

## **DEPARTMENT OF PHYSICS COLLOQUIA**

### **Fall 1999 Schedule**

#### **August 30**

Randall D. Kamien - University of Pennsylvania

Title: Liquid Crystalline Phases of DNA

#### **September 6**

Sara A. Solla – Northwestern University

Title: The Dynamics of Learning from Examples

#### **September 13**

Anton Zeilinger - University of Vienna, Austria

Title: Quantum Teleportation and the Nature of Information

#### **September 20 – The Thomas Gold Lecture Series**

Bohdan Paczynski – Princeton University

Title: Gravitational Microlensing and the Search for Dark Matter

#### **September 27**

Carlos Rovelli – University of Pittsburgh and Centre de Physique Theorique de Luminy, France

Title: Non Perturbative Quantum Gravity

#### **October 4**

Eric Siggia – Cornell University

Title: Theory and the Yeast Genome

#### **October 11 – FALL BREAK**

#### **October 18**

Edward Blucher – University of Chicago

Title: Investigating Difference between Matter and Antimatter

#### **October 25**

Venky Narayanamurti – Harvard University

Title: Condensed-Matter and Materials Physics: Basic Research for Tomorrow's Technology

#### **November 1 – The Kieval Lecture**

Steve Vogel – Duke University

Title: Locating Life's Limits with Dimensionless Numbers

#### **November 8**

Edward Kearns – Boston University

Title: The Mysteries of Missing Neutrino's: Latest Results from Super-K

#### **November 15**

Paul Steinhardt – University of Pennsylvania

Title: The Quintessential Universe

**November 22**

Dan Ralph – Cornell University

Title: Torques and Tunneling in Nano-Magnets

**November 29**

William Phillips – NIST

Title: Almost Absolute Zero: The Story of Laser Cooling and Trapping

## **Spring 2000 Schedule**

### **January 24**

Patrick Lee – Massachusetts Institute of Technology

Title: Heisenberg Model and d-wave Superconductivity: Spin Chirality Finally Coming out of Hiding

### **January 31**

Laura H. Greene – University of Illinois at Urbana-Champaign

Title: Tunneling into High-Temperature Superconductors: Spectroscopy of Broken Symmetries

### **February 7**

Jean Carlson – University of California at Santa Barbara

Title: Complexity and Robustness

### **February 14**

Sue Coppersmith – University of Chicago

Title: Force Fluctuations in Granular Materials

### **February 21**

Brian Greene – Cornell University

Title: String Theory and the Fabric of Spacetime

### **February 28**

Ira Wasserman – Cornell University

Title: The Expansion of the Universe

### **March 6**

Michael Devoret – Yale University

Title: Single Electron Transfer in Tunnel Junction Circuits

### **March 13**

Sebastien Balibar – Ecole Normale Supérieure (Paris) and Harvard University

Title: Nucleation: Bubbles, Crystals and Superfluids

### **March 20 – SPRING BREAK**

### **March 27**

Wendy Freedman – Carnegie Observatory

Title: The Hubble Space Telescope Key Project to Measure the Hubble Constant

### **April 3**

Joseph Veverka – Cornell University

Title: Exploring Eros: The First Detailed Spacecraft Study of an Asteroid

### **April 10**

Sir Michael Berry – Bristol University and Andrew D. White Professor-at-Large

Title: Extreme Twinkling, and its Opposite

**April 17**

Lars Bildsten - University of California at Santa Barbara

Title: Gravitational Radiation from Accreting Neutron Stars: Implications for Millisecond Pulsar Formation and LIGO

**April 24**

Joseph D. Lykken – Fermi National Accelerator Laboratory

Title: The Search for Extra Dimensions

**May 1**

Dan Akerib – Case Western Reserve

Title: Looking for WIMPs in the Galactic Halo: The Cryogenic Dark Matter Search

**May 8 – The Bethe Lectures**

Steve M. Block – Stanford University

Title: Sensory Transduction: Clever Physics by Dumb Organisms

## **Fall 2000 Schedule**

### **August 28**

Hans Bethe – Cornell University

Title: Gamma-Ray Bursts and Hypernovae

### **September 4**

Donald Umstadter – University of Michigan at Ann Arbor

Title: Ultra-High Intensity Laser-Plasma Interactions: Progress, Prospects and Applications

