University of Washington, Seattle
Department of Statistics
+1 206 604 1161
vroulet@uw.edu
https://vroulet.github.io

Vincent Roulet

Education

2014 - 2017 **Doctorat in Applied Mathematics**, *Paris Sciences et Lettres Research University*, Paris.
Equivalent of PhD in Optimization and Machine Learning.
Title: On the geometry of optimization problems and their structure.
Advisor: Alexandre d'Aspremont.
Location: Department of Computer Science of the École Normale Supérieure.

2013 - 2014 **Master in Applied Mathematics**, *Télécom Paris*, Paris.
Specialty in Mathematics, Vision, Learning at École Normale Supérieure Paris-Saclay.
Obtained with high honors.

2010 - 2014 **Master and Engineering degree**, *École Polytechnique*, Paris.
Equivalent of Master in Applied Mathematics, Physics, Computer Science.
Top ranked French university, admission through French national competitive exams.

2008-2010 **Classes Préparatoires**, *Lycée Louis-le-Grand*, Paris.
Equivalent to Bachelor in Mathematics and Physics.
Intense bachelor studies in Mathematics and Physics to enter top French universities.

Positions

2018–now **Postdoctoral researcher**, *University of Washington*, Seattle.
Postdoc for the Algorithmic Foundations of Data Science Institute (ADSI).

Papers

I have made several contributions in *optimization* and *machine learning*. Those have been published in peer-reviewed international journals (IMA) and main international conferences in machine learning (NeurIPS/NIPS, ICML). These conferences are very selective with an acceptance rate in general below 25%, and their proceedings play a role which is as important as international journals.

Published

Elementary Convergence Guarantees for Gradient-based Optimization of Deep Networks.
Vincent Roulet, Zaid Harchaoui. *To appear in Proceedings of the 57th Annual Allerton Conference on Communication, Control, and Computing (Allerton 2019).*

Iterative Linearized Control: Stable Algorithms and Complexity Guarantees.
Vincent Roulet, Siddhartha Srinivasa, Dmitriy Drusvyatskiy, Zaid Harchaoui. *Proceedings of the 36th International Conference on Machine Learning (ICML 2019).*

Complexity versus Statistical Performance on Sparse Recovery Problems.
Vincent Roulet, Nicolas Boumal, Alexandre d'Aspremont. *Information and Inference: a Journal of the IMA, 2019.*

A Smoother Way to Train Structured Prediction Models.
Krishna Pillutla, Vincent Roulet, Sham Kakade, Zaid Harchaoui. *Advances in Neural Information Processing Systems 31 (NeurIPS 2018).*

Sharpness, Restart and Acceleration.
Vincent Roulet, Alexandre d'Aspremont. *Advances in Neural Information Processing Systems 30 (NIPS 2017).*

Integration Methods and Accelerated Optimization Algorithms.
Damien Scieur, Vincent Roulet, Francis Bach, Alexandre d'Aspremont. *Advances in Neural Information Processing Systems 30 (NIPS 2017).*

Working papers

Safe Nonlinear Control via Iterative Linearization: Complexity Bounds.
Vincent Roulet, Maryam Fazel, Siddhartha Srinivasa, Zaid Harchaoui.

Learning Feature Representations for Discriminative Clustering with Limited Supervision.
Corinne Jones, Vincent Roulet, Zaid Harchaoui.

Kernel-based Translations of Convolutional Networks.
Corinne Jones, Vincent Roulet, Zaid Harchaoui.

Sharpness, Restart and Acceleration.
Vincent Roulet, Alexandre d'Aspremont. *Journal version under minor revisions (1st round) in SIAM Journal on Optimization (SIOPT).*

Iterative Hard Clustering of Features.
Vincent Roulet, Fajwel Fogel, Alexandre d'Aspremont, Francis Bach.

Software

2019 **ilqc**, Main contributor, `https://github.com/vroulet/ilqc`.
Software library for analyzing non-linear control algorithms from an optimization perspective.

2019 **casimir**, Contributor, `https://github.com/krishnap25/casimir`.
Software library for structured prediction learning via smooth inference oracles.
- Implemented the accelerated prox-linear algorithm for deep structured prediction

2019 **yesweckn**, Contributor, `https://github.com/cjones6/yesweckn`.
Software library that implements Convolutional Kernel Networks, the kernel translation of Convolutional Neural Networks, on image classification tasks.
- Implemented the Convolutional Kernel Networks with the Matérn Kernel.

