ESI Erwin Schrödinger International Institute
for Mathematics and Physics

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Week 5 of the Thematic Programme on

"Infinite-dimensional Geometry: Theory and Applications"

February 10 - 14, 2025

organized by

Tomasz Goliński (U of Białystok), Gabriel Larotonda (U of Buenos Aires), Alice Barbara Tumpach (WPI, Vienna), Cornelia Vizman (WU of Timisoara)

- **Monday, February 10th, 2025**

  09:00 – 09:30 **Registration**

  09:30 – 09:40 **Opening**

  09:40 – 10:40 **Mini-Course 1 Lecture 1 (1 h including questions) Pooran Memari (CNRS LIX, Paris)**
  Circle Patterns: Geometry, Analysis, and Applications

  10:40 – 11:05 **Coffee break**

  11:05 – 11:30 **Short talk (20 min + 5 min questions) Olivier Bisson (INRIA at U Côte d'Azur)**
  Differentiable Structures on Correlation Matrices with Applications in Neuroimaging

  11:30 – 12:00 **Tutorial (30 min including questions)**
  Jean Feydy (INRIA PARIS), Good practices for software development

  12:00 – 14:00 **Lunch break**

  14:00 – 15:00 **Keynote talk (1 hour including questions) Stefan Ohrhallinger (TU Vienna)**
  The Sampling - Reconstruction Dual

  15:00 – 15:30 **Coffee or Tea break**

  15:30 – 16:30 **Keynote talk (1 hour including questions)**
  Nina Miolane (Santa Barbara) TBA (ONLINE)

- **Tuesday, February 11th, 2025**

  09:00 – 10:00 **Mini-course 2 Lecture 1 (1 h including questions) Xavier Pennec (INRIA at U Côte d'Azur)**
  Geometric Statistics with applications in Computational anatomy

  10:05 – 10:30 **Short talk (20 min + 5 min questions) Tom Szwagier (INRIA at U Côte d'Azur)**
  The curse of isotropy: from principal components to principal subspaces

  10:30 – 11:00 **Coffee or Tea break**

  11:00 – 12:00 **Mini-Course 1 lecture 2 (1 h including questions) Pooran Memari (CNRS LIX, Paris)**
  Circle Patterns: Geometry, Analysis, and Applications

  12:00 – 14:00 **Lunch break**

  14:00 – 14:50 **Invited talk (40 min + 10 min questions) François-Xavier Vialard (U Gustave Eiffel, Paris)**
  Fast large deformation matching with the energy distance kernel

14:50 – 15:20 **Coffee or Tea break**

15:20 – 15:45 **Short talk (20 min + 5 min questions) Mao Nishino (Florida State U, Tallahassee)**
Path constrained unbalanced optimal transport

15:50 – 16:15 **Short talk (20 min + 5 min questions) Théo Dumont (U Gustave Eiffel, Paris)**
Bridging optimal transport and diffusion models

16:20 – 16:45 **Short talk (20 min + 5 min questions) Emmanuel Hartman (U of Houston)**
Parameterization Invariant Representations for Efficient Shape Learning

- **Wednesday, February 12th, 2025**

  09:00 – 09:50 **Software Tutorial**
  Anton François (ENS Paris-Saclay), Python library Demeter Metamorphosis,
  https://github.com/antonfrancois/Demeter_metamorphosis.

  09:50 – 10:10 **Coffee or Tea break**

  10:10 – 11:00 **Software Tutorial Jean Feydy (INRIA Paris)**
  Shape metrics with scikit-shapes

  11:10 – 12:00 **Software Tutorial**
  Elodie Maignant (Zuse Institute Berlin) and Luis F. Peirera (UC Santa Barbara): Geomstat

  12:00 – 13:30 **Lunch break**

  13:30 – 14:20 **Software Tutorial Jean Feydy (INRIA Paris)**
  Creating good-looking 3D figures with PyVista

  14:20 – 15:20 **Special Guest (1 hour including questions) Peter Kán (TU Wien)**
  Reconstruction of Illumination in 3D Scenes

  15:20 – 15:40 **Coffee or Tea break**

  15:40 – 16:40 **Keynote Speaker (1 hour including questions) Ivona Brandic (TU Wien)**
  Principles of Computational Sustainability

  17:00 – 18:00 **Aperitif**

  18:30 – **Conference Dinner**

- **Thursday, February 13th, 2025**

  09:00 – 09:30 **Tutorial (30 min including questions) Alice Barbara Tumpach (WPI, Vienna)**
  Poisson structures and isospectral matrices

  09:30 – 10:30 **Mini-course 2 lecture 2 (1 h including questions) Xavier Pennec (INRIA at U Côte d'Azur)**
  Geometric Statistics with applications in Computational anatomy

  10:30 – 11:00 **Coffee break**

  11:00 – 12:00 **Mini-Course 1 Lecture 3 (1 h including questions) Pooran Memari (CNRS LIX, Paris)**
  Circle Patterns: Geometry, Analysis, and Applications

  12:00 – 14:00 **Lunch break**

  14:00 – 15:00 **Special Guest (1 h including questions) Frédéric Barbaresco (Thalesgroup, Palaiseau)**
  Transverse Symplectic Foliation Structure for Thermodynamics-Informed Neural Network and Lie-Groups Machine Learning

  15:00 – 15:30 **Coffee or Tea break**

- **Friday, February 14th, 2025**

09:00 – 10:00 **Keynote talk (1 hour including questions)**
Georg Langs (Medical University of Vienna) TBA

10:05 – 10:30 **Short talk (20 min + 5 min questions) Elodie Maignant (Zuse, Berlin)**
Geometry of single-cell trajectories

10:30 – 11:00 **Coffee break**

11:00 – 12:00 **Mini-Course 2 Lecture 3 (1 h including questions) Xavier Pennec (INRIA at U Côte d'Azur)**
Geometric Statistics with applications in Computational anatomy

12:00 – 13:30 **Lunch break**

13:30 – 14:30 **Keynote talk (1 hour including questions) Remco Duits (TU Eindhoven)**
Geometric Learning via data-efficient PDE-G-CNNs: Training of Association Fields

14:30 – 15:00 **Coffee or Tea break**

15:00 – 15:25 **Short talk (20 min + 5 min questions) Raphaël Tinarrage (ISTA)**
Train-Free Segmentation in MRI with Cubical Persistent Homology

15:25 – 15:35 **Closing**

All talks take place at ESI Boltzmann Lecture Hall!