

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

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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	<p>PhD, Doctor of Philosophy UofT Robotics Institute University of Toronto</p> <ul style="list-style-type: none">- 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- Referred: Dr. S. Saeedi, Dr. K. Zareinia, Dr. G. Wang, Dr. M. Chevik, Dr. F. Xi <p>MSc, Master's of Applied Science Robotics and Computer Vision Laboratory (RCVL) Mechatronics and Robotics Engineering</p> <ul style="list-style-type: none">- 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 <p>HBSc, Honours Bachelor of Science Physics (Advanced) and Computer Science University of Toronto</p> <ul style="list-style-type: none">- 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

Peer Reviewed Contributions:

[1] Inverse k-visibility for RSSI-based Indoor Geometric Mapping (In Review)
J. Kim², **M. Lisondra**¹, Y. Bahoo³, S. Saeedi³
(¹University of Toronto, ²TU Delft, ³TMU)
[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. Murai⁴, K. Zareinia³, S. Saeedi³
(¹University of Toronto, ²TU Delft, ³TMU, ⁴Imperial 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. Shimoda³, K. Zareinia³, S. Saeedi³
(¹University of Toronto, ²TU Delft, ³TMU)
[IEEE/ASME Transactions on Mechatronics \(TMECH\) 2025](#) (In Progress)

[4] AnalogPedestrianNet: High Framerate Focal-Plane Sensor-Processor Pedestrian Tracking (In Progress)
M. Lisondra¹, A. Babaei², A. Ahsan², K. Zareinia², S. Saeedi²
(¹University of Toronto, ²TMU)
[IEEE Conference on Computer and Robot Vision \(CRV\)](#) (In Progress)

Acknowledged Contributions:

[5] M³RS: Multi-robot, Multi-objective, Multi-mode Routing and Scheduling
Ishaan Mehta², J. Kim², S. Taghipour², S. Saeedi²
M. Lisondra¹ in Experiments, Feedback
(¹University of Toronto, ²TMU)
[IEEE Robotics and Automation Letters \(RA-L\)](#) (In Progress)

[6] Structure from WiFi (SfW): RSSI-based Geometric Mapping of Indoor Environments
J. Kim², J. A. Zalat³, Y. Bahoo³, S. Saeedi³
M. Lisondra¹ in Experiments, Feedback, Paper Publishing/Review
(¹University of Toronto, ²TU Delft, ³TMU)
[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

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. Kim², R. Raja³, A. Jawaid³, R. Ha³

M. Lisondra¹ in Mentoring/Guidance of Thesis

(University of Toronto¹, ²TU Delft, ³TMU)

[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
Kiyani 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.