

## 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 is celebrating 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  
Yizhi You 2017-2020  
Yaojun Zhang 2015-2018

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

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



## 20 Years Later: The Many Faces of AdS/CFT October 31-November 3, 2017

**October 31: McDonnell Hall A02**

**November 1, 2, 3: Jadwin Hall, Room 407**

### Workshop Organizers

Netta Engelhardt  
Simone Giombi  
Steven Gubser  
Igor Klebanov  
Silviu Pufu  
Herman Verlinde  
Yifan Wang

## “20 Years Later: The Many Faces of AdS/CFT”

### **Tuesday, October 31, 2017—McDonnell Hall, A02**

- 8:30 – 8:55**    **Light Breakfast**
- 8:55 – 9:00**    **Welcome/Introduction**
- 9:00 – 9:30    Pure states in the SYK model and the black hole interior  
**Juan Maldacena, IAS Princeton**
- 9:30 – 10:00   Faraday/Maxwell duality: Past and Future  
**Alexander Polyakov, Princeton University**
- 10:00 – 10:30    $p$ -adic AdS/CFT  
**Steven Gubser, Princeton University**
- 10:30 – 11:00   Canonical Quantization in Anti de Sitter Space  
**Edward Witten, IAS Princeton**
- 11:00 – 11:30**   **Coffee Break**
- 11:30 – 12:00   The Power of Large N  
**Igor Klebanov, Princeton University**
- 12:00 – 12:30   Early Results on Correlation Functions  
**Dan Freedman, MIT**
- 12:30 – 2:00**    **Lunch**
- 2:00 – 2:30    Can One Obtain the Minkowski Scattering Matrix as a Limit of CFT Correlators?  
**Tom Banks, Rutgers University**
- 2:30 – 3:00    Applications of gauge/gravity duality: General lessons from the example of magnetic impurities  
**Johanna Erdmenger, Wuerzburg University**
- 3:00 – 3:30    Computing holographic correlators efficiently  
**Leonardo Rastelli, Stony Brook University**
- 3:30 – 4:00**    **Coffee Break**
- 4:00 – 4:30    Holographic cosmology  
**Kostas Skenderis, University of Southampton**

### **Tuesday, October 31, 2017—McDonnell Hall, A02 (cont.)**

4:30 – 5:00    The Membrane/Gravity correspondence  
**Shiraz Minwalla, TIFR**

5:00 – 5:30    Holography and Topological Strings  
**Cumrun Vafa, Harvard University**

**5:30 –**            **Welcome Reception at PCTS, Jadwin Hall Room 407**

### **Wednesday, November 1, 2017—Jadwin Hall 407**

**8:30 – 9:00**    **Light Breakfast**

9:00 – 9:30    Gravitational Memory and Holography in  $D > 4$  Minkowski Space  
**Andy Strominger, Harvard University**

9:30 – 10:00   BZ/CFT on BTZ: Electromagnetic energy extraction from rotating black holes and its holographic dual  
**Ted Jacobson, University of Maryland**

10:00 – 10:30   Holographic Entanglement of Purification  
**Tadashi Takayanagi, Kyoto University**

**10:30 – 11:00**   **Coffee Break**

11:00 – 11:30   Quantum Focussing Conjecture and Quantum Null Energy Condition  
**Raphael Bousso, UC Berkeley**

11:30 – 12:00   Lessons from AdS/CFT for Non-AdS Holography  
**Erik Verlinde, University of Amsterdam**

12:00 – 12:30   Holographic Complexity and Beyond  
**Rob Myers, Perimeter Institute**

**12:30 – 2:00**    **Lunch**

2:00 – 2:30    Connecting the Cosmic Censorship and Weak Gravity Conjectures  
**Gary Horowitz, UC Santa Barbara**

2:30 – 3:00    Symmetries in quantum field theory and quantum gravity  
**Daniel Harlow, MIT**