### **September 11 – The Barbara Cooper Lecture**

Ellen D. Williams – University of Maryland

Title: Fluctuations and Stability of Nanostructures

### **September 18**

Andrew Strominger – Harvard University

Title: String Theory and Black Holes

### **September 25 – The Thomas Gold Lecture Series**

Clifford Will – Washington University

Title: Einstein's Relativity put to Nature's Test: A Turn-of-the-Century Perspective

### **October 2, Joint with Nonlinear Systems**

Leo Kadanoff – University of Chicago

Title: Making a Splash, Breaking a Neck: The Development of Complexity in Physical Systems

### **October 9 - FALL BREAK**

### **October 16**

David Muller – Bell Labs, Lucent Technologies

Title: How Small is Too Small? Understanding the Electronic Structure of Atomic-Scale Transistors

### **October 23**

Z. Jane Wang – Cornell University

Title: Unsteady Aerodynamics of Insect Flight

### **October 30**

Andy Ruina – Cornell University

Title: The Possible Physics (Mechanics) of Walking

### **November 6**

John Ruhl – University of California at Santa Barbara

Title: Cosmology from the Microwave Background: Boomerang and Beyond

### **November 13, Joint with Astronomy**

Dave Stevenson – California Institute of Technology

Title: Origin of the Earth and Moon

**November 20**

Barbara Jacak – SUNY, Stonybrook

Title: High-Energy Heavy Ion Collisions: The Physics of Super-Dense Matter

**November 27**

Daniel P. Lathrop – University of Maryland

Title: Liquid Sodium Laboratory Models of the Earth's Outer Core

## **Spring 2001 Schedule**

### **January 22**

Robert F. Gilmour, Jr. – Cornell University  
Title: Electrical Restitution and Cardiac Fibrillation

### **January 29**

Eanna Flanagan – Cornell University  
Title: Unstable Rossby Modes in Newly Born Neutron Stars

### **February 5**

Francis J. DiSalvo – Cornell University  
Title: The Search for New Thermoelectric Materials or How Does a Condensed Matter Physicist Exploit Chemistry

### **February 12**

Charles Marcus – Harvard University  
Title: Small Electronics and Quantum Chaos

### **February 19**

Raman Sundrum – John Hopkins University  
Title: Extra Dimensions, the Hierarchy Problem and Gravitational Resonances at Particle Colliders

### **March 5**

Sidney Redner – Boston University  
Title: The Statistical Mechanics of Popularity

### **Mar. 12, Joint with Peace Studies Program and Science and Technology Studies**

Jeremiah Sullivan – University of Illinois at Urbana-Champaign  
Title: Prospects for the Comprehensive Test Ban Treaty

### **March 26**

Richard Galik – Cornell University  
Title: Measurements of the Michel Parameters in Lepton Decays

### **April 2**

Glennys Farrar – New York University  
Title: Ultra-High Energy Cosmic Rays: Astrophysics Causing Trouble for Particle Physics, or Vice Versa?

### **April 9**

Anupam Garg – Northwestern University  
Title: Spin Tunneling: Magnetic Molecules and Mathematical Mysteries

### **Apr. 16 – The Bethe Lectures**

Wick C. Haxton – University of Washington  
Title: Solar Neutrinos and Neutrino Oscillations

### **Apr. 23 The Bethe Lectures**

Wick C. Haxton – University of Washington

Title: Supernovae and Nucleosynthesis

**April 30**

Hal Evans – Columbia University

Title: The D0 Experiment: Now . . . and Later



## **Fall 2001 Schedule**

### **September 3**

Edwin Salpeter – Cornell University

Title: Heavy Elements in the Galaxy and Tuberculosis in the USA

### **September 10**

Sol Gruner and Maury Tigner – Cornell University

Title: Energy Recovery Linac

### **September 17**

Josh Klein – University of Pennsylvania

Title: The Sudbury Neutrino Observatory and the Solar Neutrino Problem

### **September 24**

Juan Maldacena – Harvard University

Title: QCD, Strings and Black Holes: The Large N Limit of Field Theories and Gravity

