CHARLES GUILLE-ESCURET

MILA, UdeM, Montréal, QC H2S 3H1 Canada | guillech@mila.quebec

EDUCATION

Mila, Quebec AI Institute and Université de Montréal (UdeM) *Montréal, Canada*
Candidate for Doctor of Philosophy in Computer Science; GPA 4.3/4.0 *2019 – Expected Jan 2025*

École Normale Supérieure Paris-Saclay *Paris, France*
Master of Science in Applied Mathematics - MVA program ; cum laude *2016*
Bachelor of Computer Science; cum laude *2014*

EXPERIENCE

Apple MLR *Paris, France*
Research Intern *Apr. 2023 - Sept. 2023*
• Designed a novel method to construct finite-sample valid confidence sets for linear regression in a much more realistic setting than previous works, with a wide range of applications.
• Incorporated conformal predictions to previous method to further improve performances and computation costs.

ServiceNow, ATG Research Group *Montréal, Canada*
***Visiting Researcher**, Low-data learning team (part-time)* *Dec. 2021 - May 2022 and Sept 2022 - Feb 2023*
• Trained self-supervised contrastive models to perform anomaly detection on challenging benchmarks with a novel method.
• Proposed a novel benchmark for broad OOD detection and showed how to alleviate the inconsistencies of recent works by ensembling.

Mila Quebec AI Institute and Université de Montréal (UdeM) *Montréal, Canada*
***Doctoral Candidate**, advised by Prof. Ioannis Mitliagkas* *2019 – Expected Jan 2025*
• Research Areas: *First-order optimization, computer vision, learning dynamics*
• Teaching assistant for 3 classes and co-supervised 3 internships.
• Introduced a new theoretical framework for the study of first-order optimization.
• Derived novel upper and lower bounds on the convergence rate of first-order algorithms.
• Contributed to various projects on applications such as insect classification, lightning current prediction, predictive visualization of flood effects, adversarial robustness.

University of California Berkeley *Berkeley, CA*
***Visiting Scholar**, EECS department, under the supervision of Prof. Alexandre Bayen* *Oct. 2017 - Oct. 2018*
• Worked with startup *SafelyYou* to implement then-SOTA computer vision models for automatic fall detection in elderly care facilities.
• Resulted in a 80% decrease in ER visits and 40% decrease in fall frequency.

Elum Energy *Paris, France*
Machine Learning Engineer *Sept. 2016 – Mar. 2017*
• Built from scratch all predictive models for energy consumption.
• These models were successfully deployed to optimize battery usage.
• Conducted interviews, designed and evaluated tests for ML recruitment.

HONORS AND AWARDS

Top reviewer AISTATS top 10% of reviewers *2023*
Best Student Paper Award NeurIPS OPT2020, for "A Study of Condition Numbers for First-Order Optimization" *2020*
Data Intelligence Award - Predictive Analytics Data Intelligence Forum Paris, for work at Elum Energy *2016*
Scholar Award, NeurIPS 2022 *2022*
Normalien Fellowship 4 years merit-based fellowship *2013*
3rd Prize Nationwide French Earth Sciences Olympiads *2009*

TEACHING EXPERIENCE

Mila Optimization Crash Course, Lecturer *Spring 2024*
• Gave lectures on Adam and RMSProp.

Mila and UdeM, IFT3395 and IFT6390 Fundamentals of Machine Learning, Teaching Assistant *Fall 2019*
• Designed and taught Python workshops for Machine Learning.
• Contributed to writing assignments and exams and their grading.

HEC Montreal, MATH80629A ML for Large Scale Data Analysis and Decision Making, Teaching Assistant *Winter 2021*
- Designed and taught Python workshops for Machine Learning, assisted students.

UdeM, EDUlib, SD1FR MOOC Data Science, Instructor *Jan. - Aug. 2021*
- Developed Jupyter Notebooks for an online MOOC on data science hosted by EDUlib.

Mila, internship co-supervisor *2020*
- Academic co-supervisor for 3 students of Mila's professional masters in AI doing their internship in external companies.

OTHER ACADEMIC CONTRIBUTIONS

- **Co-organizer**, 4th Neural Scaling Laws workshop *2022*
- **Co-organizer**, Montreal Machine Learning and Optimization (MTL ML-OPT) seminars. *2023-now*

PUBLICATIONS

*: co-first authors

Guille-Escuret C., Ndiaye E. (2024). From Conformal Predictions to Confidence Regions, ArXiv.

Guille-Escuret C., Ndiaye E. (2023). Finite Sample Confidence Regions for General Linear Regression Parameters Using Arbitrary Predictors, ArXiv.

Guille-Escuret C.*, Naganuma H.*, Fatras K., Mitliagkas I. (2023). No Wrong Turns: The Simple Geometry Of Neural Networks Optimization Paths, ArXiv.

Guille-Escuret C., Noel P., Vazquez D., Mitliagkas I., Monteiro J. (2023). Expecting The Unexpected: Towards Broad Out-Of-Distribution Detection, ArXiv.

Guille-Escuret C., Rodriguez P., Vazquez D., Mitliagkas I., Monteiro J. (2022). CADet: Fully Self-Supervised Anomaly Detection With Contrastive Learning, *NeurIPS 2023*.

Ibrahim A., **Guille-Escuret C.**, Mitliagkas I., Rish I., Krueger D., Bashivan P. (2022). Towards Out-of-Distribution Adversarial Robustness, Presented at ICML 2022 New Frontiers In Adversarial Machine Learning Workshop, ArXiv.

Guille-Escuret C., Rodriguez P., Vazquez D., Mitliagkas I., Monteiro J. (2022). Contrastive Self-supervision Defines General-Purpose Similarity Functions, *NeurIPS 2022, Self-supervised learning - theory and practice workshop*.

Guille-Escuret C., Ibrahim A., Goujaud B., Mitliagkas I. (2022). Gradient Descent Is Optimal Under Lower Restricted Secant Inequality And Upper Error Bound, *NeurIPS 2022*.

Guille-Escuret C.*, Goujaud B.*, Girotti M., Mitliagkas I. (2021). A Study of Condition Numbers for First-Order Optimization, *AISTATS 2021* and best student paper award at *NeurIPS 2020, Optimization for Machine Learning Workshop*.

Monferran P.*, **Guille-Escuret C.***, Guiffaut C., Reineix A. (2021). Prediction of Lightning Currents on Fastening Assemblies of an Aircraft Fuel Tank with Machine Learning Methods, *IEEE Transactions on electromagnetic compatibility*.

Boussioux L., Giro-Larraz T., **Guille-Escuret C.**, Cherti M., Kégl B. (2019). InsectUp: Crowdsourcing Insect Observations to Assess Demographic Shifts and Improve Classification, *ICML 2019, Workshop on AI for Social Good* and *ICCV 2019, Workshop on Wildlife Conservation*