3:00 – 3:30    Black hole formation in CFT  
**Tom Hartman, Cornell University**

## “20 Years Later: The Many Faces of AdS/CFT”

### Wednesday, November 1, 2017—Jadwin Hall 407 (cont.)

**3:30 – 4:00** Coffee Break

4:00 – 4:30 Something about gravity and entanglement in AdS/CFT  
**Mark van Raamsdonk, University of British Columbia**

4:30 – 5:30 **Panel: “Generalized Holography”**  
*Led by Herman Verlinde, Princeton University*  
Panelists: Vijay Balasubramanian, Ted Jacobson, Eliezer Rabinovici, Raphael Bousso, Erik Verlinde, Andy Strominger

### Thursday, November 2, 2017—Jadwin Hall 407

**8:30 – 9:00** Light Breakfast

9:00 – 9:30 A Small Black Hole in a Large Number of Dimensions  
**Chris Herzog, Stony Brook University**

9:30 – 10:00 AdS/CFT and the big questions in heavy ion collisions  
**Jorge Noronha, University of Sao Paulo, Brazil**

10:00 – 10:30 Effective actions on branes  
**Henriette Elvang, University of Michigan**

**10:30 – 11:00** Coffee Break

11:00 – 11:30 Collisions in AdS, quark-gluon plasma and energy conditions  
**Wilke van der Schee, MIT & Utrecht University**

11:30 – 12:00 Holographic Transport and Black Hole Horizons  
**Jerome Gauntlett, Imperial College**

12:00 – 12:30 Topological AdS/CFT  
**James Sparks, University of Oxford**

**12:30 – 2:00** Lunch

2:00 – 2:30 Quantum phases of QCD3  
**Nathan Seiberg, IAS Princeton**

### Thursday, November 2, 2017—Jadwin Hall 407 (cont.)

2:30 – 3:00 We need to talk (more) about AdS<sub>3</sub>/CFT<sub>2</sub>  
**Rajesh Gopakumar, ICTS-TIFR**

3:00 – 3:30 Holography beyond AdS  
**David Kutasov, University of Chicago**

**3:30 – 4:00** Coffee Break

4:00 – 4:30 On Distinguishability Of Black Hole Microstates  
**Hiroshi Ooguri, Caltech**

4:30 – 5:00 On research of lost time: reminiscences and new observables  
**Eva Silverstein, Stanford University**

5:00 – 5:30 Causality and Unitarity, Holography and Positivity  
**Nima Arkani-Hamed, IAS Princeton**

**6:00** Buffet dinner at PCTS

### Friday, November 3, 2017—Jadwin Hall 407

**8:30 – 9:00** Light Breakfast

9:00 – 9:30 The conformal bootstrap at large charge  
**Daniel Jafferis, Harvard University**

9:30 – 10:00 All point correlation functions in SYK  
**Vladimir Rosenhaus, KITP**

10:00 – 10:30 Two Exercises in Supersymmetric SYK Models  
**Marcus Spradlin, Brown University & IAS Princeton**

**10:30 – 11:00** Coffee Break

11:00 – 11:30 Small deformations of circular Wilson loops at weak and strong coupling  
**Nadav Drukker, Kings College**

11:30 – 12:00 Quantum Holography  
**Atish Dabholkar, ICTP**

# “20 Years Later: The Many Faces of AdS/CFT”

## Friday, November 3, 2017—Jadwin Hall 407 (cont.)

12:00-12:30 **Herman Verlinde, Princeton University**

**12:30 – 2:00 Lunch**

2:00 – 2:30 AdS Amplitudes and the Definition of Holographic CFT  
**Eric Perlmutter, CalTech**

2:30 – 3:00 Non-extremal Black Holes, Subtracted Geometry and AdS2  
Holography  
**Mirjam Cvetič, University of Pennsylvania**

3:00 – 3:30 Spinning Witten Diagrams  
**Charlotte Sleight, Universite Libre de Bruxelles**

3:30 – 4:00 Strings on AdS3 WZW: an identity crisis for AdS/CFT in its  
late teens, and its resolution.  
**Massimo Porrati, NYU**

**4:00 – 4:30 Coffee Break**

4:30 – 5:30 **Discussion on Future Directions**  
(Organized by Netta/Silviu/Simone/Yifan)