Sacha Morin

✉ *sacha.morin@mila.quebec*
🌐 *sachamorin.github.io*
Ⓢ *Google Scholar*
⌗ *Github*
🐦 *@SachMorin*

Education

2022–present **PhD, Computer Science**, Université de Montréal - Mila
Machine Learning and Robotics
Expected Graduation Date: 08/2027
Advisors: Guy Wolf and Liam Paull
Labs:
○ Mila - Quebec Artificial Intelligence Institute
○ RAFALES
○ Robotics and Embodied AI Lab (REAL)

2021–2022 : **Research MSc, Computer Science**, Université de Montréal - Mila
Machine Learning. Fast tracked to PhD.
Advisor: Guy Wolf
GPA: 4.30/4.30

2017–2021 : **Bachelor of Mathematics and Computer Science**, Université de Montréal
GPA: 4.15/4.30

2014–2017 : **Bachelor of Law (LLB)**, Université de Sherbrooke
GPA: 3.68/4.30

Research Experience

Nokia Bell labs

Summer 2024 **Research Intern**, *Murray Hill, NJ, United States*
○ 3D perception with mobile robots.
○ LLM integration with multimodal 3D representations.
○ Topological language mapping.

Advisor: Dan Kushnir

Mila - Quebec AI Institute

2022-present **Phd Student**, *Montreal, QC, Canada*
○ 3D multimodal representations for robotics [C1].
○ Representation learning for robotics [C2], [C3].
○ Generative models for mapping and planning.

Advisors: Guy Wolf and Liam Paull

2020-2022 **Research Intern/MSc Student**, *Montreal, QC, Canada*
- ○ Learning structured and interpretable representations by combining autoencoders and manifold learning [J3], [C4].
- ○ Apply clustering and data visualization tools for unsupervised exploration of biological datasets [J1], [P1], [J4].

Advisor: Guy Wolf

Université de Montréal

2018-2019 **Research Intern**, *Montreal, QC, Canada*
- ○ Develop Gambit Forensics, an analytics tool to benchmark various compilers of the Scheme programming language.

Advisor: Marc Feeley

Work Experience

LJT Laywers LLP

Jan 2020- **Lawyer (Part Time)**, *Montreal, QC, Canada*
April 2020 Mergers and acquisitions of software companies. Contract Law.

June 2019- **Articling Student**, *Montreal, QC, Canada*
Jan 2020 Mergers and acquisitions of software companies. Contract Law. Litigation.

Supervisor: Me Nicolas Lassonde

May 2018- **Law Student**, *Montreal, QC, Canada*
Aug 2018 Contract Law. Litigation.

Training

2023 **ETH Zurich Robotics Summer School**, *Avully, Switzerland*
- ○ Search and rescue with mobile robots. Our team won the competition!

2022 **Mila Robotics Summer School**, *Montreal, QC, Canada*
- ○ Introduction to quadruped robots and RL.

Awards

2023 **NSERC PGS D Scholarship**, Natural Sciences and Engineering Council of Canada

2023 **FRQNT Doctoral Scholarship**, Fonds de recherche du Québec - Nature et technologies

2021 **IVADO M.Sc. Scholarship**, Institut de valorisation des données

2021 **FRQNT B1X Scholarship**, Fonds de recherche du Québec - Nature et technologies

2021 **NSERC M.Sc. Scholarship (Declined)**, Natural Sciences and Engineering Council of Canada

2021 **ISM Undergraduate Research Scholarship**, Institut des sciences mathématiques

2020 **IVADO Undergraduate Research Scholarship**, Institut de valorisation des données

2019 **NSERC Undergraduate Award**, Natural Sciences and Engineering Research Council of Canada

2019	**Scholarship for Academic Excellence**, Bourse d'excellence des diplômés et des professeurs
2016	**Winner of the Matthieu-Bernard Competition**, Société québécoise de droit international
2015-2017	**Dean's List**, Faculty of Law, Université de Sherbrooke

Teaching and Academic Involvement

2023-2024	**Organizer**, Robot Learning Seminar, Mila - Quebec AI institute ○ YouTube Playlist
2023-2024	**Teaching Assistant**, STT 3795: Theoretical Foundations of Data Science, Université de Montréal ○ Undergraduate class taught by Prof. Guy Wolf.
2023	**Co-organizer**, Mila Robotics Summer School, Mila - Quebec AI Institute ○ Prepare workshop and challenge using the Unitree Go1 robot and TagSLAM.
2023	**Volunteer**, Conference on Robots and Vision (CRV), Montreal, Quebec, Canada
2022-2023	**Member**, IVADO Student Intersectoral Committee ○ Support major IVADO events, such as job fairs and *Digital October*.
2022	**Invited Talk on AI, Data & Algorithms**, Prof. Sylvano Santini's SEM9500 Seminar, Université du Québec à Montréal
2014-2015	**Pro Bono Canada**, Université de Sherbrooke ○ Draft training material for directors of non-profits.

