Matthew Lisondra, Physics HBSc, Eng. MASc (Eng. PhD–Present)

UofT Robotics Institute, Toronto, Canada

University of Toronto

mattlisondra.com

Email / Google Scholar / LinkedIn

Research Interests

Robotics, Robot Perception, Robot Learning, Computer Vision, SLAM,
Autonomous/Intelligent Systems Algorithms,
High Framerate Processing Low-Power Unconventional Sensing,
3D Scene Representations and Spatial AI

Education

PhD, Doctor of Philosophy
UofT Robotics Institute
University of Toronto
- Toronto, ON Sep 2024 – Present
- Focus: Robot Perception, Robot Learning, Computer Vision
- Leveraging LLM and VLM agents w/ Computer Vision for Robot Learning
- Thesis Cont. Robot Approach Tracking under Intraclass Variations (A. Fung)
- Research at the University of Toronto Robotics Institute
- Supervised by: Dr. G. Nejat of the ASB Lab
- Reffered: Dr. S. Saeedi, Dr. K. Zareinia, Dr. G. Wang, Dr. M. Chevik, Dr. F. Xi

MASc, Master's of Applied Science
Robotics and Computer Vision Laboratory (RCVL)
Mechatronics and Robotics Engineering
- Toronto, ON Sep 2022 – Aug 2024
- Focus: Computer Vision and Visual-Inertial SLAM
- Designed the first 6-DOF Visual Inertial Odometry on FPSPs (BIT-VIO)
- Thesis Published, Presentation in Yokohama, Japan for IEEE 2024 ICRA
- Collaboration with Imperial College London and University of Manchester
- Supervised by: Dr. S. Saeedi of RCVL, Dr. K. Zareinia of HapTel Lab
- Referred: Dr. D. Jones

HBSc, Honours Bachelor of Science
Physics (Advanced) and Computer Science
University of Toronto
- Toronto, ON Sep 2017 – June 2021
- Focus: Robotic Mechanics, Probability, TS-Analysis, Computational Physics
- Research: Time Series Analysis on Global Temperature, Sea Level Pressure
- Research: Helium-Neon Laser Analysis (Reviewed by Dr. A. Vutha)
- Research: Percolation via Random Processes Monte Carlo, Porous Rock
- Collaborated with: Dr. D. Jones of the APCM Group

Publications

Peer Reviewed Contributions:

[1] Inverse k-visibility for RSSI-based
Indoor Geometric Mapping (In Review)
J.Kim[2], **M. Lisondra[1]**, Y. Bahoo[3], S. Saeedi[3]
([1]University of Toronto, [2]TU Delft, [3]TMU)
IEEE Sensors Journal (ISJ) 2024 (In Review)

[2] Visual Inertial Odometry using
Focal Plane Binary Features (BIT-VIO)
M. Lisondra[1,*], J. Kim[2,*], R. Murai[4], K. Zareinia[3], S. Saeedi[3]
([1]University of Toronto, [2]TU Delft, [3]TMU, [4]Imperial College London)
Presented in Yokohama, Japan for IEEE 2024 ICRA
IEEE International Conference on Robotics and Automation (ICRA) 2024
Project Webpage / PDF / Video / Presentation

Forthcoming Contributions:

[3] TCB-VIO: Tightly-Coupled Focal-Plane
Binary-Feature Visual Inertial Odometry (In Progress)
M. Lisondra[1,*], J.Kim[2,*], G. Shimoda[3], K. Zareinia[3], S. Saeedi[3]
([1]University of Toronto, [2]TU Delft, [3]TMU)
IEEE/ASME Transactions on Mechatronics (TMECH) 2025 (In Progress)

[4] AnalogPedestrianNet: High Framerate Focal-Plane
Sensor-Processor Pedestrian Tracking (In Progress)
M. Lisondra[1], A. Babaei[2], A. Ahsan[2], K. Zareinia[2], S. Saeedi[2]
([1]University of Toronto, [2]TMU)
IEEE Conference on Computer and Robot Vision (CRV) (In Progress)

Acknowledged Contributions:

[5] M[3]RS: Multi-robot, Multi-objective, Multi-mode Routing and Scheduling
Ishaan Mehta[2], J. Kim[2], S. Taghipour[2], S. Saeedi[2]
M. Lisondra[1] in Experiments, Feedback
([1]University of Toronto, [2]TMU)
IEEE Robotics and Automation Letters (RA-L) (In Progress)