### **October – The Salpeter Lecture Series**

John Carlstrom – University of Chicago

Title: A New Measurement of Cosmic Microwave Background Anisotropy from the South Pole

### **October 8 - Fall Break**

### **October 15**

Sidney Redner – Boston University

Title: The Statistical Mechanics of Popularity

### **October 22 – The Kieval Lecture**

Eric Cornell – NIST

Title: Artifice and Equilibrium: Experiments with Synthetic and Natural Vortices in a Superfluid Gas

### **October 29**

Ray Goldstein – University of Arizona

TBA

### **November 5**

J.C. Seamus Davis – UC Berkeley

Title: Using Individual Impurity Atoms to Study High-Tc

### **November 12**

Richard L. Liboff – Cornell University

Title: Quantum Billiards and Quantum Chaos

### **November 19 – No Colloquium**

### **November 26**

A.J. Stewart Smith – Princeton University

Title: Observation of CP Violation at the B Factories

**December 3**

David Hammer – Cornell University

Title: Studies of Extremely High Energy Density Plasmas with Picosecond Time Resolution

**Spring 2002 Schedule**

**January 21**

Matthias Neubert – Cornell University

Title: Flavor Delicacies (A Tour Trough the Mysteries of Matter)

**January 28**

Riccardo Giovanelli – Cornell University

Title: Into Thin Air: The Atacama Telescope Project

**February 4**

Dong Lai – Cornell University

Title: Matter and Radiation in Superstrong Magnetic Fields

**February 11**

Barbara A. Baird – Cornell University

Title: A Biophysical View of Immune Receptor Action

**February 18**

Serge Lemay – Delft University

Title: Two-Dimensional Imaging of Electronic Wavefunctions in Carbon Nanotubes

**February 25 – The Bethe Lectures**

Stanford Woosley – UC Santa Cruz

Title: Core Collapse Supernovae

**March 4 - BETHE LECTURE**

Stanford Woosley – University of California at Santa Cruz

Title: Type Ia Supernovae

**March 11**

Hitoshi Murayama – University of California at Berkeley

Title: Big World of Small Neutrinos

**March 18 – Spring Break**

**March 25, Joint with Cornell Libraries**

Marty Blume – Editor in Chief, APS

Title: The Physical Review and Physics Publishing: Past and Future

**April 1**

Lawrence Krauss – Case Western Reserve University

Title: Life, the Universe, and Nothing: The Future of Life in an Expanding Universe

**April 8**

Csaba Csaki – Cornell University

Title: The Physics of Extra Dimensions

**April 15**

Susanne Arney – Bell Labs., Lucent Technologies

Title: Design for Reliability of MEMS/MOEMS for Lightwave Telecommunications

**April 22 – The Thomas Gold Lecture Series**

Frank Shu – President, Tsinghua University, Hsinchu, Taiwan

Title: Protostellar Winds and Jets

**April 29**

Karel Svoboda – Cold Springs Harbor Imaging Synaptic

Title: Function in the Brain

**Fall 2002 Schedule**

**September 2**

Katepalli Sreenivasan – Yale University

Title: Cosmic Background Radiation and Hydrodynamic Turbulence

**September 9**

Mark Chen – Queens University, Kingston, Ontario, Canada

Title: Solving the Solar Neutrino Problem with the Sudbury Neutrino Observatory

**September 16**

Paul McEuen – Cornell University

Title: Electronics and Mechanics with Single Molecules

**September 23**

David Huse – Princeton University

Title: Quantum Phase Transitions in Randomly Inhomogeneous Solids

**September 30**

Nima Arkani-Hamad – Harvard University

Title: Adventures in Theory Space

**October 7 – The Bethe Lectures**

Carl E. Wieman – University of Colorado at Boulder

Title: Resonant BEC

**October 14 – Fall Break**

**October 21 – The Parratt Memorial Lecture**

Stuart Raby – Ohio State University

Title: The Puzzle of Charge and Mass

**October 28**

Lawrence Gibbons – Cornell University

Title: Probing HEP's Bose-Einstein Condensate: The Physics Potential of a Linear  $e^+e^-$  Collider

