



GSi'21

LEARNING GEOMETRIC STRUCTURES



GSi'21 – Geometric Science of Information

PARIS, Sorbonne University, 21st to 23rd July 2021

Conference Co-chairs:

- [Frank Nielsen](#)
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Ecole Polytechnique, France
- [Frédéric Barbaresco](#)
President of SEE ISIC Club
Thales Land & Air Systems, Limours, France

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- [Xavier Fresquet](#)
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www.gsi2021.org

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- [Jun Zhang](#) – University of Michigan, Ann Arbor

First announcement and call for papers

As for GSi'13, GSi'15, GSi'17 and GSi'19, the objective of this SEE GSi'21 conference, hosted in Sorbonne University, is to bring together pure/applied mathematicians and engineers, with common interest for Geometric tools and their applications for Information analysis and Learning. It emphasizes an active participation of young researchers to discuss emerging areas of collaborative research on "Geometric Science of Information and their Applications".

Current and ongoing uses of Information Geometry Manifolds in applied mathematics are the following: Advanced Signal/Image/Video Processing, Complex Data Modeling and Analysis, Information Ranking and Retrieval, Coding, Cognitive Systems, Optimal Control, Statistics on Manifolds, Topology/Machine/Deep Learning, Physics and Learning, Geometry of Quantum states, Speech/sound recognition, natural language treatment, Small/Big Data Analytics, Learning for Robotics, etc., which are substantially relevant for industry.

The Conference will be therefore held in areas of topics of mutual interest with the aim to:

- Provide an overview on the most recent state-of-the-art
- Exchange mathematical information/knowledge/expertise in the area
- Identify research areas/applications for future collaboration

This conference will be an interdisciplinary event and will unify skills from Geometry, Probability and Information Theory. *Proceedings are published in Springer's Lecture Note in Computer Science (LNCS) series. SPRINGER will sponsor Best paper Award GSi'21.*

Gala Diner will take place in Paris Downtown.

Important Dates:

- Deadline for 8 pages SPRINGER LNCS format: 14th of February 2021
- Notification of acceptance: 25th of April 2021
- Final paper submission: 9th of May 2021

Paper templates and Guideline on GSi'21 website at "Author Instructions"

Topics of interests include but are not limited to:

- Geometric Deep Learning (ELLIS session)
- Probability on Riemannian Manifolds
- Optimization on Manifold
- Shape Space & Statistics on non-linear data
- Lie Group Machine Learning
- Harmonic Analysis on Lie Groups
- Statistical Manifold & Hessian Information Geometry
- Monotone Embedding in Information Geometry
- Non-parametric Information Geometry
- Computational Information Geometry
- Distance and Divergence Geometries
- Divergence Statistics
- Optimal Transport & Learning
- Geometry of Hamiltonian Monte Carlo
- Statistics, Information & Topology
- Graph Hyperbolic Embedding & Learning
- Inverse problems: Bayesian and Machine Learning interaction
- Integrable Systems & Information Geometry
- Geometric structures in thermodynamics and statistical physics
- Contact Geometry & Hamiltonian Control
- Geometric and structure preserving discretizations
- Geometric & Symplectic Methods for Quantum Systems
- Geometry of Quantum States
- Geodesic Methods with Constraints
- Probability Density Estimation & Sampling in High Dimension
- Geometry of Tensor-Valued Data
- Geometric Mechanics
- Geometric Robotics & Learning
- Topological and geometrical structures in neurosciences

A special session will deal with:

- Geometric Structures Coding & Learning Libraries (geomstats, pyRiemann, Pot...)

Provisional program of Invited Speakers:

Keynote speaker: **Max Welling** (Univ.Amsterdam) on *Exploring Quantum Statistics for Machine Learning*

Other keynote speakers to be announced soon on the website.