[6] Structure from WiFi (SfW):
RSSI-based Geometric Mapping of Indoor Environments
J. Kim[2], J. A. Zalat[3], Y. Bahoo[3], S. Saeedi[3]
M. Lisondra[1] in Experiments, Feedback, Paper Publishing/Review
([1]University of Toronto, [2]TU Delft, [3]TMU)
IEEE 2024 American Control Conference (ACC)

Research Affiliations

Autonomous Systems
and Biomechatronics Lab (ASB Lab)
UofT Robotics Institute
University of Toronto
(Lab Webpage)
- Toronto, ON — Sep 2024 – Present
- Focus: Robot Perception, Robot Learning, Computer Vision
- Research at the University of Toronto Robotics Institute
- Affiliated with UofT Temerty Faculty of Medicine (TFM)
- Affiliated with Universal Health Network (UHN)
- Supervised by: Dr. G. Nejat

Robotics and Computer Vision Laboratory (RCVL)
(Lab Webpage)
- Toronto, ON — Sep 2022 – Present
- Focus: Computer Vision and Visual-Inertial SLAM
- Affiliated Research with Imperial College London (i.e. Dyson Robotics Lab)
- Affiliated Research with University of Manchester (i.e. MD Lab)
- Affiliated Research with University of Bath (i.e. Pering Lab)
- Supervised by: Dr. S. Saeedi

Haptics Telerobotics Laboratory (HapTel Lab)
(Lab Webpage)
- Toronto, ON — Sep 2022 – Present
- Focus: Haptics, Robotic Manipulator Operation, Surgical/Medical Robotics
- Currently: Image-Based Force Estimation in Medical Applications Research
- Supervised by: Dr. K. Zareinia

Organizations

Reviewer (Journal) for ISJ 2025 — Fall 2024 – Present
IEEE Sensors Journal (ISJ) 2025
Reviewer (Journal) for RA-L 2024 — Fall 2023 – Present
IEEE Robotics and Automation Letters (RA-L) 2024
Reviewer (Conference) for IROS 2024 — Winter 2024
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
Reviewer (Conference) for ICRA 2024 — Fall 2023
International Conference on Robotics and Automation (ICRA) 2024
Reviewer (Conference) for IEEE CCECE 2023 — Winter 2023
2023 Canadian Conference On Electrical and Computer Engineering
Reviewer (Conference) for IROS 2023 — Winter 2023
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

Teaching Affiliations

Emerald Valley Academy (EVA)
- Toronto, ON — Sep 2024 – Present
- Leading Department of Mathematics and Science
- Teaching Higher-Level Physics, Calculus and Computer Science I, II
- Part of EVA Faculty overseeing Ontario Ministry of Education Inspection

Virtute Innovation Academy (VIA)
- Toronto, ON — Sep 2023 – Aug 2024
- Leading Department of Mathematics and Science
- Teaching Higher-Level Physics, Calculus and Computer Science I, II
- Part of VIA Faculty overseeing Ontario Ministry of Education Inspection
- Collaborated with: Dr. A. Jiang

Select List of Students Currently Teaching†, Alumni Taught and **Refereed***:
Helen Li Hanfei
Linlin Liang Chulin
Nate Feng Botao
Raya Sun Xiaoru* **(Multiple Scholarship Offers in Australia, England)**
Willow Zheng Kehui
Alex Zhang
Angel Huang Anqi* **(Now at Berkeley Music School)**
Ben Zheng Yonhchun
Brian Luo Tian* **(Full Scholarship Physics, University College Lodon)**
Bridget Yang Liu* **(Now at King's College London)**
Cindy Yang Xintong* **(Now at Durhan University)**
Frank Chen
Guo Ye* **(Now at University of Hong Kong)**
Jack Wu Jianpu
Kevin Sheng, Chuwen **(Multiple University Offers)**
Lynn Lin Guanying
Natty Zhao Te* **(Multiple University Offers in Business)**
Nick Tian Boyue
Astrid Jiajun Pu
Destin Jiayi Qiu
Morson Yuhao Wang
Raylene Xinyue Zhang
Chun Zou
Yizhou Tang Caelon
Samantha Yumo Fan
Annie Ma
Aiden Xiuqi Xu
Kevin Bowen Chen
Freya Li Xin
Ando Li Yi Lan

