

## 8 Lectures (90 min)

Langevin Dynamics: Old and News (x 2) – Eric Moulines Computational Information Geometry On statistical distances and information geometry for ML – Frank Nielsen Information Manifold modeled with Orlicz Spaces – Giovanni Pistone Nen-Equilibrium Thermodynamic Geometry A variational perspective of closed and open systems- François Gay-Balmaz

A Homogeneous Symplectic Approach - Arjan van der Schaft

## Geometric Mechanics

Gallilean Mechanics & Thermodynamics of Continua - Géry de Saxcé Souriau-Casimir Lie Groups Thermodynamics & Machine Learning – F. Barbaresco



Joint Structures and Common Foundation of Statistical Physics, Information Geometry and Inference for Learning 26<sup>th</sup> July to 31<sup>st</sup> July 2020 <u>https://franknielsen.github.io/SPIG-LesHouches2020/</u>

## 17 Keynotes (60 min)

Learning with Few Labeled Data - Pratik Chaudhari Sampling and statistical physics via symmetry - Steve Huntsman The Bracket Geometry of Measure-Preserving Flows and Diffusions - Alessandro Barp Exponential Family by Representation Theory - Koichi Tojo Learning Physics from Data - Francisco Chinesta Information Geometry and Integrable Hamiltonian - Jean-Pierre Françoise Information Geometry and Quantum Fields - Kevin Grosvenor Thermodynamic efficiency implies predictive inference- Susanne Still Diffeological Fisher Metric - Hông Vân Lê Deep Learning as Optimal Control - Elena Celledoni Schroedinger's problem, Hamilton-Jacobi-Bellman equations and regularized Mass Transportation - Jean-Claude Zambrini Mechanics of the probability simplex - Luigi Malago Dirac structures in nonequilibrium thermodynamics - Hiroaki Yoshimura Port Thermodynamic Systems Control - Bernhard Maschke Covariant Momentum Map Thermodynamics - Goffredo Chirco Contact geometry and thermodynamical systems - Manuel de León Computational dynamics of multibody-fluid system in Lie group setting- Zdravko Terze