Théo **Uscidda**

French and Italian passports • Born 19-08-1998
Email: theo.uscida@gmail.com
Website: https://theouscidda6.github.io/
LinkedIn • Google Scholar • Github • Twitter

EDUCATION

ENSAE – Institut Polytechnique de Paris, Area of Paris, France Nov 2021 – Dec 2025 *(Expected)*
Ph.D. Candidate at the Center for Research in Economics and Statistics (CREST)
- o Research interests: Optimal Transport, Generative Modeling, Representational Learning.
- o Advised by Marco Cuturi (Apple MLR).

École Normale Supérieure Paris-Saclay, Area of Paris, France Sept 2020 – Sept 2021
MRes "Mathématiques, Vision, Apprentissage" (MVA) – Achieved with Highest Honors, GPA: 4.0/4.0
- o Major in Machine Learning and Computer Vision.
- o Relevant coursework: Convex Optimization, Topological Data Analysis, Computational Statistics, Probabilistic Graphical Model, Computational Optimal Transport, Kernel Methods, Theoretical Foundations of Deep Learning, Sparse Signal Representation, Computer Vision, Natural Language Processing, Bayesian Machine Learning, Machine Learning for Time Series.

Télécom Paris – Institut Polytechnique de Paris, Area of Paris, France Sept 2018 – Sept 2021
Bachelor's Degree – Achieved with Highest Honors, GPA: 4.0/4.0
- o Major in Mathematics, Minor in Computer Science.

PROFESSIONAL EXPERIENCE

Amazon, New York City, USA | *Applied Scientist Intern* Dec 2024 – Mar 2025 *(Expected)*
Amazon Web Services (AWS) AI Labs – Fundamental Research Team
- o Working on State Space Models for Language Modeling.
- o Advised by Matthew Tragger (AWS) and Alessandro Achille (AWS – Caltech).

Flatiron Institute, Hybrid | *Guest Researcher* August 2024 – present
Simons Foundation – Center for Computational Biology (CCB)
- o Building on the work initiated during the internship.
- o Hosted by Michael Shelley (New York University – CCB).

Flatiron Institute, New York City, USA | *Research Intern* June 2024 – August 2024
Simons Foundation – Center for Computational Biology (CCB)
- o Working on Generative Modeling for Biophysics.
- o Advised by Michael Shelley (New York University – CCB), Victor Chardes (CCB), and Surya Maddu (CCB – Harvard QBio).

Helmholtz AI, Munich, Germany | *Visiting Ph.D.* Feb 2024 – Dec 2024
Computational Health Center – Institute for Computational Biology (ICB)
- o Working on Generative Modeling for Single-Cell Perturbation Discovery.
- o Visited the lab from February 2024 to May 2024, then from September 2024 to December 2024.
- o Advised by Fabian J. Theis (Technical University of Munich – ICB).

Sorbonne Université, Paris, France | *Master Thesis* Apr 2021 – Sept 2021
Laboratory of Probability, Statistics and Modeling (LPSM)
- o Working on Federated Missing Data Imputation.
- o Advised by Claire Boyer (LPSM), Julie Josse (INRIA PreMeDICaL, ex-Google), and Boris Muzellec (Owkin, ex-INRIA SIERRA).

Telecom Etude (Junior Enterprise), Paris, France | *Project Manager* Apr 2019 – Apr 2020
Student-run consulting firm with 40 years of experience, ISO 9001 certified
- o Providing an interface between companies and student entrepreneurs to realize missions focused on machine learning. Supervised 10 missions in parallel with my 4th-year bachelor's degree, generating a revenue of 10.3k$.

Corsica Ferries, Bastia, France | *Data Science Intern* May 2019 – Aug 2019
The leading ferry operator for tourism and cargo on the Western Mediterranean Sea
- o Implementing a dynamic pricing algorithm for travel tickets, using data continuously gathered on the company's website.
- o Advised by the CTO & Business Manager.

PUBLICATIONS & PREPRINTS

o **Mirror and Preconditioned Gradient Descent in Wasserstein Space**, Clément Bonet, <u>Théo Uscidda</u>, Adam David, Pierre-Cyril Aubin-Frankowski, Anna Korba; *arXiv Preprint, arXiv:2406.08938*.

o **Entropic (Gromov) Wasserstein Flow Matching with GENOT**, Dominik Klein*, <u>Théo Uscidda</u>*, Fabian J. Theis, Marco Cuturi; *arXiv Preprint, arXiv:2310.09254*.

o **Disentangled Representation Learning through Geometry Preservation with the Gromov-Monge Gap**, <u>Théo Uscidda</u>*, Luca Eyring*, Karsten Roth, Fabian J. Theis, Zeynep Akata*, Marco Cuturi*; in *International Conference on Machine Learning (**ICML**) 2024 Workshop on* **Structured Probabilistic Inference & Generative Modeling *(SPIGM)***.

o **Unbalancedness in Neural Monge Maps Improves Unpaired Domain Translation**, Luca Eyring*, Dominik Klein*, <u>Théo Uscidda</u>*, Giovanni Palla, Niki Kilbertus, Zeynep Akata, Fabian J. Theis; *in Proceedings of the* 12*th International Conference on Learning Representations (**ICLR**) 2024*.

o **The Monge Gap: a Regularizer for All Transport Maps**, <u>Théo Uscidda</u>, Marco Cuturi; *in Proceedings of the* 40*th International Conference on Machine Learning (**ICML**)*, 2023.

