128th Statistical Mechanics Conference

Rutgers University

Sunday, May 18, 2025: Rutgers Academic Building, East Wing, Room 4225

15 Seminary Place, New Brunswick, a 10 minute walk from New Brunswick train station

Monday, May 19 & Tuesday, May 20, 2025 Busch Campus, Hill Center,
110 Frelinghuysen Road, Room 114, Piscataway, NJ

All maps are available on the conference website

Guests of Honor

David Nelson, Stefano Olla, Sara Solla

Sunday, May 18, 2025, Rutgers Academic Building East Wing, 15 Seminary Place, New Brunswick, Room 4225

Registration and Breakfast 8:00 - 9:30

9:30- 9:55 **Randall Kamien** - University of Pennsylvania
Knitogami

9:55 - 10:20 **Pablo Ferrari** - Universidad de Buenos Aires and Conicet
Hard rod hydrodynamics and the Lévy Chentsov field

10:20-10:45 **Mark Goldman** - UC Davis
STDP2: a metaplasticity mechanism for learning synaptic plasticity rules

10:45 - 11:15 ***Coffee Break 10:40***

11:15 - 11:40 **Erwin Frey** - LMU Munich
Turing Foams and Active Foams

11:40 - 12:05 **Oskar Hallatschek** - UC Berkeley
Microfluidic Island Biogeography

12:05 - 12:30 **Tatiana Engel** - Princeton University
Universal scaling of intrinsic timescales across the whole mouse brain

Lunch 12:30 - 1:55

1:55 - 2:20 **Yariv Kafri** - Technion
Stability of Discrete and Continuous-Symmetry Flocks

2:20 - 2:45 **Sebastian Seung** - Princeton
The Mind of a Fly

2:45 - 3:10 **Gigliola Staffilani** - MIT
A curious phenomenon in wave turbulence theory

3:10 - 3:35 **Vincenzo Vitelli** - University of Chicago
Odd Turbulence

3:35 - 4:05 ***Coffee Break***

4:05 - 4:30 **Partha Mitra** - Cold Spring Harbor Laboratory

AI Without Networks

4:30 - 4:55 **SueYeon Chung -** NYU/Flatiron institute

Computing with Neural Manifolds: Towards a Multi-Scale Understanding of Biological and Artificial Neural Networks

4:55 - 5:20 **Paul Steinhardt** - Princeton University

The search for quasicrystals: here, there, and everywhere

5:40 **Transportation to Fiber Optics Auditorium at 101 Bevier Road, Piscataway, NJ 08854 will be provided**

6:00 - 7:40 Cocktails & Concert in the Fiber Optics Auditorium, Busch Campus sponsored by Springer

7:45 Conference dinner at the Hill Center - 7th Floor - Reservation required

Monday, May 19, 2025: BUSCH Campus, Hill Center, Room 114

Registration and Breakfast 8:00 - 8:30

8:30 - 9:45 **Short Talks: Session A**

9:50 - 10:15 **Subir Sachdev - H**arvard University

Spin liquids and the cuprate superconductors

10:15 - 10:40 **Dmitri Chklovskii** - Flatiron Institute

Do Your Neurons Understand Physics Better Than You Do?

10:40 - 11:10 Coffee Break

11:10-11:35 **Abigail Plummer** - Boston University

Statistical mechanics of the flexural Ising model

11:35 - 12:00 **Jed Pixley** - Rutgers University

Controlling chaos on classical and quantum computers

12:00 - 12:25 **Andrej Kosmrlj** - Princeton University

Designing the Morphology of Separated Phases in Multicomponent Liquid Mixtures

Lunch 12:25 - 1:45 7th Floor Hill Center

1:45 - 2:10 **Konstantin Mischaikow** - Rutgers University

Identifying Nonlinear Dynamics from Sparse Data

2:10 - 2:35 **Naomichi Hatano** - University of Tokyo

Non-Hermiticity and non-Markovianity of open quantum systems

2:35 - 3:00 **Arup Chakraborty** - MIT

How the humoral immune system learns

3:00 - 3:25 **Jane Wang** - Cornell University

Physics and Evolution of Insect Flight

3:25 - 3:50 **Ned Wingreen** - Princeton University

The Benefits of a Fitness-Dependent Mutation Rate: Insights from B Cell Affinity Maturation

3:50 - 4:20 Coffee Break

4:20 - 4:45 Human Rights Session: Ian Jauslin and Joel Lebowitz, Rutgers University

4:45 - 5:10 **Subir Sachdev ,** Laudatio for David Nelson

5:10 - 5:35 **Pablo Ferrari,** Laudatio for Stefano Olla

5:35 - 6:00 **Mark Goldman,** Laudatio for Sara Solla

6:00 Cocktails and Dinner at the Hill Center - 7th Floor, reservation required

Tuesday, May 20, 2025: BUSCH Campus, Hill Center, Room 114

Registration and Breakfast 8:00 - 8:30

8:30 - 9:30 **Short Talks: Session B**

9:35 - 10:00 **Ilya Nemenman** – Emory University
A second look at low-dimensional neural computation

10:00 - 10:25 **Kirill Korolev** – Boston University
KPZ and Fisher equations describe competition in microbial colonies

10:25 - 10:50 **James Fitzgerald** - Northwestern University
Stability through plasticity: Finding robust memories through representational drift

10:50 - 11:20 Coffee Break

11:20 - 11:45 **Stefano Fusi** - Columbia University
Rarely categorical, always high-dimensional: how the neural code changes along the cortical hierarchy

11:45 - 12:10 **Alexandre Morozov -** Rutgers University
Emergence of cooperativity in the game of Prisoner's Dilemma

12:10 - 12:35 **Predrag Cvitanowic** - Georgia Tech
Field theory description of spatiotemporal chaos

Lunch 12:35 - 1:45 7th Floor, Hill Center

1:45 - 2:10 **Mehran Kardar** – MIT
Competition at the front of expanding populations

2:10 - 2:35 **David Huse -** Princeton University
A low-density parity check (LDPC) code as a nonrandom spin glass

2:35 - 3:00 **Michael Aizenman -** Princeton University
Quantum stoquastic tensor networks from a stat mech perspective

3:00 - 3:25 **Pedro Garrido -** University of Granada
Anharmonic lattices with periodic forcing: Some results