

THÉO DUMONT

PhD student at LIGM, Univ. Gustave Eiffel (Marne-la-Vallée, France)
Optimal transport / Riemannian geometry / Machine learning

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OVERVIEW

1.1. Summary. I am a PhD student in mathematics at LIGM (Université Gustave Eiffel), under the supervision of François-Xavier VIALARD, Théo LACOMBE and Virginie EHRLACHER. I am studying the geometry of several optimizations problems related to optimal transport (OT), such as regularized OT or Gromov-Wasserstein.

1.2. Interests and recent work. My interests span the theory of OT and infinite-dimensional Riemannian geometry, and I am passionate about the interplay between those fields. In particular, I am fond of gradient flows and functional inequalities when they both arise from various choices of metrics on the space of probability measures. I recently worked with F.X. VIALARD and T. LACOMBE on gradient flows constrained to the space of OT maps [1] and on the Gromov-Wasserstein problem [2], with P. HARMS on the infinite-dimensional geometry of neural networks, and with K. MODIN on gradient flows in the diffeomorphism group. I also have a strong background in computer science and machine learning, both theoretical and applied, thanks to my academic background and my early research experiences [3, 4].

I also love teaching—whether it is mathematics, computer science, or societal topics. I love creating visuals, summarizing dense content in a clear way, and thinking about the best way to make something easily understandable.

CURRICULUM

2.1. Education.

- 2023– : **PhD in mathematics, LIGM (Université Gustave Eiffel)**
Thesis: *Geometry of some optimization problems on spaces of measures* [1]
Supervisors: [François-Xavier VIALARD](#), [Théo LACOMBE](#) and [Virginie EHRLACHER](#)
- 2021–2022: **M.Sc., ENS Paris-Saclay**, Master 2 MVA (Mathematics, Computer Vision and Machine Learning)
Thesis: *Existence of Monge maps for the Gromov-Wasserstein problem* ([link](#) of the thesis) [2]
Supervisors: [François-Xavier VIALARD](#) and [Théo LACOMBE](#)
- 2018–2022: **M.Sc., Mines Paris – PSL University** (Applied Mathematics and Computer Science) [3, 5, 4]
- 2016–2018: **B.Sc., Lycée Sainte-Geneviève** (Mathematics, Physics, Fundamental and applied Computer Science)

2.2. Teaching experiences.

• Mathematics

(3 years) 2023–2026 | Computer Science for Mathematics, Year 2, Université Gustave Eiffel, France.
2020–2025 | Private tutor in Mathematics, Years 1,2,3.

• Machine Learning and Computer Science

(2 years) 2023–2025 | Algorithm and programming, Year 1, Université Gustave Eiffel, France.
(2 years) 2024–2026 | Machine learning, Year 4, Université Gustave Eiffel, France.
(2 years) 2023–2025 | Data science, Year 3, Mines Paris, France ([link](#)).

• Ecological crisis

(2 years) 2024–2026 | Climate change, Year 1, Université Gustave Eiffel, France.

2.3. Research experiences.

Here is a list of my research stays, prior to my PhD.

- 2023:
(2 months) **Chalmers University (Göteborg, Sweden)**, internship (infinite-dimensional Riemannian geometry)
Gradient flows in the diffeomorphism group
Supervisor: [Klas MODIN](#)
- 2022–2023:
(6 months) **NTU Singapore**, internship (infinite-dimensional Riemannian geometry)
Intrinsic geometry of neural networks
Supervisor: [Philipp HARMS](#)

- 2022:
(6 months) **Université Gustave Eiffel – LIGM**, internship (optimal transport)
Existence of Monge maps for Gromov–Wasserstein [2]
Supervisors: [François-Xavier VIALARD](#) and [Théo LACOMBE](#)
- 2021:
(6 months) **Tekal.ai, working with MIT CSAIL**, internship (deep learning)
Video memorability prediction [3]
Supervisor: [Camilo FOSCO](#)
- 2020–2021:
(6 months) **InterDigital, Inc.**, internship (deep learning)
Temporal segmentation of facial features
Supervisors: [Claire-Hélène DEMARTY](#) and [Frédéric LEFEBVRE](#)
- 2020:
(3 months) **Turing Centre for Living Systems (INMED)**, internship (computer vision)
Image processing and dimensionality reduction for neuronal coactivity detection in the brain [5]
Supervisors: [Rosa COSSART](#) and [Julien DENIS](#)
- 2019–2020:
(6 months) **Mines Paris – Center for Mathematical Morphology**, internship (deep learning)
Image segmentation by superpixels [4]
Supervisor: [Bruno FIGLIUZZI](#)

PUBLICATION LIST

See also my [Google Scholar](#) page.

3.1. Optimal transport and geometry.

- [1] [T. Dumont](#), T. Lacombe, and F. X. Vialard. “Learning Monge maps by lifting and constraining Wasserstein gradient flows”. In: *to appear* (2026). POSTER.
- [2] [T. Dumont](#), T. Lacombe, and F. X. Vialard. “On the existence of Monge maps for the Gromov–Wasserstein problem”. In: *Foundations of Computational Mathematics* (2024), pp. 1–48. PDF CODE SLIDES POSTER.

