Elodie Maignant

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https://github.com/elodiemaignant
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Current position

Jan 2024 – present **Postdoctoral position**, *Zuse Institute Berlin, Germany.*
"Geometric learning for Single-Cell RNA velocity modelling". PI: Christoph von Tycowicz.

Education

Oct 2020 – Dec 2023 **PhD in Applied Mathematics**, *Université Côte d'Azur, France.*
"Barycentric embeddings for geometric manifold learning". Under the supervision of Xavier Pennec and Alain Trouvé.

Sep 2019 – Sep 2020 **Master's degree in Applied Mathematics**, *ENS Paris-Saclay, France.*
Mathematics, Vision, Learning (MVA)

Sep 2016 – Sep 2020 **Master's degree – Mathematics**, *ENS Paris-Saclay, France.*
2019 Master's degree in Higher Education in Mathematics with specialisation in Effective Algebra. Successful candidate to the Agrégation de Mathématiques (rank 66/308).
2017 Bachelor's degree in Mathematics.

Sep 2014 – Jul 2016 **Classe préparatoire en Mathématiques et Physique**, *Lycée Saint Louis, Paris.*
Intensive two-year study course in Mathematics and Physics preparing for the competitive entrance examinations to the French "Grandes Écoles".

Research experience

Apr 2020 – Sep 2020 **Master's thesis**, *ENS Paris-Saclay, France.*
"Data embedding and symmetric spaces with applications to molecular dynamics". Under the supervision of Alain Trouvé.

Apr 2018 - Jul 2018 **Visiting Student**, *Albert-Ludwigs-Universität Freiburg, Germany.*
"Statistical analysis of geometric shapes with applications to anthropology". Visiting Philipp Harms.

Jan 2017 - Jun 2017 **Bachelor's thesis**, *ENS Paris-Saclay, France.*
"Learning stochastic systems in high dimension". Under the supervision of Alain Trouvé.

Awards

2024 **2nd PhD prize**
PhD prize of the Université Côte d'Azur in Automatic, Signal Processing and Image Analysis.

2021 **2nd prize**
ICLR 2021 challenge for computational geometry & topology.

Travel grants

2025 **COST Action CaLISTA**, EUR 2400
Supporting a short-term scientifc mission at University College London to work with Anna Calissano on dimensionality reduction for network-valued data.

Publications

Submitted papers

2025 **"Barycentric subspace analysis of network-valued data"**
Elodie Maignant, Alain Trouvé, Xavier Pennec, Anna Calissano.

Journal articles

2021 **"Identification of the primary factors determining the specificity of the human VKORC1 recognition by thioredoxin-fold proteins"**, *International Journal of Molecular Sciences 22.2: 802.*
Maxim Stolyarchuk, Julie Ledoux, Elodie Maignant, Alain Trouvé, Luba Tchertanov.

Conference proceedings

2025 **"Tree inference with varifold distances"**, *GSI'25. Springer.*
Elodie Maignant, Tim Conrad, Christoph von Tycowicz.

2023 **"Riemannian locally linear embedding with application to Kendall shape spaces"**, *GSI'23. Springer.*
Elodie Maignant, Alain Trouvé, Xavier Pennec.

2023 **"Towards quotient barycentric subspaces"**, *GSI'23. Springer.*
Anna Calissano, Elodie Maignant, Xavier Pennec.

2021 **"Parallel transport on Kendall shape spaces"**, *GSI'21. Springer.*
Nicolas Guigui, Elodie Maignant, Alain Trouvé, Xavier Pennec.

Preprints

2019 **"Approximation of Riemannian distances and applications to distance-based learning on manifolds"**
Philipp Harms, Elodie Maignant, Stefan Schlager.

Others

2021 **"ICLR 2021 challenge for computational geometry & topology: Design and results"**, *ICLR 2021.*
Nina Miolane, et al.