**November 4**

Matthew P.A. Fisher – University of California at Santa Barbara

Title: Cuprates Amis: Subtle Simplicity or a Matted Mess

**November 11**

Krishna Rajagopal – Massachusetts Institute of Technology

Title: The Condensed Matter Physics of QCD

**November 18**

Allen MacDonald – University of Texas at Austin

Title: Ferromagnetism in Diluted Magnetic Semiconductors

**November 25**

Avi Loeb – Harvard University

Title: The First Source of Light in the Universe

**December 2**

David DiVincenzo – IBM, T.J. Watson Research Center

Title: Prospects for Quantum Computation



## **Spring 2003 Schedule**

### **January 20**

Kurt Gottfried - Cornell University

Title: P.A.M. Dirac and the Discovery of Quantum Mechanics

### **January 27**

Naomi Makins - UIUC

Title: Spin Structure of the Proton: Recent Results from HERMES

### **February 3**

Dr. V. Sahakian - Cornell University

Title: String Theory without Equations

### **February 10**

Paul Selvin - University of Illinois, Urbana-Champaign

Title: Nanometer Resolution with Single Molecule Fluorescence Imaging: Application to Biomolecular Motors

### **February 17**

Henry Kelly - President of the Federation of American Scientists

Title: The Future of National Science Policy

### **February 24**

Nitin Samarth - Pennsylvania State University

Title: Semiconductor Spintronics

### **March 3**

Lynn Orr - University of Rochester

Title: Why is the Top Quark Special, and How Can We Exploit It?

### **March 10**

Mats Selen - University of Illinois

Title: Education in Bulk: The Introductory Physics Courses Revisions at Illinois

### **March 17 - SPRING BREAK**

### **March 24 – The Bethe Lectures**

Bert Halperin - Harvard University

Title: One-Dimensional Metals in Theory and Experiment

### **March 31**

Hasam Padamsee - Cornell University

Title: Will Superconductivity Propel the Next-Generation Accelerators?

### **April 7**

David Spergel - Princeton University Title: MAP First Year Results: Implications for Cosmology

**April 14**

Aida El Khadra - University of Illinois, Urbana-Champaign

Title: The Charm and Beauty of Lattice QCD

**April 21**

Daniel Gauthier - Duke University

Title: Controlling Cardiac Dynamics

**April 28 – The Salpeter Lecture Series**

Shri Kulkarni - California Institute of Technology

Title: Gamma-Ray Bursts: Brilliant Explosions Across the Universe



## **Fall 2003 Schedule**

### **September 8**

Michelle Wang - Cornell University

Title: Probing Gene Expression and Regulation at the Single Molecule Level

### **September 15**

Stuart Freedman - University of California at Berkeley

Title: First Results from KamLAND

### **September 22**

Eshen Ben-Jacob - Tel Aviv University

Title: Why Bacteria Go Complex: Higher Flexibility for Better Adaptability

### **September 29**

Scott A. Diddams - National Inst of Standards, Boulder, Colorado

Title: Optical Atomic Clocks: Science and Metrology on the Femtosecond Time Scale

### **October 6**

Martin Schmaltz - Boston University

Title: New Physics at the LHC: Maybe the Little Higgs

### **October 13 - FALL BREAK**

### **October 20**

Qun Shen – Cornell University

Title: X-Ray Imaging and Microscopy Applications and Future Opportunities with an ERL Source

### **October 27**

Carlos Bustamante - University of California at Berkeley

Title: Grabbing the Cat by the Tail: Studies of the Packaging of DNA by Single Ph29 Bacteriophage Particles using Optical Tweezers

### **November 3**

Valery Nesvizhevsky - Institute Laue - Langevin, France

Title: Quantum States of Neutrons in the Gravitational Field, Short-Range Forces and Interaction of Ultracold Neutrons with Nanoparticles

