Jocelyn Meyron

Postdoctoral researcher,
PhD in applied mathematics,
Engineer in computer science

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Education

2019 - 2021 **Postdoctoral researcher**, *LIRIS*, Lyon, France.
Pattern generation for digital surface analysis. Supervised by Tristan Roussillon.

2015 - 2018 **PhD Thesis**, *GIPSA-lab*, Grenoble, France.
Semi-discrete optimal transport and applications to non-imaging optics. Supervised by Dominique Attali, Quentin Mérigot, Boris Thibert, defended on October 16^{th} 2018.

2012 - 2015 **Graduate in computer science and applied mathematics**, *Ensimag*, Grenoble, France.
Specialization: *Mathematical modeling, Vision, Graphics and Simulation*.
Selection of courses:
- **1st year**: Common core curriculum
  - Mathematical analysis, probabilities
  - Formal language theory, information theory, operational research
  - Algorithmics, data structures, architecture, networks
- **2nd year**: *Mathematical modeling, Vision, Graphics and Simulation* specialization
  - Object-oriented programming, databases, operating systems, concurrent programming
  - Partial differential equations, geometrical modeling
  - Functional analysis, image processing, 3D graphics
- **3rd year**: *Master of Science in Informatics at Grenoble*
  - Autonomous Robotics
  - Computational Geometry
  - Computer Graphics
  - Computer Vision
  - Machine Learning and Category Representation
  - Medical Imaging, Simulation and Robotics
  - Virtual Reality and 3D Interfaces Reality

2010 - 2012 **Preparatory classes for French Grandes Écoles**, *MPSI-MP**, Marseille, France.

Projects

07-08/2018 **Research internship**, *Osaka University*, Osaka, Japan.
- Advisor: Professor Ohta Shin-ichi
- Goal: Study Wasserstein gradient flows and Wasserstein barycenters.
- Details: Study the discrete-time gradient flow approach for the relative entropy functional as well as results on approximation of measures.

02-06/2015 **Research internship**, *GIPSA-lab*, Grenoble, France.
- Advisors: Domininique Attali and Quentin Mérigot
- Goal: Discretization of mean curvature flows on point clouds.
- Details: Algorithms for simulating (anisotropic) mean curvature flows on point clouds. The mean curvature is approximated by the gradient of the function that associates for a point cloud the volume of a union of balls centered at that point cloud.
- Tools:
  - Mathematics: Voronoi diagrams, automatic differentiation, gradient descent
  - Programming: C++ / CGAL / CMake / Git
- Available on my *GitHub* profile, 10kLOC.

06-08/2014 **Research internship**, *Google Summer of Code, LJK*, Grenoble, France.

- Advisor: Quentin Mérigot
- Goal: Implementation of a function for computing an intersection of halfspaces and the Voronoi Covariance Measure (VCM) inside the *CGAL* library.
- Details: Implementation of a function that computes the intersection of halfspaces using the duality. This function can be used to evaluate differential quantities on point clouds such as normals or mean curvatures.
- Tools:
  - Mathematics: Voronoi diagrams, duality
  - Programming: C++ / CGAL / CMake / Doxygen / Git
- Available in the *CGAL* library, 2kLOC.

06-2014 **Second year final project**, *Ensimag*, Grenoble.

- Goal: Procedural generation of strongholds, and terrain adaptation
- Details: Development of a software that can generate a stronghold defined by a list of rules (a grammar). The stronghold will adapt to the terrain it is built on.
- Tools:
  - Mathematics: Formal language theory
  - Programming: ANTLR / C++ / OpenGL
- Available on *GitHub*.

Skills

Computer science

- Programming languages: C, C++, Java, Python, Coq
- Libraries: Eigen, CGAL, OpenGL, pybind11, NumPy, SciPy, Matplotlib, DGtal
- Software: Git, Linux, LaTeX
- 3D Graphics: Blender, LuxRender, GIMP

Mathematics

- Computational geometry
  - Voronoi and Power diagrams
  - Randomized algorithms
  - Arrangements
  - Meshing
  - Surface reconstruction
- Optimal transport
  - Laguerre diagrams
  - Monge-Ampère equation
  - Damped Newton's algorithm
- Numerical analysis
- Finite element methods
- Partial differential equations
- Digital geometry

Languages

French **Mother tongue**.

English **Fluent in both oral and writing**, *TOEIC: 960 points*.

Japanese **Notions**, *Japanese Language Proficiency Test N3 Level, received March 2020*.

Teachings

- Practicals for *Advanced Programming in C++*, Université Claude Bernard, Lyon, France (15h)
- Practicals for *Theory of Formal Languages* and *Classical Logic*, Université Claude Bernard, Lyon, France (12h)

Publications

1. An Optimized Framework for Plane-Probing Algorithms, *Jacques-Olivier-Lachaud, Jocelyn Meyron, Tristan Roussillon*.
   - Published in the Journal of Mathematical Imaging and Vision,
   - Preprint available on *HAL*.
2. Initialization procedures for discrete and semi-discrete optimal transport, *Jocelyn Meyron*.
   - Published in the Computer-Aided Design journal,
   - Preprint available on *my personal website*.
3. Light in Power: A General and Parameter-free Algorithm for Caustic Design, *Quentin Mérigot, Jocelyn Meyron, Boris Thibert*.
   - Published in ACM Transactions on Graphics (TOG, Proc. SIGGRAPH Asia).
   - Preprint available on *arXiv*.
4. An algorithm for optimal transport between a simplex soup and a point cloud, *Quentin Mérigot, Jocelyn Meyron, Boris Thibert*.
   - Published in the SIAM Journal on Imaging Sciences (SIIMS).
   - Preprint available on *arXiv*.

Presentations and research projects

Presentations:

- 2019/11: **GDMM research group meeting**, Marseille (France): A general approach for plane-probing algorithms
- 2019/06: **SPM 2019**, Vancouver (Canada): Initialization procedures for discrete and semi-discrete optimal transport
- 2018/12: **SIGGRAPH Asia 2018**, Tokyo (Japan): Light in Power: A General and Parameter-Free Algorithm for Caustic Design
- 2018/08: **RIKEN AIP Seminar**, Osaka (Japan): Semi-discrete optimal transport and applications to non-imaging optics
- 2018/07: **Curves and Surfaces 2018**, Arcachon (France): An algorithm for optimal transport between a simplex soup and a point cloud
- 2017/12: **Computational Geometry days**, Aussois (France): Geometric methods for the conception of optical components in non-imaging optics
- 2017/06: **MAGA days**, Grenoble (France): Geometric methods for the conception of optical components in non-imaging optics

Research projects:

- Member of the ANR project **MAGA** (2016-2020)
- Member of the ANR project **PARADIS** (2018-2023)