Talks

Oct 2025 **GSI'25 – Contributed talk**, *Saint-Malo, France.*
"Tree inference with varifold distances"

Jul 2025 **Math in Umbria: Geometry, Shapes and PDEs – Invited talk**, *Città di Castello, Italy.*
"RNA velocity fields and tree inference"

Feb 2025 **Infinite-dimensional Geometry: Theory and Applications – Invited talk**, *ESI, Austria.*
"Geometry of single-cell trajectories"

Aug 2024 **COMPSTAT 2024 – Invited talk**, *Giessen, Germany.*
"Barycentric subspace analysis of networks"

Aug 2024 **Math in Maine: Geometry, Shapes and PDEs – Invited talk**, *Andover, USA.*
"RNA velocity fields"

Jun 2024 **POPNets Workshop – Invited talk**, *Copenhagen, Denmark.*
"Barycentric subspace analysis of networks"

May 2024 **Geometric Sciences in Action – Poster**, *CIRM, France.*
"Barycentric subspace analysis of networks"

Jan 2024 **Workshop on Small Data Analysis – Invited talk**, *Berlin, Germany.*
"Barycentric subspace analysis of a set of graphs"

Dec 2023 **Seminar on Shape Analysis – Invited talk**, *Paris, France.*
"Intrinsic methods for manifold-valued data"

Nov 2023 **Workshop on Dimension Reduction – Contributed talk**, *Lyon, France.*
"Barycentric subspace analysis of sets of graphs"

Aug 2023 **GSI'23 – Contributed talk**, *Saint-Malo, France.*
"Riemannian locally linear embedding with application to Kendall shape spaces"

Aug 2023 **GSI'23 – Contributed talk**, *Saint-Malo, France.*
"Towards quotient barycentric subspaces"

Aug 2023 **Statistical Learning Theory Lab – Invited talk**, *Seoul National University.*
"Barycentric geometry on manifolds and application to non-Euclidean dimensionality reduction"

Jul 2023 **Math in the Mine: Geometry, Shapes and PDEs – Invited talk**, *Tende, France.*
"Geodesics of orbit spaces, affine mappings of simple manifolds and some related questions in barycentric geometry"

Sep 2022 **Introductory School on Geometry and Statistics – Poster**, *Cargèse, France.*
"Looking for invariance in Locally Linear Embedding"

Jun 2022 **Curves and Surfaces 2022 – Poster**, *Arcachon, France.*
"Looking for invariance in Locally Linear Embedding"

Jan 2022 **Working Group on Image Processing – Invited talk**, *Université Paris-Saclay.*
"Introducing a generalisation of Locally Linear Embedding to manifold-valued data"

Nov 2021 **Laboratoire de Mathématiques d'Orsay – Invited talk**, *Université Paris-Saclay.*
"A generalisation of Locally Linear Embedding to manifold-valued data"

Oct 2021 **CJC-MA 2021 – Contributed talk**, *Palaiseau, France.*
"A generalisation of Locally Linear Embedding to manifold-valued data"

Aug 2021 **GTDAML 2021 – Contributed talk**, *Online*
"Visualisation of Kendall shape spaces with Geomstats"

Jul 2021 **GSI'21 – Contributed talk**, *Paris, France.*
"Parallel transport on Kendall shape spaces"

Teaching

Oct 2020 – Jun 2022 **Teaching assistant, in charge of tutorials**, *Université Paris-Saclay, France.*
Global Analysis, Topology and Differential Calculus.

Sep 2018 – Sep 2020 **Interrogatrice en classe préparatoire**, *Lycée Saint-Louis, Paris.*
Examiner in Mathematics for weekly oral interrogations in small groups.

Languages

French Native

English Complete working knowledge *Cambridge English Advanced C1*

Miscellaneous

Volunteering I am active in promoting women in sciences and I have been involved in the organisation of several events aimed at this end. More generally, I enjoy teaching and I am strongly committed to education for all. I am also devoted to the animal cause and have done voluntary work with a shelter.

Personal Interest I am passionate about music and art. I have been singing and playing the viola and the saxophone since I was a very young age. I also practised judo at a high level for years.