Caelon Tang Yi†
Fize Chen Yanh†
Leo Li Juale†
Marvin Wu Di†
Raylene Zhang†
Samantha Fan Yumo†

Thesis Mentoring/Guidance:

[7] Autonomous Truck Navigation
with Trailer Integration via Natural Language Processing (NLP)
J. Kim[2], R. Raja[3], A. Jawaid[3], R. Ha[3]
M. Lisondra[1] in Mentoring/Guidance of Thesis
(University of Toronto[1], [2]TU Delft, [3]TMU)
Project Webpage / Conference PDF / Full Thesis

Graduate/Teaching for MEC411 Winter 2023 – Aug 2024
Mechanics of Machines at Toronto Metropolitan University (TMU)
Graduate/Teaching for BME/MEC323 Fall 2022 – Aug 2024
Statics and Mechanics of Materials at Toronto Metropolitan University (TMU)

Academic Horizons⋆
- Surrey, BC Oct 2021 – Sep 2023
- Senior Physics and Computer Science Instructor
- Taught 500+ 1-on-1 Teaching Sessions Physics, Math, Computer Science
- Taught 500+ Class Size Teaching Sessions with Director of Education
- Total Taught 100+ Students (Many now in Science, Engineering)

Lumist of Lumi Education⋆⋆
- Toronto, ON April 2021 – Oct 2021
- Leading Physics Education Sector of Lumist, Lumi Education
- Teaching 1st-4th yr. students from UCLA, UC Berkeley, UCSD, among others
- Textbook Draft/Course Material Written of University Physics I, 500+ Pages
- Total Taught 100+ Students (Many now in Science, Engineering)
- Collaborated with: Dr. N. Murray (Now Algoma University Professor)
- Collaborated with: Dr. F.G. Parra (Now Leading Ace Acumen Academy)

Select List of Students Taught from ⋆, ⋆⋆:
Jack Zheng
Jasmeet Cheema
Arven Gill
Claire Liu
Jack Christofferson
William Burns

Arsalan Khan
Arjan Berar
Jasmeet Bhatthal
Megan Gosal
Gagan Dhanoa
Roha Kashif
Brody Hart
Gurjaap Kahlon
Carter Latham
Kilian Dokaj
Kelvin Dokaj
Zara Johal
Elle Lubinich
Matias Fisher
Jasmine Tatla
Imaan Sandhu
Oliver Botelho
Kiyan Lalani
Syra Johal
Callum Holland
Ava Young
Khaliya Sidi
Khushi Chahal
Peri Bennett
Momin Kashif
Ava Psefteas
Kensington Hilts
Adrian Purewal
Jeevan Rai
Breanna McGowan
Jashan Tatla
Yousef Marei
Grace D'Haese
Nabil Ashrafi
Rajin Chahal
Justen Denman
Ahmed Marei
Mnria Grewal
Miya Negrin
Rafay Naeem
Dylan Garland
Innika Singh
Jessica Bresciani
Samiksha Dandina

Jayden Trentini
Maya Sanger
Armaan Sandhu
Gurasees Warrya
Afifa Anwar
Sophia Catroppa
Gurjaap Warrya
Aarya Gill
Hamza Khan
Isaiah Sidi
David Fam
Nicole Scoten
Kumayl Abbas
Waffa Hussain
Aaron Hayre
Anthony Ashton
Curtis Latham
Kennedy Burrell
Kent McDermid
Mustafa Ali Shah
Damian Jones
Devin Barrett
Cooper Dewaal
Chanden Mann
Simarjit Minhas
Justin Hayer
Gabe Boychuk
Yazmin Johal
Chase Marshall
Dhiya Gill
Kyra Borgersen

Industry Affiliations

Rosor Exploration
(Company Webpage)
- Toronto, ON Jan 2024 – May 2024
- Researcher - Robotics, Geoscientific UAVs and Drones
- Working on Development of Rosor's Active Terrain Following (ATR) System
- Currently: Now Led by H. A. Jaafar
- Collaborated with: R. Efrem

Skills

Coding: Python, PyTorch, keras, R, C/C++, Java, R, C#, Javascript, HTML, CSS
Technologies: Windows, Linux, NXP MCUs based on Arm Cortex-M cores

References available on request.