### **November 10**

Boris Altshuler - Princeton University and NEC Laboratories-America

Title: Disorder + Interactions in Electronic Systems

### **November 17**

Bob Ecke - Los Alamos National Laboratory

Title: Granular Chains: Knots, Random Walks and Statistical Mechanics

### **November 24**

Jim Cordes - Cornell University

Title: The Radio Universe: Arecibo and Next Generation Radio Telescopes

**December 1**

Gerald Gabrielse - Harvard University

Title: Observations of Cold Antihydrogen and Fundamental Measurements

## **Spring 2004 Schedule**

### **January 26**

Gerry Jackson - Hbar Technologies. LLC

Title: Chasing the Dream of Antimatter Commercialization

### **February 2**

Harold Rose - LBL - Government

Title: State and Prospects of Aberration-Corrected High-Resolution Energy-Filtering Electron Microscopes

### **February 9**

Gabriela Gonzalez - Louisiana State University

Title: Gravitational Waves: New Eyes for Physics and Astronomy

### **February 16**

Greg Landsberg - Brown University

Title: Out-of-This World Physics: Probing Quantum Gravity in the Lab

### **February 23**

Abraham Stroock - Cornell University

Title: Patterning Microflows

### **March 1**

Sivan Kartha - Stockholm Environment Institute's Climate Program

Title: The Carbon-Hydrogen Bond: How Strong is the Interaction between Global Warming and the "Hydrogen Economy?"

### **March 8**

Subir Sachdev - Yale University

Title: Quantum Phase Transitions: From Mott Insulators to the Cuprate Superconductors

### **March 15**

Joanna Aizenberg - Bell Laboratories, Lucent Technologies

Title: Lessons in Optics from the Deep

### **March 22 - SPRING BREAK**

### **March 29 – The Thomas Gold Lecture Series**

Charles Townes - University of California

### **April 5**

Viet Elser - Cornell University

Title: Phase Retrieval with Atoms, Bits and Pixels

### **April 12 – The Bethe Lectures**

Bruce Winstein - University of Chicago

Title: The Allure of the Neutral Kaons

**April 19 – The Bethe Lectures**

Bruce Winstein - University of Chicago

Title: Searching for Patterns in the Polarization of the Cosmic Microwave Background Radiation

**April 26 – The Kieval Lecture**

David Spergel - Princeton University

Title: WMAP and Beyond: Implications of Microwave Background Observations

**May 3 – The Salpeter Lecture Series**

Andrea Ghez - University of California at Los Angeles

Title: Unveiling a Supermassive Black Hole at the Center of Our Galaxy

## **FALL 2004 Schedule**

### **August 30**

Bruce Knuteson - Massachusetts Institute of Technology

Title: Searching for a Guaranteed Surprise: Systematic Analysis of Frontier Energy Collider Data

### **Sept. 6 – Labor Day, No Colloquium**

### **September 13**

Juan Carlos Campuzano - University of Illinois

Title: What Does Photoemission Tell us About the Electrons in High Temperature Superconductors?

### **September 20**

Cumrun Vafa - Harvard University

Title: Quantum Foam and Melting Crystal

### **September 27**

Daniel Kleppner - Massachusetts Institute of Technology

Title: Can A Boost-Phase Intercept System Assist Missile Defense?

### **October 4**

David R. Nelson - Harvard University

Title: Spherical Crystallography: Virus Buckling and Grain Boundary Scars

### **October 11 -FALL BREAK**

### **October 18 – The Bethe Lectures**

Albert Libchaber - Rockefeller University

Title: Some Physical Aspects of the Origin of Life and of Artificial Cells

### **October 25 – The Bethe Lectures**

Albert Libchaber - Rockefeller University

Title: From Physics Techniques to Biological Observation

### **November 1**

Peter Lepage - Cornell University

Title: The Fall and Rise of Lattice QCD, Part II: High-Precision Lattice QCD Confronts Experiment

### **November 8**

Roy Briere - Carnegie Mellon University

Title: First Results from CLEO-c and CESR-c

### **November 15**

Michael Peskin - Stanford University

Title: The International Linear Collider: The Next Step in High-Energy Electron-Positron Physics

