

Princeton Center for Theoretical Physics

The Princeton Center for Theoretical Physics is a new, University-funded enterprise dedicated to exploring frontiers across the theoretical 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 will be home to a corps of Center Postdoctoral Fellows, chosen from nominations made by senior theoretical scientists around the world. The first class of three Fellows took up residence in Fall 2006. A group of senior Center Faculty, chosen from science departments across the campus, are responsible for guiding Center activities, which include focused topical programs involving Visiting Fellows from inside and outside the university. To house these activities, the University is constructing a dedicated facility in Jadwin Hall, home of the Physics Department, and located a few hundred feet from the departments of Biology, Geology, Chemistry, and Astrophysical Sciences, as well as the Lewis-Sigler Center for Integrative Genomics. The Center hopes to become a focus for innovation and cross-fertilization in theory for all these departments.

Center Faculty:

Curtis Callan, Director
Paul Steinhardt, Associate Director
Ravindra Bhatt
William Bialek
Igor Klebanov
Shivaji Sondhi
David Spergel
Salvatore Torquato

Center Postdoctoral Fellows:

Bogdan Andrei Bernevig
Meera Parish
Antonello Scardicchio

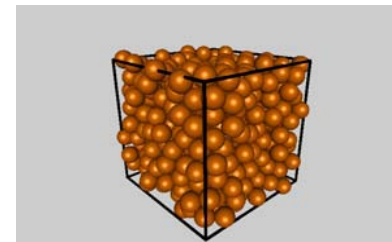


Packing Problems, Classical Ground States, and Glasses

**April 12, 2007, Taplin Auditorium,
Fine Hall**

April 13, 2007, Room A-10, Jadwin Hall

9:00 am – 5:00 pm



Organizers

Pablo Debenedetti, Frank Stillinger,
Salvatore Torquato

**Sponsored by Princeton Center for Theoretical
Physics**

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April 12, 2007, Taplin Auditorium, Fine Hall

- 8:45 – 9:00 am Opening Remarks, Curtis Callan, Director, PCTP & Salvatore Torquato, Workshop Organizer
- 9:00 – 10:30 am **Session Chair--Robert Calderbank, PACM, EE, Princeton**
- 9:00 – 9:45 am “Nonclassical Codes and Packings”,
Neil Sloane, AT&T Shannon Lab, New Jersey
- 9:45 – 10:30 am “Configurational Polytopes Near the Jamming Limit”
Frank Stillinger, Chemistry, Princeton
- 10:30 – 11:00 am **Coffee Break in Lobby Downstairs**
- 11:00 – 12:30 pm **Session Chair—Antonello Scardicchio, PCTP & Physics, Princeton**
- 11:00 – 11:45 am “Order and Disorder in Sphere Packings”
Henry Cohn, Theory Group, Microsoft Corporation
- 11:45 – 12:30 pm “Can Disordered Sphere Packings Ever be Maximally Dense?”
Salvatore Torquato, Chemistry & PCTP, Princeton
- 12:30 – 1:30 pm **Lunch, Brush Gallery, McDonnell Hall**
- 1:30 – 3:00 pm **Session Chair—Meera Parish, PCTP & Physics, Princeton**
- 1:30 – 2:15 pm “Upper Bounds: Delsarte and Beyond”,
Noam Elkies, Mathematics, Harvard University
- 2:15 – 3:00 pm “Quasicrystals: Tiling and Packing Problems”
Paul Steinhardt, Physics & PCTP, Princeton
- 3:00 – 3:30 pm **Coffee Break in Lobby downstairs**
- 3:30 – 5:00 pm **Session Chair—Roberto Car, Chemistry, Princeton**
- 3:30 – 4:15 pm “Packing Heterogeneity and Bumpy Landscapes in Protein Folding”
Ken Dill, UC San Francisco, Pharmaceutical Chemistry and Biophysics
- 4:15 – 5:00 pm “Understanding the Symmetries of Packings in Space”
John Conway, Mathematics, Princeton

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April 13, 2007, Room A-10, Jadwin Hall

- 9:00 – 10:30 am **Session Chair—David Huse, Physics, Princeton**
- 9:00 – 9:45 am “Thermal Fluctuations and Crumpling of Amorphous Shells”
David Nelson, Physics, Harvard University
- 9:45 – 10:30 am “Crystal Structures and their Cohesive Energies in Metallic Glass-forming Alloy Systems”
Michael Widom, Physics, Carnegie Mellon University
- 10:30– 11:00 am **Coffee Break in Lobby**
- 11:00 – 12:30 pm **Session Chair—Athanasios Z. Panagiotopoulos, Chemical Engineering & PRISM, Princeton**
- 11:00 – 11:45 am “The Jamming Transition of Sphere Packings”
Andrea Liu, Physics, University of Pennsylvania
- 11:45 – 12:30 pm “Bernal Packing Revised: Insights into Disordered Sphere Packings”
Tomaso Aste, Applied Mathematics, Australian National University
- 12:30 – 1:30 pm **Lunch, Brush Gallery, McDonnell Hall**
- 1:30 – 3:00 pm **Session Chair—Andrei Bernevig, PCTP & Physics, Princeton**
- 1:30 – 2:15 pm “The Order Map: Towards a Smooth Progression of Liquid Behavior, from Hard Spheres to Water”
Pablo Debenedetti, Chemical Engineering, Princeton
- 2:15 – 3:00 pm “Caging, Barrier Hopping and Heterogeneous Dynamics in Glassy Fluids of Hard Objects”
Ken Schweizer, Chemistry, University of Illinois at Urbana-Champaign
- 3:00 – 3:30 pm **Coffee Break in Lobby**
- 3:30 – 5:00 pm **Session Chair—Elliot Lieb, Physics & Mathematics, Princeton**
- 3:30 – 4:15 pm “Universal Extremal Lattices for Epstein’s Zeta Function”
Peter Sarnak, Mathematics, Princeton
- 4:15 – 5:00 pm “Experiments on the Random Packing of Ellipsoids and Tetrahedra”,
Paul Chaikin, Physics, New York University