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

PRINCETON CENTER FOR THEORETICAL SCIENCE

"Mechanics in Morphogenesis"

February 21-23, 2018

Jadwin Hall, Room 407

Workshop Organizers

Andrej Košmrlj, Princeton University
Lisa Manning, Syracuse University
Celeste Nelson, Princeton University
Stas Shvartsman, Princeton University

“Mechanics in Morphogenesis”

Wednesday, February 21, 2018

8:30 **Coffee & Light Breakfast**

9:15-9:20 Welcome/Introduction

9:20-10:00 Symmetry and Asymmetry controlled by fluid flow
Rebecca Burdine, Princeton University

10:00-10:40 Organ size control by fluid lumen
Takashi Hiiragi, European Molecular Biology Laboratory

10:40-11:10 **Coffee break**

11:10-11:50 Volumetric morphogenesis in the mouse embryo
Sevan Hopyan, Hospital for Sick Children, University of Toronto

11:50-1:30 **Lunch at PCTS**

12:00-1:00 **MolBio Seminar, Lewis Thomas Lab (LTL), Room 003**
Clustered protocadherins and neuronal self-recognition in vertebrates
Lawrence Shapiro, Columbia University

1:30-2:10 Scaling and positioning of multiple nuclei in muscle cell
Alex Mogilner, NYU Courant Institute

2:10-2:50 Modeling the Mechanics of Segmentation and Polycystic Kidney Disease
James Glazier, Indiana University

2:50-3:20 **Coffee break**

3:20-4:00 Patterning morphogenesis: lessons from the mammalian epidermis
Danelle Devenport, Princeton University

4:00-4:40 Statics and Dynamics in an Epithelial Cell Layer
Boris Shraiman, University of California, Santa Barbara

4:40-6:30 **Poster Session and Welcome Reception**

Thursday, February 22, 2018

8:30 AM **Coffee & Light Breakfast**

9:00-9:40 Tension-based vertex model of epithelial shells: Organoids and embryos
Primož Ziherl, Institute Jožef Stefan

Thursday, February 22, 2018 (cont.)

9:40-10:20 Cell rearrangement and epithelial tissue mechanics in Drosophila development
Karen Kasza, Columbia University

10:20-11:00 **Coffee break**

11:00-11:40 Cables, fibers, and tissue response to mechanical stress
David Lubensky, University of Michigan

11:40-12:20 Cell shear as a driver of epithelial invagination
Jeremy Green, King's College London

12:20-2:00 **Lunch at PCTS, Jadwin Hall, Fourth Floor**

2:00-2:40 Biomechanics of early brain morphogenesis in chick embryos
Zi Chen, Dartmouth College

2:40-3:20 Mechanics of the developing brain
Ellen Kuhl, Stanford University

3:20-4:00 **Coffee break**

4:00-5:00 **Physics Colloquium, Room A-10 Jadwin**
Motifs in morphogenesis
L. Mahadevan, Harvard University

Friday, February 23, 2018

8:30 **Coffee & Light Breakfast**

9:00-9:40 Entropic constraints in cell lineage tree packings
Jörn Dunkel, Massachusetts Institute of Technology

9:40-10:00 Best poster talk 1

10:00-10:20 Best poster talk 2

10:20-11:00 **break**

11:00-11:40 Engineering the *in vivo* tissue microenvironment
Kandice Tanner, National Cancer Institute (NIH)

11:40-12:20 Mechanical Tension and Epithelial Mesenchymal Transitions
Eric Wieschaus, Princeton University

12:20-2:00 **Conclusion and Lunch at PCTS**