### **November 22**

Sidney Nagel - University of Chicago

Title: Physics and the Breakfast Table

**November 29 – The Thomas Gold Lecture Series**  
Geoff Marcy - University of California at Berkeley  
Title: The Properties of Planetary Systems

## **Spring 2005 Schedule**

### **January 24**

Dung-Hai Lee - University of California at Berkeley  
Title: From Landau Order to Topological Order

### **January 31 – No Colloquium**

### **February 7**

Ben Widom - Cornell University  
Title: What's New with Gibb's Absorption Equation

### **February 14**

Steve Squyres - Cornell University  
Title: Science Results from the Mars Exploration Rover Mission

### **February 21**

Wolfgang Ketterle - Massachusetts Institute of Technology  
Title: Bose-Einstein Condensation of Atoms, Molecules, and Fermion Pairs

### **February 28**

Alexander Szalay - Johns Hopkins University  
Title: Large Scale Structure of the Universe

### **March 7**

Jonathan L. Rosner - Enrico Fermi Institute - University of Chicago  
Title: The Buzz of B's - News of the Fifth Quark

### **March 14 – The Kieval Lecture**

Buford Price – UC Berkeley  
Title: Interconnectedness of Science: 10 12 eV Neutrinos, Climate, Volcanism, and Life in Ice

### **March 21 - SPRING BREAK**

### **March 28**

Majorie Shapiro - UC Berkeley  
Title: Why Does the W have Mass? Prospects for Uncovering the Source of Electroweak Symmetry Breaking

### **April 4**

Matthias Troyer - Swiss Federal Institute of Technology, Zurich, Switzerland  
Title: Simulating Quantum Phase Transitions: From Quantum Magnets to Ultra-Cold Atomic Gases

### **April 11**

Ian Shipsey - Purdue University  
Title: Bringing Hearing to the Deaf - Cochlear Implants: A Technical and Personal Account

### **April 18**

Michel Devoret - Yale University

Title: The Qnantronium: A Quantum-Mechanically Coherent Electrical Circuit Behaving Like An Atom  
**April 25**

Jainendra Jain - Pennsylvania State University

Title: Composite Fermions: Whay They Are and What They Do

**May 2 – The Salpeter Lecture Series**

Victoria Kaspi - McGill University

Title: Magnetars



## **FALL 2005 Schedule**

### **September 5 – Labor Day**

#### **September 12 – The Kieval Lecture**

Gary Westfall - Michigan State University

Title: Recent Results from RHIC: Towards a Better Understanding of Polymer-Induced Frag Reduction

#### **September 19**

Dung Hai Lee - University of California at Berkeley

Title: How to Block Nature's Tendency to Order

#### **September 26**

Pierre Ramond - University of Florida

Title: Sunshine at Midnight

#### **October 3 – The Parratt Lecture**

Stephen Olsen - University of Hawaii

Title: Homeless Mesons

#### **October 10 –Fall Break**

#### **October 17 – The Bethe Lectures**

Donald M. Eigler - IBM Almaden Research Center

Title: Information Transport and Computation in Nanometer-Scale Structures

#### **October 24 – The Bethe Lectures**

Donald M. Eigler - IBM Almaden Research Center

Title: Single-Atom Spin-Excitation Spectroscopy

#### **October 31**

Karin A. Dahmen - University of Illinois - Urbana-Champaign

Title: Crackling Noise and Disorder: Learning from Magnets and Earthquakes

#### **November 7**

John Spence - Arizona State University and Lawrence Berkeley National Labs

Title: Diffraction from a Beam of Laser-Aligned Proteins, and some Cavendish History

#### **November 14**

Neal Lane - Rice University

Title: The Future of U.S. Science - Storm Clouds on the Horizon

#### **November 21**

John Reppy - Cornell University

Title: The Search for the Super Solid

#### **November 28**

Paul Chaikin - New York University

Title: Jammed Ellipsoids Beat Jammed Spheres: Experiments with Candies, Colloids and Crystals

