KAVLI INSTITUTE FOR THEORETICAL PHYSICS www.kitp.ucsb.edu

KITP Conference: Rough Landscapes: From Physics to Algorithms

(Jan 7-11, 2019)

Coordinators: Giulio Biroli, Chiara Cammarota, Patrick Charbonneau, and Andrea Montanari

Monday, Jan 07, 2019

Session Chair: Chiara Cammarota (King's College)

8:50am Lars Bildsten (KITP Director) Welcome

9:00am Sasha Rakhlin (MIT) TUTORIAL: Generalization and Overfitting --

Basic Concepts and Open Questions

10: 30am Morning Break-KITP Courtyard

11:00am Ricardo Zecchina (Polito) On the Existence and on the Role of Wide

Flat Minima in Neural Networks Models

11:45am Yan Fyodorov On Reconstructing Monlinearly Encrypted

(King's College) Signals Corrupted by Noise

12: 30pm Lunch Break-KITP COURTYARD

2:00pm FREE AFTERNOON-SHUTTLE AVAILABLE TO BWSCI

Tuesday, Jan 08, 2019

Session Chair: Giulio Biroli (ENS)

9:00am Marc Mézard (ENS-Paris) TUTORIAL: Disordered systems in Physics,

Information Theory and Computer Science

10: 30am Morning Break-KITP COURTYARD

11:00am Michael Jordan (Berkeley) On Gradient-Based Optimization and

Diffusions in High Dimensions

11:45am Deanna Needell (UCLA) Iterative Projective Approach for Linear

Systems with Link to Deep Learning

12:30pm Lunch Break-KITP COURTYARD

Session Chair: Andrea Montanari (Stanford)

2:00pm Sho Yaida (FAIR) Glassy Slowdown and Amorphous Order

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2:45pm Surya Ganguli (Stanford) An Analytic Theory for the Nonlinear

Dynamics of Generalization in Deep Linear

Network

3:30pm Afternoon Break-KITP COURTYARD

4:00pm Lenka Zdeborova Algorithmic Barriers in High-dimensional

(CEA-Saclay) Non-convex Landscapes

4:45pm David Donoho (Stanford) TBA

5:30pm **RECEPTION-KITP COURTYARD**

6:00pm SPECIAL EVENTS DINNER-KITP COURTYARD

8:00pm SHUTTLE TO BWSCI

Wednesday, Jan 09, 2019

Session Chair: Chiara Cammarota (King's College)

9:00am Nathan Srebro (Chicago) TUTORIAL: Optimization Methods from a

Machine Learning Perspective

10:30am Morning Break-KITP COURTYARD

11:00am Yue Lu (Harvard) The Energy Landscapes of Massive MIMO

Detection

11:45am Nike Sun (MIT) Capacity Lower Bound for the Ising

Perceptron

12:30pm Maggie Sherriffs (KITP) Announcement-Follow-on program

12: 35pm Lunch Break-KITP COURTYARD

Session Chair: Andrea Montanari (Stanford)

2:00pm Po-Ling Loh (Wisconsin) The not-so-rough Landscape of Nonconvex

M-estimators

2:45pm Antonio Auffinger Energy Landscape of Mean Field Spin

(Northwestern) Glasses

3:30pm Afternoon Break-KITP COURTYARD

4:00pm Matthieu Wyart (EPFL) Effect of a Jamming Transition on Loss

Landscape and Generalization in Deep

Learning

4:45pm Yuxin Chen (Princeton) Gradient descent with random initialization:

Fast global convergence of Nonconvex Phase

Retrieval

5:30pm SHUTTLE TO BWSCI

Thursday, Jan 10, 2019

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Session Chair: Patrick Charbonneau (Duke)

9:00am Leticia Cugliandolo TUTORIAL: Dynamics in High Dimensional

(Sorbonne U) Landscapes

10: 30am Morning Break-KITP COURTYARD

11:00am Daniel Fisher (Stanford) Evolutionary and Ecological Dynamics:

Landscapes and Beyond

11:45am Nicolas Brunel (Duke) Dynamics of Neural Networks with Learning

Rules Inferred from Data

12:30pm Lunch Break-KITP COURTYARD

Session Chair: Lenka Zdeborova (CEA)

2:00pm Federico Ricci-Tersenghi Unexpected Behavior in the off Equilibrium

(La Sapienza) Dynamics of Spin Glasses

2:45pm Gerard Benarous (NYU) Denoising Simple Tensors

3:30pm Afternoon Break-KITP COURTYARD

4:00pm David Wales (Cambridge) Energy Landscapes: from Molecules and

Nanodevices to Machine Learning

4:45pm Amir Dembo (Stanford) TBA

5:30pm **RECEPTION-KITP COURTYARD**

6:00pm SPECIAL EVENTS DINNER-KITP COURTYARD

8:00pm SHUTTLE TO BWSCI

Friday, Jan 11, 2019

Session Chair: Leticia Cugliandolo (Sorbonne U)

9:00am Ankur Moitra (MIT) TUTORIAL Sum-of-Squares, with a View

Towards Average-case Complexity

10: 30am Morning Break-KITP COURTYARD

11:00am Adel Javanmard (USC) Analysis of a Two-Layer Neural Network via

Displacement Convexity

11:45am Roberto Oliveira (IMPA) Local Optima of the Sherrington-Kirkpatrick

Hamiltonian

12:30pm Lunch Break-KITP COURTYARD

2:00pm CONFERENCE END SHUTTLE TO BWSCI *Also available to SB Airport and SB Airbus, Goleta location (See Registration Desk BEFORE FRIDAY to sign up.)

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