming	(Fall 2021, Fall 2023)
CSC 258: Computer Organization	(Winter 2022)
CSC 148: Introduction to Computer Science	(Winter 2021, Winter 2022)
CSC 236: Introduction to the Theory of Computation	(Fall 2022)

Software Development Engineering Intern May 2023 − Aug 2023
Zillow - Rich Media Experiences (RMX) Team *Remote*
- Integrated Apple's **RoomPlan API** into the AR room capture app, streamlining a multi-step manual process into a single iPhone scan.
- Implemented **ARSession relocalization**, and 2D/3D floor plan generators with furniture.
- Delivered a comprehensive report to the RMX team, incorporating key WWDC23 updates for ongoing initiatives.

Zillow Engineering & Leadership (ZEAL) intern Jun 2022 − Aug 2022
Zillow *Remote*
- Completed **rotational projects** with the Rental Revenue Platform, Premier Agent iOS Mobile, and Constellation Design System teams, and participated in Zillow's annual Hackweek competition.
- **Rental Revenue Platform Team:** Enhanced data handling efficiency by streamlining database access, using a Java Job Trigger to export Parquet-format tables to the **AWS Datalake**.
- **Premier Agent iOS Mobile Team:** Developed a contact details page for Real Estate agents using **UIKit** and **JSON** data parsing.
- **Hack-week Competition:** Team won 2nd place in the Product Features & Business Ideas category, for which I modified **USDX** models using the **RoomPlan API**.
- **Constellation Design System Team:** Redesigned the Constellation documentation platform and improved navigation via an upgraded search UI with **React**, **GraphQL**, and **Styled Components**.

Software Development Intern Jun 2021 − Aug 2021
Tiary Inc. *Toronto, Ontario*
- Revamped web pages (Blog, FAQ, Checkout, Order Tracking) using **React** and developed Tiary Studios' info site with **JavaScript**, **Gatsby**, and **GraphQL**, improving site functionality and user experience.

Product Marketing Management Intern Jul 2019 − Aug 2019
Microsoft *Mississauga, Ontario*
- Developed a **PowerApps** Inventory Management Platform with a team of 5, reducing marketing material request time and demoed the application at **Microsoft's 2019 National Annual General Meeting**.

Extracurricular & Volunteer Involvement

Website Manager - Women in Science & Computing (WiSC) UTM ⤤ Sep 2021 − May 2022
- Designed and developed the organization's website using Gatsby, Contentful, HTML, CSS, and JavaScript and collaborated with executives to enhance usability and ensure scalability.

VP Events Coordinator - UTM Robotics Club ⤤ Apr 2020 − May 2021
- Co-developed the second iteration of the UTM Robotics website using Gatsby, Contentful, HTML, CSS, and JavaScript, collaborated with club members, graduate students, and professors for initiatives, and created content to promote events and introduce students to robotics on social media.

Midfielder - UTM Tri-Campus Soccer League ⤤ Jan 2020 − May 2021
- Played with the team in the Winter 2020 and Winter 2021 indoor soccer seasons.

Licenses & Certifications

Linear Algebra for Machine Learning and Data Science ↗   Oct 2024

AI for Good Specialization ↗   Sep 2024
  - Courses completed: AI and Public Health, AI and Climate Change, AI and Disaster Management

TCPS 2: CORE-2022 (Course on Research Ethics)   Oct 2022

DELF B1 Certification   May 2019

Skills & Courses

Languages: Spanish (Native), English (Fluent), French (DELF B1), Italian (Beginner)

Developer Tools:
  - Deeplabcut, OpenCV, YOLO, MediaPipe, PyTorch, TensorFlow, SciPy, Pandas, Numpy, matplotlib, CUDA
  - libfranka, Eigen, ROS, Gazebo, RoomPlan
  - Python, C++, Swift, Javascript, HTML, CSS, React
  - Firebase, AWS, Docker, Gatsby, GraphQL, PostgreSQL, Figma