## **Spring 2006 Schedule**

### **January 23**

Sarah Eno - University of Maryland  
Title: The LHC Adventure

### **January 30**

Amir Yacoby - Weizmann Institute of Science, Rehovot, Israel  
Title: Coherent Control and Manipulation of Two-Electron Spin States

### **February 6**

David Weitz - Harvard University  
Title: Dripping, Jetting, Drops, and Wetting: The Magic of Microfluidics

**February 13** - No Seminar Today

### **February 20**

Philip Kim - Columbia University  
Title: Quantum Electrodynamics at your Pencil Tips: Dirac Fermion in Graphite

### **February 27**

A. Douglas Stone - Yale University  
Title: Einstein's Unknown Insight and the Problem of Quantizing Chaotic Motion

### **March 6**

Amber Miller - Columbia University  
Title: Peeking in Ancient Holes and Seeking the Holy Grail

### **March 13**

Maxim Perelstein - Cornell University  
Title: Electroweak Symmetry Breaking

**March 20 - SPRING BREAK**

### **March 27**

Gary Horowitz - University of California at Santa Barbara  
Title: Spacetime in String Theory

### **April 3**

Barry C. Barish - California Institute of Technology  
Title: Probing the Universe for Gravitational Waves

### **April 10**

Lene Hau - Harvard University  
Title: Frozen Light

### **April 17 – The Salpeter Lecture Series**

Avi Loeb - Harvard University

Title: The Frontier of 21cm Cosmology: Probing Reionization As Well As The Inflationary Initial Conditions

**April 24**

Eberhard Bodenschatz - Cornell University

Title: The Cornell Experiments on Fluid Turbulence

**May 1**

Sunil Golwala - California Institute of Technology

Title: The Search for WIMP Dark Matter

**May 8**

Harold Shapiro - Princeton University

Title: Particle Physics at the Crossroads: Charting the Course for Elementary Particle Physics in the 21st Century

## **FALL 2006 Schedule**

### **August 28**

Bill Louis - Los Alamos National Laboratory

Title: Searching for Neutrino Oscillations with MiniBooNE

### **Sept. 4 – Labor Day**

### **September 11**

Mark Trodden - Syracuse University

Title: Gravitational Approaches to Cosmic Acceleration

### **September 18**

Kerry Emanuel - Massachusetts Institute of Technology

Title: Is Global Warming Increasing Hurricane Activity?

### **September 25**

Persis Drell -Stanford University

Title: GLAST: The Gamma Ray Large Area Space Telescope

### **October 2**

Csaba Csaki - Cornell University

Title: Searching for the Mechanism of Electroweak Symmetry Breaking

### **October 9 –Fall Break**

### **October 16 – The Bethe Lectures**

David Gross - Kavli Institute for Theoretical Physics, UC at Santa Barbara

Title: The Search for a Theory of Fundamental Reality: The Theory of Elementary Particles

### **October 23**

Ziao-Gang Wen - Massachusetts Institute of Technology

Title: An Origin of Light, Fermions, and Gravity

### **October 30**

Henry Greenside - Duke University

Title: Songbirds and Synfire Chains

### **November 6**

Greg Boebinger - Florida State University

Title: Levitation, Superconductivity, and the World's Largest Magnets

### **November 13**

Michael Oppenheimer - Princeton University

Title: How Warm is Too Warm? Global Warming, Sea Level Rise, and the Future of the Polar Ice Sheets

### **November 20**

Neil Ashby - National Institute of Standards and Technology

Title: Relativity in the Global Positioning System

**November 27**

Daniel Fisher - Harvard University

Title: Is Evolution Understood? Quantitative Questions from a Statistical Mechanic

## **Spring 2007 Schedule**

### **January 22 - Special Physics Colloquium**

Daniel Freedman - Cornell University

Title: Empirical Insights from a Physicist's Year as a Grunt in Iraq

### **January 29 – The Kieval Lecture**

Lisa Randall - Harvard University

Title: Searching for Warped Geometry at the LHC

### **February 5**

Saul Teukolsky - Cornell University

Title: Black Holes and Gravitational Waves

### **February 12**

Steve Peggs - Brookhaven National Lab.

