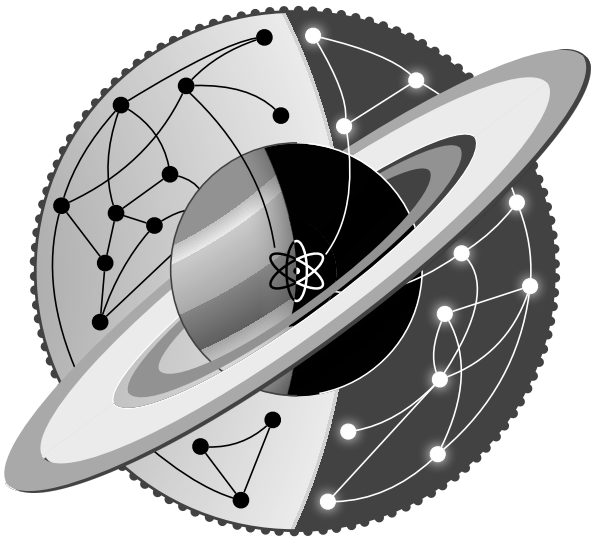
2022 MATH + X Symposium
on Matter under Extreme Conditions in Solar System Giant Planets and Exoplanets, Inverse Problems and Deep Learning



Las Catalinas, Guanacaste, Costa Rica · November 6–9

Agenda

Sunday, November 6 Santarena, Rooftop Terrace

7:00pm	*reception*	

Monday, November 7 Santarena, The Conservatory

6:30am	breakfast, Ponciana	
8:15am	opening remarks	de Hoop, Chaves
		Chair: Bruna
8:30am	**Keynote:** Why Multicomponent Systems and their Phase Diagrams are Essential for Understanding Planets	Stevenson
9:30am	Scalars are Universal: Equivariant Machine Learning, Structured Like Classical Physics	Villar
10:15am	*coffee/juice break*	
10:45am	Inverse Problem for the Wave Equation on Lorentzian Manifolds	Oksanen
11:30am	*Spotlight: Linking planetary diversity to planet formation processes using machine learning*	Cambioni
11:45am	From Slow to Fast Rates in Active Learning	Kpotufe

12:30pm	*lunch, Ponciana Terrace*	
3:30pm	*coffee/juice break*	
		Chair: Weiss
4:00pm	Giant Exoplanet Population Physics	Thorngren
4:45pm	*Spotlight: Inverse source problems for the system of elastic-gravitational equations*	Baldassari
5:00pm	Multiscale Inverse Problem, from Schrödinger to Newton to Boltzmann	Li
5:45pm	*discussion*	
6:00pm	*adjourn*	
7:30pm	*dinner, Plaza Danta*	

Tuesday, November 8 Santarena, The Conservatory

6:30am	breakfast, Ponciana	
		Chair: Ceperley
8:30am	**Keynote:** Generation and Inverse Problems with Deep Wavelet Conditional Models	Mallat
9:30am	First-Principles Equation of State Calculations and Application to Jupiter and Saturn	Militzer
10:15am	*coffee/juice break*	
10:45am	Designing Universal Causal Deep Learning Models: The Case of Infinite-Dimensional Dynamical Systems from Stochastic Analysis	Kratsios
11:30am	*Spotlight: The Non-Abelian X-Ray Transform*	Grebnev
11:45am	Phase Diagram and Optical Properties of Hydrogen under Extreme Conditions	Pierleoni
12:30pm	*lunch, Ponciana Terrace*	
3:30pm	*coffee/juice break*	
		Chair: van der Hilst
4:00pm	**Keynote:** Machine Learning Based Ab-initio Molecular Dynamics	Car
5:00pm	*Spotlight: Generalized Optimizer for Unsupervised Deep Assignment*	Jasperson
5:15pm	Inverse Problems for Graphs and Discrete Spaces	Lassas
6:00pm	*adjourn*	
8:00pm	*symposium dinner, The Plaza*	

Wednesday, November 9 Santarena, The Conservatory

6:30am	breakfast, Ponciana	
		Chair: Uhlmann
8:30am	**Keynote:** Mapping the Complex Chemistry of Dense Matter	Pickard
9:30am	Learning Graphs, Manifolds and Bundles by Playing Trumpets and Pooling Walks	Dokmanić
10:15am	*coffee/juice break*	
10:45am	Spectral Rigidity of Radial Planets	Ilmavirta
11:30am	*Spotlight: Quantitative Unique Continuation for Wave Equations, Seismicity and the Kinematic Inverse Rupture Problem*	Lu
11:45am	Evaluating Unsupervised Denoising Requires Unsupervised Metrics	Fernandez-Granda
12:30pm	*lunch, Ponciana Terrace*	
		Chair: Johnson
2:00pm	Unveiling Jupiter's Interior with Juno	Guillot
2:45pm	*Spotlight: Implicit Neural Representation and Lens Rigidity Unveiling Planetary Interiors*	Nguyen
3:00pm	*Spotlight: Deep Invertible Approximation of Topologically Rich Maps between Manifolds and Uncertainty Quantification*	Puthawala
3:15pm	Principled Simplicial Neural Networks for Trajectory Prediction	Segarra
4:00pm	*adjourn*	
7:00pm	*dinner, Ponciana Terrace*	