Teaching

Lecturer

Winter 2020 **Statistical Learning**, *University of Washington*, Seattle.
Reviews optimization and convex optimization in its relation to statistics. Covers the basics of unconstrained and constrained convex optimization, basics of clustering and classification, entropy, KL divergence and exponential family models, duality, modern learning algorithms like boosting, support vector machines, and variational approximations in inference.

Spring 2020 **Probability II**, *University of Washington*, Seattle.
Random variables; expectation and variance; laws of large numbers; normal approximation and other limit theorems; multidimensional distributions and transformations.

Teaching assistant

2014-2017 **Convex Optimization**, *Master Mathematics, Vision, Learning*, École Normale Supérieure Paris-Saclay, Paris.
Advanced master in Machine Learning, 90 students, 3 years, 40 hours per year.

2013-2014 **Oral Interrogations in Maths**, *Classes Préparatoires in Mathematics and Physics*, Lycée Janson de Sailly, Paris.
Intense bachelor classes, 30 students, 1 year, 64 hours.

Tutorials

2018 **Optimization for deep learning**, *Summer School on Fundamentals of Data Analysis*, University of Wisconsin-Madison.

2019 **Automatic Differentiation**, *Statistical Machine Learning for Data Scientists*, University of Washington.

Mentoring

2018–2019 Mentored PhD student **Krishna Pillutla** in
- A Smoother Way to Train Structured Prediction Models.

2018–2019 Mentored PhD student **Corinne Jones** in
- Kernel-based Translations of Convolutional Networks,
- Learning Feature Representations for Discriminative Clustering with Limited Supervision.

Presentations

Jun 2019 Iterative Linearized Control: Stable Algorithms and Complexity Guarantees, *International Conference on Machine Learning*, Long Beach, Talk and Poster.

Dec 2018 A Smoother Way to Train Structured Prediction Models., *Conference on Neural Information Processing Systems*, Montreal, Poster.

Dec 2017 On the Geometry of Optimization Problems and their Structure, *INRIA*, Paris, Talk.

Dec 2017 Sharpness, Restart and Acceleration, *Conference on Neural Information Processing Systems*, Montreal, Poster.

Dec 2017 Integration Methods and Accelerated Optimization Algorithms, *Conference on Neural Information Processing Systems*, Montreal, Poster.

Jun 2017 Integration Methods and Accelerated Optimization Algorithms, *IRIT*, Toulouse, Talk.

Jun 2017 Learning with Clustered Penalties, *IRIT*, Toulouse, Talk.

Feb 2017 Sharpness, Restart and Acceleration, *Optimization and Statistical Learning Workshop*, Les Houches, Talk and Poster.

Dec 2015 Supervised Clustering in the Data Cube, *Transfer and Multi-Task Learning Workshop at Neural Information Processing Systems Conference*, Montreal, Talk and Poster.

Academic service

Reviewing

Conference Neural Information Processing Systems 2018-2019, International Conference on Machine Learning 2019.

Journal Foundations of Computational Mathematics, Mathematics of Operation Research, IEEE Transactions on Information Theory, IEEE Transactions on Image Processing.

Scientific events

2019 **Summer School on Foundations of Data Science**, *University of Washington*, Seattle.
Participated in the organization of the event.

Work Experiences

Internships

Summer 2014 **Intern**, *INRIA*, Paris.
Studied hierarchical feature learning with kernel methods for computer vision.

Summer 2013 **Intern**, *Imperial College*, London.
Studied applications of *Knows What It Knows* paradigm to bandit problems for recommendation.

Summer 2012 **Intern**, *Astrium EADS*, Bremen.
Developed a better systematic statistical analysis of the pneumatic tests on the Ariane 5.

Entrepreneurship

2015 - 2016 **Entrepreneur**, *Bloom*, Paris.
Leaded the development of a high quality multi-usage pocket size speaker within a team of 4 engineers.
Selected to present the project at Échappée Volée organized by TedX Paris.

Social work

2010–2011 **Educator**, *Fondation d'Auteuil*, Paris.
Helped teenagers in social difficulties, e.g. young immigrants, orphans, to get education and work.
Lived in a social residence with 8 teenagers for seven months to provide them good living conditions.

Awards

2014 Outstanding investment award: "Outstanding student who has distinguished himself through his behavior, dedication and commitment to the student body" granted to 10% of the students of Ecole Polytechnique.

2016 Start-up prize *Be the Future of Sound* organized by Société d'Accélération du Transfert de Technologies Lutech, received 70 000€ for the project Bloom.

2018-2019 Outstanding reviewer for the Neural Information processing Systems Conference in 2018 and 2019, granted to 10% of the reviewers.