ADDITIONAL PROJECTS

Co-supervision of [Carl Scandelius](#)'s Research Program | *with Prof. [Zeynep Akata](#)*   June 2024 – Aug 2024
o Topic: Learning the prior distribution in VAE-based Disentangled Representational Learning.
o 3-month internship as part of Harvard Bachelor's Degree.

Co-supervision of [Selman Özleyen](#)'s Master Thesis | *with Prof. [Fabian J. Theis](#)*   Apr 2024 – Sept 2024
o Topic: Imputation of Spatial Transcriptomics using Optimal Transport-based Generative Models.
o 6-month internship as part of MSc "Data Engineering and Analytics" at the Technical University of Munich (TUM).

Co-supervision of [Pablo Acuaviva](#)'s Master Thesis | *with Prof. [Fabian J. Theis](#)*   Apr 2024 – Sept 2024
o Topic: Optimal Transport Flow Matching for Unpaired Image Translation.
o 6-month internship as part of MSc "Mathematics in Data Science" at the Technical University of Munich (TUM).

Co-supervision of [Adam David](#)'s Master Thesis | *with Prof. [Anna Korba](#)*   Apr 2023 – Sept 2023
o Topic: Extending Wasserstein gradient flows to general strictly convex and translation invariant cost functions.
o 6-month internship as part of MRes "Mathématiques de l'Aléatoire" (MDA) at the Université Paris-Saclay and École Normale Supérieure (ENS) Paris.

Who are the high-frequency traders? | *AMF Data Challenge*   Jan 2021 – Jun 2021
o Designed an algorithm to detect high-frequency traders from behavioral variables based on order and transaction data provided by the AMF (French Financial Markets Authority).
o Top 1%; invited by the AMF to present the work to the France and Quebec Data Intelligence team.

TEACHING ASSISTANT

Taught **192 hours** of **tutorial classes** to both **undergraduate** and **graduate students** at ENSAE – IP Paris.

o **Statistical Learning Theory** (Prof <u>A. Stromme</u>): **graduate** course, **30 students**, taught in 2023.
o **Computational Optimal Transport** (Prof. <u>M. Cuturi</u>): **graduate** course, **50 students**, taught in 2022 & 2023.
o **Deep Learning** (Prof. <u>M. Cuturi</u>): **graduate** course, **50 students**, taught in 2022 & 2023.
o **Probability Theory** (Prof <u>VE. Brunel</u>): **undergraduate** course, **30 students**, taught in 2022.
o **Introduction to Machine Learning** (Prof <u>V. Perchet</u>): **undergraduate** course, **30 students**, taught in 2022.
o **Simulation & Monte Carlo** (Prof <u>N. Chopin</u>): **undergraduate** course, **30 students**, taught in 2022.
o **Functional & Convex Analysis** (Prof. <u>L. Deucreusefond</u>): **undergraduate** course, **30 students**, taught in 2021 & 2022.
o **Applied Statistical Learning** (Prof <u>M. Hebiri</u>): **graduate** course, **50 students**, taught in 2021.

TALKS & POSTER SESSION

o **Google DeepMind Reading Group on Generative Modeling, Diffusion & Transport,** Google DeepMind, London, April 2024. *"Unbalancedness in Neural Monge Maps Improves Unpaired Domain Translation"* [1h Talk].
o **Université Paris-Saclay Welcome Day**, Institut des Hautes Études Scientifiques (IHES), Area of Paris, October 2023. *"Optimal Transport & Deep Learning"* [1h Talk].
o **International Conference on Machine Learning (ICML)**, Honolulu, July 2023. "*The Monge gap: a Regularizer for All Transport Maps*" [Poster session].

- o **Student Statistical Seminar**, CREST, Area of Paris, May 2023. "*The Monge gap: a Regularizer for All Transport Maps*" [30min Talk].

ACADEMIC SERVICE

- o **Conference Reviewer:** International Conference on Machine Learning (ICML) 2023, 2024; Neural Information Processing Systems (NeurIPS) 2023, 2024; International Conference on Machine Learning (ICLR) 2024
- o **Journal Reviewer:** Journal of Machine Learning Research.

SOFTWARE

- o **OTT-JAX**, Contributor, https://github.com/ott-jax/ott.

SKILLS & EXTRACURRICULAR

Technology: Python, JAX, PyTorch, TensorFlow, Scikit-Learn, Latex, Spark, C, C++, Java, SQL, Matlab.

Languages: French (native), English (proficient), Italian (proficient).