Mathieu Pont

Post-doctoral Researcher

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Work Experience

Oct. 2024 – Ongoing
Post-doctoral Position
RPTU Kaiserslautern-Landau, Germany (Scientific Visualization Lab).

Dec. 2023 – Sep. 2024
Post-doctoral Position
CNRS and Sorbonne Université (LIP6).

2020 (6 months)
Master 2 Research Intern
CNRS and Sorbonne Université (LIP6).
Title: *Topologically Discriminant Metric.*
Advisor: *Julien Tierny.*

2019 (3 months)
Master 1 Research Intern
Paris Descartes University (LIPADE).
Title: *Biomedical Corpus Analysis.*
Advisor: *Séverine Affeldt.*

2018 (3 months)
Bachelor Research Intern
Toulouse Paul Sabatier University (IRIT).
Title: *Comparison of Deep Reinforcement Learning methods with an existing Multi-Agent System.*
Advisors: *Frédéric Migeon and Jêrome Mengin.*

2016 (3 months)
DUT Research Intern
ISAE-Supaero.
Title: *Server Room Thermal Monitoring and Evaluation of EV3 Robotic Kit.*
Advisors: *Régine Leconte and Jean-François Dassieu.*

Education

Oct. 2020 – Nov. 2023
Ph.D. in Computer Science
CNRS and Sorbonne Université (LIP6).
Title: *Analysis of Ensembles of Topological Descriptors.*
Advisor: *Julien Tierny.*

2018 – 2020
Master's Degree in Computer Science
"Machine Learning for Data Science" track of Paris Descartes University.
Rank: *1 / 38 (S4) ; 1 / 37 (S3) ; 1 / 33 (S2) and 3 / 33 (S1)*

2016 – 2018
Bachelor's Degree in Computer Science
Toulouse Paul Sabatier University.
Rank: *4 / 152*

2014 – 2016
DUT GEII (Electrical and Computer Science Engineering)
Toulouse Paul Sabatier University.

Awards

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2023   • **Best Paper Honorable Mention Award** at IEEE VIS 2023
For the paper: "Merge Tree Geodesics and Barycenters with Path Mappings"

     • **Best Paper and Presentation Award** at CORESA 2023
For the talk: "Analyse en Géodésiques Principales d'Arbres de Fusion (et de Diagrammes de Persistance)"

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Research

Thesis

2023   • **Analysis of Ensembles of Topological Descriptors**
<u>Mathieu Pont</u>
Ph.D. thesis in Computer Science
Committee: *Gabriel Peyré (President), David Coeurjolly (Reviewer), Vijay Natarajan (Reviewer), Elsa Cazelles (Examiner), Stanley Durrleman (Examiner), Roland Kwitt (Examiner), Katharine Turner (Examiner), Julien Tierny (Advisor)*

Publications

2025   • **Region-Aware Wasserstein Distances of Persistence Diagrams and Merge Trees**
<u>Mathieu Pont</u> and Christoph Garth
Submitted, 2025.

2024   • **A Practical Solver for Scalar Data Topological Simplification**
Mohamed Kissi, <u>Mathieu Pont</u>, Joshua A. Levine and Julien Tierny
IEEE Transactions on Visualization and Computer Graphics
Proc. of IEEE VIS 2024.

2023   • **Wasserstein Auto-Encoders of Merge Trees (and Persistence Diagrams)**
<u>Mathieu Pont</u> and Julien Tierny
IEEE Transactions on Visualization and Computer Graphics
Presented at IEEE VIS 2024.

     • **Merge Tree Geodesics and Barycenters with Path Mappings**
Florian Wetzels, <u>Mathieu Pont</u>, Julien Tierny and Christoph Garth
IEEE Transactions on Visualization and Computer Graphics
Proc. of IEEE VIS 2023.
Best Paper Honorable Mention Award

2022   • **Principal Geodesic Analysis of Merge Trees (and Persistence Diagrams)**
<u>Mathieu Pont</u>, Jules Vidal and Julien Tierny
IEEE Transactions on Visualization and Computer Graphics
Presented at IEEE VIS 2023.