Reviewer

RA-L 2024, RSS 2024, T-RO 2023, IROS 2023, ICRA 2023, NeurIPS SSL Workshop 2023, MAIS 2020

Software

2023	**StepMix**, A Python package following the scikit-learn API for model-based clustering and generalized mixture modeling of continuous and categorical data [J2].

Skills

Programming Languages	Python. C++. Some knowledge of C, R, JAVA and Javascript.
Libraries	PyTorch, ROS, Scikit-Learn, Pandas, NumPy.

Publications & Preprints

* indicates joint authorship.

Journal Publications

[J1] E. Brunet-Ratnasingham*, **S. Morin***, H. E. Randolph*, M. Labrecque, J. Bélair, R. Lima-Barbosa, A. Pagliuzza, L. Marchitto, M. Hultström, J. Niessl, *et al.*, "Sustained

ifn signaling is associated with delayed development of sars-cov-2-specific immunity", *Nature Communications*, vol. 15, no. 1, p. 4177, 2024.

[J2] **S. Morin***, R. Legault*, F. Laliberté, Z. Bakk, C.-É. Giguère, R. de la Sablonnière, and É. Lacourse, "Stepmix: A Python package for pseudo-likelihood estimation of generalized mixture models with external variables", *Journal of Statistical Software (To appear)*, 2024.

[J3] A. F. Duque*, **S. Morin***, G. Wolf, and K. R. Moon, "Geometry regularized autoencoders", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2022.

[J4] B. Paré, M. Rozendaal, **S. Morin**, L. Kaufmann, S. M. Simpson, R. Poujol, F. Mostefai, J.-C. Grenier, H. Xing, M. Sanchez, *et al.*, "Patient health records and whole viral genomes from an early SARS-CoV-2 outbreak in a Quebec hospital reveal features associated with favorable outcomes", *Plos one*, vol. 16, no. 12, e0260714, 2021.

Conference Proceedings

[C1] Q. Gu*, A. Kuwajerwala*, **S. Morin***, K. Jatavallabhula*, B. Sen, A. Agarwal, C. Rivera, W. Paul, K. Ellis, R. Chellappa, C. Gan, C. de Melo, J. Tenenbaum, A. Torralba, F. Shkurti, and L. Paull, "Conceptgraphs: Open-vocabulary 3d scene graphs for perception and planning", *2024 IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[C2] **S. Morin***, M. Saavedra-Ruiz*, and L. Paull, "One-4-All: Neural potential fields for embodied navigation", in *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, 2023.

[C3] M. Saavedra-Ruiz*, **S. Morin***, and L. Paull, "Monocular robot navigation with self-supervised pretrained vision transformers", in *2022 19th Conference on Robots and Vision (CRV)*, IEEE, 2022, pp. 197–204.

[C4] A. F. Duque*, **S. Morin***, G. Wolf, and K. Moon, "Extendable and invertible manifold learning with geometry regularized autoencoders", in *2020 IEEE International Conference on Big Data (Big Data)*, IEEE, 2020, pp. 5027–5036.

Preprints

[P1] J. S. Rhodes, A. Aumon, **S. Morin**, M. Girard, C. Larochelle, E. Brunet-Ratnasingham, A. Pagliuzza, L. Marchitto, W. Zhang, A. Cutler, *et al.*, "Gaining biological insights through supervised data visualization", *bioRxiv*, pp. 2023–11, 2023.

Workshops

[W1] **S. Morin***, S. Naht*, S. Ebrahimi Kahou, and G. Wolf, "Spectral temporal contrastive learning", in *NeurIPS 2023 Workshop: Self-Supervised Learning - Theory and Practice*, 2023.

[W2] A. F. Duque*, **S. Morin***, G. Wolf, and K. Moon, "Extendable and invertible manifold learning with geometry regularized autoencoders", in *NeurIPS 2020 Workshop on Differential Geometry Meets Deep Learning (DiffGeo4DL)*, 2020.

[W3] A. F. Duque*, **S. Morin***, G. Wolf, and K. Moon, "Extendable and invertible manifold learning with geometry regularized autoencoders", in *DeepMath 2020 Conference on the Mathematical Theory of Deep Neural Networks*, 2020.

[W4] **S. Morin***, A. F. Duque*, G. Wolf, and K. Moon, "Extendable and invertible manifold learning with geometry regularized autoencoders", in *Montreal AI Symposum (MAIS)*, 2020.