

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.

Faculty Fellows:

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

Center Postdoctoral Fellows:

Dmitry Abanin 2008-2011
Bogdan Andrei Bernevig 2006-2009
Thomas Klose 2007-2010
Jean-Luc Lehners 2007-2010
M. Lisa Manning 2008-2011
Meera Parish 2006-2009
Matthew Reece 2008-2011
Branson Stephens 2007-2010
Aleksandra Walczak 2007-2010

To find out more about Center Postdoctoral Fellowships and Programs see:

<http://pcts.princeton.edu/pcts>

The **Atmospheric and Oceanic Sciences Program (AOS)** is a unique collaboration between Princeton University, & the Geophysical Fluid Dynamics Laboratory (GFDL) of the National Oceanic & Atmospheric Administration (NOAA). AOS, is an autonomous Program within the Geosciences Department, hosts graduate students, postdoctoral researchers, and visiting senior researchers, as well as permanent research staff and faculty. http://www.princeton.edu/aos/about_us/

Co-operative Institute for Climate Sciences (CICS) was founded in 2003 to foster research collaborations between Princeton University and the Geophysical Fluid Dynamics Laboratory (GFDL) of the National Oceanographic and Atmospheric Administration (NOAA). <http://web.princeton.edu/sites/cics/>



Fundamental Problems in Climate Dynamics

May 4-13, 2009

Jadwin Hall, Fourth Floor

Organizers:

Isaac Held
Geoff Vallis

**Co-sponsored by the Princeton University
Atmospheric & Oceanic Sciences Program
and
Co-operative Institute for Climate Sciences**

Monday, May 4, 2009

Introduction to the Atmosphere, the Oceans and Climate

- 8:45 am Welcome: **Isaac Held, Geoff Vallis, Paul Steinhardt**
- 9 – 10 am “The cycles of energy angular momentum and water in the atmosphere” Part I
Isaac Held, GFDL/Princeton University
- 10 – 11 am Break
- 11 – 12 pm “The cycles of energy angular momentum and water in the atmosphere” Part II
Isaac Held, GFDL/Princeton University
- 12:00 – 2:00 pm Lunch on your own**
- 2 – 3 pm “Ocean circulation and the uptake, storage and transport of energy.” Part I
Geoffrey Vallis, GFDL/Princeton University
- 3 – 4 pm Break
- 4 – 5 pm “Ocean circulation and the uptake, storage and transport of energy.” Part II
Geoffrey Vallis, GFDL/Princeton University
- 5:00 – 7:00 Immediately following the talks, Reception at PCTS**

Tuesday, May 5, 2009

Atmospheric and Oceanic Circulation

- 9 – 10 am “The role of macroturbulence in the global circulation of the atmosphere”
Tapio Schneider, California Institute of Technology
- 10 – 11 am Break
- 11 – 12 pm “Water vapor and the dynamics of climate changes”
Tapio Schneider, California Institute of Technology
- 12:00 – 2:00 pm Lunch on your own**
- 2 – 3 pm “Exploring the role of the ocean in climate” Part I
John Marshall, Massachusetts Institute of Technology
- 3 – 4 pm Break
- 4 – 5 pm “Exploring the role of the ocean in climate” Part II
John Marshall, Massachusetts Institute of Technology

Friday, May 8, 2009

Paleoclimate, Climate Sensitivity and Challenges Ahead

- 9 – 10 am “Pleistocene glaciation: Northern Hemisphere onset, orbital forcing, and the 40ky glacial cycles.”
Peter Huybers, Harvard University
- 10 – 11 am Break
- 11 – 12 pm “Pleistocene glaciation: The 100ky glacial cycles and symmetric variability between the North and South.”
Peter Huybers, Harvard University
- 12:00 – 2:00 pm Lunch on your own**
- 2 – 3 pm “Five Not-So-Easy Pieces: A grand tour of grand challenges in climate.” Part I
Ray Pierrehumbert, University of Chicago
- 3 – 4 pm Break
- 4 – 5 pm “Five Not-So-Easy Pieces: A grand tour of grand challenges in climate.” Part II
Ray Pierrehumbert, University of Chicago
- 6:00–8:00 pm BBQ - Lawn between Guyot and Eno Halls.**

Monday, May 11 – Wednesday, May 13

PCTS Seminar Room 407, Jadwin Hall

Informal discussions and presentations by Adam Sobel (Columbia), Lorenzo Polvani (Columbia), Olivier Pauluis (NYU), Ed Gerber (NYU), Isaac Held (GFDL), and possibly others. Schedule to be determined.

Tuesday, May 12, 2009

6:00–8:00 pm BBQ - Lawn between Guyot and Eno Halls.

Wednesday, May 6, 2009
Clouds, Convection and Climate

- 9 – 10 am “Thermodynamics for multi-phase, atmospheric flows”
Bjorn Stevens, Max Planck Institute, Hamburg
- 10 – 11 am Break
- 11 – 12 pm “Moist convection and large-scale circulation”
David Neelin, UCLA
- 12:00 – 2:00 pm Lunch on your own**
- 2 – 3 pm “Cloud Forcing and Feedbacks”
Bjorn Stevens, Max Planck Institute, Hamburg
- 3 – 4 pm Break
- 4 – 5 pm “Moist convection: parameterization, observations, consequences”
David Neelin, UCLA
- 6:00 pm Informal Discussions and Pizza at PCTS, Fourth Floor, Jadwin Hall**

Thursday, May 7, 2009
Fluctuation-dissipation Theory and Climate

- 9 – 10 am “Low Frequency Climate Response by Fluctuation Dissipation Theorems: Theory and Practice” Part I
Andy Majda, New York University
- 10 – 11 am Break
- 11 – 12 pm “Low Frequency Climate Response by Fluctuation Dissipation Theorems: Theory and Practice” Part II
Andy Majda, New York University
- 12:00 – 2:00 pm Lunch on your own**
- 2 – 3 pm “Applying the Fluctuation-Dissipation Theorem to Problems in Atmospheric Response”
Grant Branstator, NCAR, Boulder
- 3 – 4 pm Break
- 4 – 5 pm “Climate Change and Intrinsic Atmospheric Modes of Variability”
Grant Branstator, NCAR, Boulder