2021 • **Wasserstein Distances, Geodesics and Barycenters of Merge Trees**
<u>Mathieu Pont</u>, Jules Vidal, Julie Delon and Julien Tierny
IEEE Transactions on Visualization and Computer Graphics
Proc. of IEEE VIS 2021.

Technical Reports

2023 • **A Hands-on TTK Tutorial for Absolute Beginners**
Christoph Garth, Robin Maack, <u>Mathieu Pont</u>, Julien Tierny, Bei Wang, Florian Wetzels, Michael Will
IEEE VIS Tutorials 2023

2022 • **Topological Analysis of Ensemble Scalar Data with TTK, A Sequel**
Christoph Garth, Charles Gueunet, Pierre Guillou, Federico Iuricich, Joshua Levine, Jonas Lukasczyk, <u>Mathieu Pont</u>, Julien Tierny, Jules Vidal, Bei Wang, Florian Wetzels
IEEE VIS Tutorials 2022

Professional Service

Program Committee
• **IEEE VIS Short Papers**
2025

Reviewer
• **La Matematica**
2024

• **IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)**
2023

Talks

2025 • **Tutorial: Merge Tree Computation and Feature Tracking in TTK**
Nov. 3rd, IEEE VIS

2024 • **Poster: Wasserstein Auto-Encoders of Merge Trees (and Persistence Diagrams)**
Nov. 21st, CORESA

• **Wasserstein Auto-Encoders of Merge Trees (and Persistence Diagrams)**
Oct. 17th, IEEE VIS

• **Variability Analysis of Ensembles of Topological Descriptors**
Jul. 1st, RPTU Kaiserslautern-Landau Invited Talk

• **Auto-Encodeurs de Wasserstein d'Arbres de Fusion (et de Diagrammes de Persistance)**
Jun. 18th, Journée Visu

• **Auto-Encodeurs de Wasserstein d'Arbres de Fusion (et de Diagrammes de Persistance)**
May 30th, Journée APR

2023 • **Analysis of Ensembles of Topological Descriptors**
Dec. 1st, Ph.D. Defense

2023 (continued)	• **Principal Geodesic Analysis of Merge Trees (and Persistence Diagrams)** *Oct. 26th, IEEE VIS*
	• **Tutorial: Wasserstein Distances between Persistence Diagrams in TTK** *Oct. 22nd, IEEE VIS*
	• **Principal Geodesic Analysis of Merge Trees (and Persistence Diagrams)** *Oct. 16th, Pre-VIS Day*
	• **Analyse en Géodésiques Principales d'Arbres de Fusion (et de Diagrammes de Persistance)** *Jun. 23rd, Journée APR*
	• **Analyse en Géodésiques Principales d'Arbres de Fusion (et de Diagrammes de Persistance)** *Jun. 22nd, Journée Visu*
	• **Analyse en Géodésiques Principales d'Arbres de Fusion (et de Diagrammes de Persistance)** *Jun. 8th, CORESA* – Best Paper and Presentation Award!
2022	• **Distances de Wasserstein, Géodésiques et Barycentres d'Arbres de Fusion** *Nov. 25th, JFIG*
	• **Tutorial: Wasserstein Distances, Barycenters and Clusters of Merge Trees in TTK** *Oct. 17th, IEEE VIS, Recorded Talk*
	• **Distances de Wasserstein, Géodésiques et Barycentres d'Arbres de Fusion** *Jun. 28th, Journée Visu*
2021	• **Wasserstein Distances, Geodesics and Barycenters of Merge Trees** *Oct. 28th, IEEE VIS, Recorded Talk*

Teaching Experience

2022 − 2023	• **Introduction to Programming 1** $\sim 40h$ *in Bachelor 1 using Python*
	• **Data Structures** $\sim 20h$ *in Bachelor 2 using C*
2021 − 2022	• **Introduction to Programming 1** $\sim 40h$ *in Bachelor 1 using Python*
	• **Introduction to Scientific Visualization** $\sim 20h$ *in Master 2 using C++ and ParaView*
2020 − 2021	• **Introduction to Scientific Visualization** $\sim 20h$ *in Master 2 using C++ and ParaView*
	• **Introduction to Programming 2** $\sim 40h$ *in Bachelor 1 using C*