Quentin **Fournier**

Research Fellow · Language Models for Drug Discovery

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Positions

Research Fellow – Mila 2024 - today
Lead a thematic lab on ML for drug discovery

Consultant as Senior Machine Learning Scientist – Amgen 2024 - today
Design novel ML solutions for drug discovery

Lecturer – Polytechnique Montréal 2019 - 2022
INF8111 – Data Mining (Fall 2019, Summer 2020, Fall 2020, Fall 2022) (graduate-level)

Teacher Assistant – Polytechnique Montréal 2018 - 2021
INF8111 – Data Mining (Summer 2021, Fall 2021) (graduate-level)
INF8215 – Artificial Intelligence: Methods and Algorithms (Fall 2018) (graduate-level)

Research and Development Internship – IT Link 2018
Supervised by Nicolas Ménard and Christian Raymond

Research Internship – Institut de Recherche en Informatique et Système Aléatoire (IRISA) 2017
Supervised by Christian Raymond

Education

Postdoctoral Fellow – Mila, University of Montréal 2023 - 2024
Advised by Sarath Chandar and Irina Rish
Computer Science and Operations Research Department

Ph.D. – Polytechnique Montréal 2018 - 2022
Supervised by Daniel Aloise and Michel R. Dagenais
Computer Engineering and Software Engineering Department
Nominated for Best Thesis Award

Master of Engineering – Institut National des Sciences Appliquées Rennes 2013 - 2018
Computer Science Department

Scientific *Baccalauréat* – Lycée Jean Guéhenno 2008 - 2013
Mathematics Specialty
First-Class Honors

Co-Supervisions

Ph.D. Students

Gabriele Prato (Mila, UdeM, with Sarath Chandar) – LLMs Groundness 2025 - today
Davide Baldelli (Mila, PolyMTL, with Sarath Chandar) – Computer-Aided Design (CAD) with LLMs 2025 - today
Léa Kaufman (Mila, UdeM, with Sébastien Lemieux) – Gene Expression Across Cell Lines 2025 - today
Darshan Patil (Mila, PolyMTL, with Sarath Chandar) – Lifelong pLMs 2024 - today

Prashant Govindarajan (Mila, PolyMTL, with Sarath Chandar) – Computer-Aided Design (CAD) with LLMs 2024 - today
Lola Le Breton (Mila, PolyMTL, with Sarath Chandar) – Protein Language Models 2023 - today
David Heurtel-Depeiges (Mila, PolyMTL, with Sarath Chandar) – Diffusion Protein Language Models 2023 - today
Pranshu Malviya (Mila, PolyMTL, with Sarath Chandar) – Neural Network Expansion; Lifelong pLMs 2023 - today
Jerry Huang (Mila, UdeM, with Sarath Chandar) – Role of Memory; Protein State-Space Model 2023 - today

Master Students

Istabrak Abbes (Mila, UdeM, with Sarath Chandar) – LLMs Groundness 2024 - today
Megh Thakkar (Mila, UdeM, with Sarath Chandar and Amal Zouaq) – Safety Alignment; Merging 2023 - 2025
Maziar Sargordi (Mila, PolyMTL, with Sarath Chandar and Amal Zouaq) – NN with Constraint Programming 2023 - 2024

Researcher Assistants

Behnoush Khavari (Mila, with Sarath Chandar) – Role of Memory; Protein State-Space Model 2023 - today
Kamran Chitsaz (Mila, with Sarath Chandar) – Transformer Quantization; Molecule Language Models 2023 - today

Interns

Alex Aselstyne (PolyMTL, with Sarath Chandar) – Antimicrobial Resistance Prediction 2025-today
Can (Sam) Chen (Mila, UdeM, with Yoshua Bengio) – Structure Alignment for Protein Language Models 2025
Annabel Adeyeri (Mila, MIT, with Sarath Chandar) – Fairness in Pre-Trained Language Models 2023
Julia Rolland (UTBM, PolyMTL with Daniel Aloise) – Machine Learning to Detect Anomalies in Traces 2021

Scientific Activities

Conference Chairs

Sponsor Chair – Fourth Conference on Lifelong Learning Agents (CoLLAs) 2025
Virtual Chair – Third Conference on Lifelong Learning Agents (CoLLAs) 2024
Virtual Chair – Second Conference on Lifelong Learning Agents (CoLLAs) 2023

Reviewer

ICML (2025), ICLR (2025), NeurIPS (2025, 2024), AISTATS (2025), etc.

Invited Talks and Workshops

Protein Language Model – RiboClub Social Day 2025
AMPLIFY: Is Scaling Protein Language Model Necessary? – Zoetis 2025
Lessons on Efficient Language Models and Future Applications – Queen's University 2024
ML-driven Small Molecule and Protein Design – Mila-SickKids Workshop 2024
How to Fine-tune LLMs on DGX – Royal Military College 2024