3.2. Applied ML and image analysis.

- [3] [T. Dumont](#), J. S. Hevia, and C. L. Fosco. “Modular Memorability: Tiered Representations for Video Memorability Prediction”. In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*. 2023, pp. 10751–10760. PDF CODE.
- [4] D. Paulovics, B. Figliuzzi, [T. Dumont](#), and F. Blanc. “A supervised algorithm entirely trained on a synthetic dataset to segment granular suspension images”. Preprint. 2023. PDF CODE.
- [5] R. F. Dard, E. Leprince, J. Denis, S. R. Balappa, D. Suchkov, R. Boyce, C. Lopez, M. Giorgi-Kurz, T. Szwagier, [T. Dumont](#), et al. “The rapid developmental rise of somatic inhibition disengages hippocampal dynamics from self-motion”. In: *Elife* 11 (2022), e78116. PDF CODE.

TALKS AND POSTERS

Here are listed talks on my original research (●) and talks on other people’s work (○). Posters are indicated with ☆.

- **Learning Monge maps by lifting and constraining Wasserstein gradient flow** [1] POSTER
 - ☆ Oct 2025 | [GdR IASIS: “Modèles génératifs : diffusion, flow matching et leurs applications”](#), ENS Lyon, France.
 - Jan 2025 | [Infinite-dimensional Geometry: Theory and Applications](#), ESI Vienna, Austria.
- **Existence of Monge maps for the Gromov–Wasserstein problem** [2] SLIDES POSTER
 - Oct 2024 | [Congrès des Jeunes Chercheur.e.s en Mathématiques Appliquées \(CJC-MA\)](#), ENS Lyon, France.
 - ☆ Aug 2024 | [Machine Learning in Infinite Dimensions](#), Bath, UK.
 - ☆ May 2024 | [Geometric Sciences in Action: from geometric statistics to shape analysis](#), CIRM, Marseille, France.
 - Jan 2024 | [MAP5 lab PhDs’ seminar](#), Université Paris Cité, France.
 - Oct 2023 | [Oberwolfach seminar: “Variational and information flows in ML and OT”](#), Oberwolfach, Germany.
- **Gradient flows on Riemannian manifolds and on the space of probability measures**
- **Logarithmic Sobolev inequalities and related topics** NOTES
 - Oct 2024 | [New Monge problems](#), Paris, France.

- **Infinite-dimensional Riemannian geometry of optimal transport and Gromov–Wasserstein**

Nov 2023 | [Shape analysis seminar](#), INRIA Paris, France.

SUMMER SCHOOLS, CONFERENCES, WORKSHOPS AND SEMINARS

Here is a list of my participation in events, with indication of whether I presented a talk on my original research (●), a talk on other people’s work (○), or a poster (☆).

- **Summer schools**

- Sept 2024 | [Metric Measure Spaces, Ricci Curvature, and Optimal Transport](#), Lake Como, Italy.
- July 2024 | [Festum Pi: “Modern research in analysis”](#), Chania, Greece.
- Oct 2023 | [Oberwolfach seminar: “Variational and information flows in ML and OT”](#), Oberwolfach, Germany.
- Jun 2022 | [An optimization perspective on sampling using optimal transport](#) ([my notes](#)), Paris, France.

- **Conferences**

- Jan 2025 | [Infinite-dimensional Geometry: Theory and Applications](#), ESI Vienna, Austria.
- ☆ Aug 2024 | [Machine Learning in Infinite Dimensions](#), Bath, UK.
- ☆ May 2024 | [Geometric Sciences in Action: from geometric statistics to shape analysis](#), CIRM, Marseille, France, awarded the first place for the poster competition.
- Oct 2022 | [Geometry, Topology and Statistics in Data Sciences](#), IHP, Paris, France.

- **Workshops**

- ☆ Oct 2025 | [GdR IASIS: “Modèles génératifs : diffusion, flow matching et leurs applications”](#), ENS Lyon, France.
- July 2025 | [Labos 1point5: Enseigner les transitions écologiques et sociales dans le supérieur](#), Université Lyon 1, France.
- June 2025 | [Rencontres Archipel](#), Université Lyon 1, France.
- Oct 2024 | [Congrès des Jeunes Chercheur.e.s en Mathématiques Appliquées \(CJC-MA\)](#), ENS Lyon, France.

- **Seminars**

- Oct 2024 | [New Monge problems](#), Paris, France.
- Jan 2024 | [MAP5 lab PhDs’ seminar](#), Université Paris Cité, France.
- Nov 2023 | [Shape analysis seminar](#), INRIA Paris, France.

COMPUTER AND LANGUAGE SKILLS

Computer skills

Proficient: Python, PyTorch, git, Unix, \LaTeX ,
BASH, SQL, Tikz, Adobe Suite

Intermediate: Java, OCaml, HTML, CSS, Coq

See also my GitHub, [theodumont](#).

Language skills

English: Fluent (C1, TOEFL 113/120)

French: Native speaker

Italian: Intermediate (B1)

Japanese: Basic (A2)