Princeton Center for Theoretical Science

The Princeton Center for Theoretical Science is dedicated to exploring the frontiers of theory in the natural sciences. Its purpose is to promote interaction among theorists and seed new directions in research, especially in areas cutting across traditional disciplinary boundaries.

The Center is home to a corps of Center Postdoctoral Fellows, chosen from nominations made by senior theoretical scientists around the world. A group of senior Faculty Fellows, chosen from science and engineering departments across the campus, are responsible for guiding the Center. Center activities include focused topical programs chosen from proposals by Princeton faculty across the natural sciences. The Center is located on the fourth floor of Jadwin Hall, in the heart of the campus "science neighborhood". The Center hopes to become the focus for innovation and cross-fertilization in theoretical natural science at Princeton and celebrated its tenth anniversary in 2016.

Faculty Fellows
Paul Steinhardt, Director
Igor Klebanov, Associate Director
Andrei Bernevig
Curtis Callan
Pablo Debenedetti
Eve Ostriker
Howard Stone
Herman Verlinde
Ned Wingreen

Center Postdoctoral Fellows
Barry Bradlyn 2015-2018
Jennifer Cano 2015-2018
Anna Frishman 2016-2019
Bruno Le Floch 2015-2018
Daniel Lecoanet 2016-2019
Zhiyuan Li 2015-2018
Biao Lian 2017-2020
Pierre Ronceray 2016-2019
Oren Slone 2018-2020
Yizhi You 2017-2020
Yaojun Zhang 2015-2018

To find out more about Center Postdoctoral Fellowships and Programs see: http://pcts.princeton.edu/pcts

Bridging Mathematical Optimization, Information Theory, and Data Science

14-16 May 2018
Jadwin Hall, Room 407

Workshop Organizers
Yuxin Chen
Mengdi Wang

This workshop is co-sponsored by Princeton Center for Statistics and Machine Learning (CSML); Department of Electrical Engineering; and Department of Operations Research and Financial Engineering (ORFE).
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<th>Time</th>
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<td>8:30-9:00</td>
<td>Check in and Continental Breakfast</td>
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<td>9:00am - 9:05am</td>
<td>Welcome and introduction</td>
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| 9:05am - 9:50am | Peter Bartlett                                                             
|               | Optimization and Generalization Properties of Deep Neural Networks       |
| 9:50am - 10:35am | Stephen Wright                                                             
|               | Nonconvex Optimization Algorithms with Complexity Guarantees             |
| 10:35am - 11:00am | Break                                                                    |
| 11:00am - 11:30am | Yihong Wu                                                                
|               | Recovering a Hidden Hamiltonian Cycle via Linear Programming             |
| 11:30am - 12:00pm | Alex Dimakis                                                              
|               | Gans for Compressed Sensing and Adversarial Defense                     |
| 12:00-12:30  | Mengdi Wang                                                              
|               | On the (Reduced) Complexity of Markov Decision Process                  |
| 12:30pm - 2:00pm | LUNCH at PCTS                                                            |
| 2:00pm - 2:30pm | Weijie Su                                                                 
|               | Statistical Inference for Online Learning and Stochastic Approximation via Hierarchical Incremental Gradient Descent |
| 2:30pm - 3:15 | Andrea Montanari                                                         
|               | A Mean Field View of the Landscape of Two-Layers Neural Networks         |
| 3:15 - 3:45pm | Zongming Ma                                                              
|               | Optimal Hypothesis Testing For Stochastic Block Models with Growing Degrees |
| 3:45pm - 4:15pm | Break                                                                    |
| 4:15pm - 5:00pm | Harrison Zhou                                                            
|               | Statistical and Computational Guarantees of Mean Field Variational Inference for Community Detection |
| 5:00pm - 5:30pm | Anru Zhang                                                                
|               | Sparse and Low-Rank Tensor Estimation via Cubic Sketchings               |
| 5:30pm - 6:15pm | Ankur Moitra                                                              
|               | Robustness Meets Algorithms                                              |
| 8:30-9:00    | Continental Breakfast                                                    |
| 9:00am - 9:45am | Robert Nowak                                                              
|               | Outranked: Exploiting Nonlinear Algebraic Structure in Matrix Recovery Problems |
| 9:45am - 10:30am | Rachel Ward                                                              
|               | Learning the Learning Rate in Stochastic Gradient Descent                |
| 10:30am - 11:00am | Break                                                                    |
| 11:00am - 11:45am | Alfred Hero                                                               
|               | Rate-Optimal Meta-Learning                                               |
| 11:45am - 12:15pm | Yuejie Chi                                                                
|               | Geometry and Regularization in Nonconvex Statistical Estimation         |
| 12:15 - 2:00pm | Lunch and POSTER SESSION                                                 |
| 2:15pm – 3:00pm | David Tse                                                                
|               | Understanding Generative Adversarial Networks                             |
| 3:00pm - 3:30pm | Sewoong Oh                                                               
|               | The Power of Two Samples for Generative Adversarial Networks            |
| 3:30pm – 4:00pm | Wotao Yin                                                                
|               | R-Local Minimum Analysis and Run-And-Inspect Method for Certain Nonconvex Optimization with Complexity Guarantees |
Bridging Mathematical Optimization, Information Theory, and Data Science

Tuesday, May 15, 2018 (cont.)

4:00pm-4:30pm  Break

4:30pm - 5:00pm  Guanghui Lan
Accelerated Stochastic Methods for Non-Convex Finite-Sum Optimization

5:00pm - 5:30pm  John Wright
Nonconvex Sparse Deconvolution: Geometry and Efficient Methods

5:30pm - 6:15pm  Donald Goldfarb
ADMM for Multiaffine Constrained Optimization: Theory and Applications

Wednesday, May 16, 2018

8:30-9:00  Continental Breakfast

8:45am - 9:30am  Pramod Vishwanath
Learning in Gated Neural Networks

9:30am - 10:15am  Alex Shapiro
Matrix Completion with Deterministic Pattern

10:15am - 10:45am  Break

10:45am - 11:30am  Arkadi Nemirovski
Tight Semidefinite Relaxations and Statistical Estimation

11:30am - 12:00pm  Sebastian Bubeck
Metrical Task Systems on Trees

12:00pm - 12:30pm  Raghu Pasupathy
The Complexity of Adaptive Sampling Gradient and Adaptive Sampling Accelerated Gradient Methods for Stochastic Optimization