Publications

[1] Fournier, Q.*, Vernon, R. M.*, van der Sloot, A., Schulz, B., Chandar, S., Langmead, C. J. (2025). Protein Language Models: Is Scaling Necessary? [UNDER REVIEW]
[2] Khavari, B., Huang, J., Khullar, J., Fournier, Q., Rivest, F., Chandar, S. (2025) On Memory and Generalization in the Era of Linear Recurrence [UNDER REVIEW]
[3] Chen, C., Heurtel-Depeiges, D., Vernon, R. M., Langmead, C. J., Bengio, Y., Fournier, Q. (2025) Structure-Aligned Protein Language Model [UNDER REVIEW]
[4] Chitsaz, K., Balaji, R., Fournier, Q., Pravinbhai Bhatt, N., Chandar, S. (2025) NovoMolGen: Rethinking Molecular Language Model Pretraining [UNDER REVIEW]
[5] Govindarajan, P., Baldelli, D., Pathak, J., Fournier, Q., Chandar, S. (2025) CADmium: Fine-tuning Code Language Models for Text-Driven Sequential CAD Design [UNDER REVIEW]

[6] Le Breton, L., Fournier, Q., El Mezouar, M., Chandar, S. (2025) NeoBERT: A Next Generation BERT. Transactions on Machine Learning Research.
[7] Malviya, P., Huang, J., Fournier, Q., Chandar, S. (2025). Manifold Metric: A Loss Landscape Approach for Predicting Model Performance. The fourth Conference on Lifelong Learning Agents.
[8] Thakkar, M., Fournier, Q., Riemer, M. D., Chen, P.-Y., Zouaq, A., Das, P., Chandar, S. (2025) Combining Domain and Alignment Vectors Provides Better Knowledge-Safety Trade-offs in LLMs. The 63rd Annual Meeting of the Association for Computational Linguistics.
[9] Abbes, I., Prato, G., Fournier, Q., Rodriguez, F., Boukhary, A., Elwood, A., Chandar, S. 2025) Small Encoders Can Rival Large Decoders in Detecting Groundedness. The 63rd Annual Meeting of the Association for Computational Linguistics.
[10] Chitsaz, K., Fournier, Q., Mordido, G., Chandar, S. (2024). Exploring Quantization for Efficient Pre-Training of Transformer Language Models. Proceedings of the 2024 Conference on Empirical Methods in Natural Language Processing.
[11] Thakkar, M., Fournier, Q., Riemer, M. D., Chen, P.-Y., Zouaq, A., Das, P., Chandar, S. (2024). A Deep Dive into the Trade-Offs of Parameter-Efficient Preference Alignment Techniques. The 62nd Annual Meeting of the Association for Computational Linguistics.
[12] Fournier, Q., Caron, G. M., Aloise, D. (2023). A practical survey on faster and lighter transformers. ACM Computing Surveys, 55(14s), 1–40.
[13] Denys, P.-F., Fournier, Q., Dagenais, M. (2023). Distributed computation of the critical path from execution traces. Software: Practice and Experience.
[14] Khanahmadi, M., Shameli-Sendi, A., Jabbarifar, M., Fournier, Q., Dagenais, M. (2023). Detection of microservice-based software anomalies based on OpenTracing in the cloud. Software: Practice and Experience.
[15] Fournier, Q., Aloise, D., Azhari, S. V., Tetreault, F. (2021). On improving deep learning trace analysis with system call arguments. 2021 IEEE/ACM 18th International Conference on Mining Software Repositories (MSR), 120–130. IEEE.
[16] Patel, S., Park, B., Ezzati-Jivan, N., Fournier, Q. (2021). Automated Cause Analysis of Latency Outliers Using System-Level Dependency Graphs. 2021 IEEE 21st International Conference on Software Quality, Reliability, and Security (QRS), 422–433. IEEE.
[17] Ezzati-Jivan, N., Fournier, Q., Dagenais, M. R., Hamou-Lhadj, A. (2020). Depgraph: Localizing performance bottlenecks in multi-core applications using waiting dependency graphs and software tracing. 2020 IEEE 20th International Working Conference on Source Code Analysis and Manipulation (SCAM), 149–159. IEEE.
[18] Fournier, Q., Aloise, D. (2019). Empirical comparison between autoencoders and traditional dimensionality reduction methods. 2019 IEEE Second International Conference on Artificial Intelligence and Knowledge Engineering (AIKE), 211–214. IEEE.
[19] Fournier, Q., Ezzati-Jivan, N., Aloise, D., Dagenais, M. R. (2019). Automatic cause detection of performance problems in web applications. 2019 IEEE International Symposium on Software Reliability Engineering Workshops (ISSREW), 398–405. IEEE.

Community Involvement

Webmaster – Rock'n Solex 2016

- Develop the website for a student festival combining Solex racing and music since 1967

Lead Developer – Club'Dev 2016

- Develop the student association website and tutored computer science students

Member of the Network Team – INSALAN 2014

- Contribute to the deployment of the hardware and software required for 100+ players LAN tournament

Skills

Expertise in Data Mining and Machine Learning

- Deep Learning: Transformer and its lower-complexity alternatives, deep and variational autoencoders
- Machine Learning: SVM, LDA, QDA, KNN, Naive Bayes, Trees, KMeans, DBSCAN, OPTICS, Gaussian Mixture
- Data Mining: logging and tracing, data munging, statistical analysis, data visualization

Competitive Engineering and Programming

- Languages: Python, LaTeX, Bash, SQL, HTML5, CSS3

- Libraries: PyTorch, WandB, Hydra, Scikit-learn, Scipy, Matplotlib, Seaborn
- Tools: Git, Slurm, VS Code