Title: Accelerator Science at the LHC Frontier

### **February 19**

Angela Olinto - University of Chicago

Title: New Era in UHE AstroParticle Physics

### **February 26**

Carl Bender - Washington University - St. Louis

Title: Making Sense of Non-Hermitian Hamiltonians

### **March 5**

Lars Bildsten - UC at Santa Barbara

Title: Explosions in Accreting White Dwarfs: From Classical Novae to Supernovae

### **March 12 – The Bethe Lectures**

Joe Polchinski - Kavli Institute for Theoretical Physics - UC at Santa Barbara

Title: Gauge/Gravity Duality: From Black Holes to the Bethe Ansatz

### **March 19 - Spring Break**

### **March 26**

Richard Packard - UC Berkeley

Title: Superfluid Weak Links: Physics and Applications

### **April 2 – The Salpeter Lecture Series**

Jonathan Lunine - University of Arizona

Title: The Past, Present and Future of Methane of Titan

### **April 9**

Matthew Pritchard - Cornell University

Title: Imaging SubCentimeter Ground Deformation from Space

**April 16**

Richard L. Garwin - IBM T.J. Watson Research Center

Title: A Major Expansion of Nuclear Power to Fight Global Warming? Problems and Prospects."

**April 23**

Michael Riordan - University of California

Title: US Big-Science Lessons from the SSC

**April 30 – No Colloquium**

ALTERNATIVE: Harold Varmus Subject: Science, Policy and Education

**Fall 2007 Schedule**

**August 27**

Henry Tye - Cornell University



Title: How Our Universe Began?

**September 3 - LABOR DAY**

**September 10**

William Bialek - Princeton University

Title: Physics Problems in Early Embryonic Development

**September 17**

Kyle Shen - Cornell University

Title: Shedding Light on Mysteries in the Solid State

**September 24**

David Goldhaber-Gordon - Stanford University

Title: Designer Hamiltonians in the Laboratory: Observation of Many Body Physics in a Semiconductor Nanostructure

**October 1**

Keith Schwab - Cornell University

Title: Quantum Mechanics with Mechanical Objects: Chasing Schrodinger's Whisker

**October 8 - FALL BREAK**

**October 15**

Geoffrey West - Santa Fe Institute

Title: Size Matters: Growth, Innovation and the Pace of Life from Cells to Cities

**October 22**

Robert Gilmour - Cornell University

Title: Nonlinear Dynamics of Heart Rhythm Disorders

**October 23 – The Thomas Gold Lecture Series, Joint with Astronomy**

Andrew Lyne - Australia

**October 29**

Steven Kivelson - Stanford University

Title: Electronic Liquid Crystals

**November 5**

Adam Burrows - University of Arizona

Title: Theories of the Explosive Death of Massive Stars

**November 12**

Francis Everitt - Stanford

Title: Testing Einstein in Space: Gravity Probe B & STEP

**November 19**

Anthony Leggett - UIUC

Title: Testing the Limits of Quantum Mechanics: Motivation, State of Play, Prospects

**November 26**

Neal Weiner - New York University

Title: Illuminating Dark Matter

## **Spring 2008 Schedule**

### **January 21**

Steven M. Girvin - Yale University

Title: Circuit QED: What is the Electric Field of a Single Photon?

### **January 28**

Seamus Davis - Cornell University

Title: Quasiparticle Extinction Due to Mottness - the Achilles' Heel of High-Tc Superconductivity

### **February 4**

Andrew Cohen - Boston University

Title: Electroweak Superconductivity

### **February 11**

Suzanne Staggs - Princeton University

Title: Wringing Yet More Reality from the Cosmic Microwave

### **February 18**

Denise Freed - Schlumberger-Doll Research

Title: The Physics of Crude Oils: What Downhole Nuclear Magnetic Resonance can tell us about Crude Oil

### **February 25**

Erich Mueller - Cornell University

Title: Ultracold Fermions

### **March 3 - Special Colloquium**

Mildred Dresselhaus - President APS

Title: Remarkable Nanostructured Forms of Carbon

### **March 10**

Eric G. Adelberger - University of Washington

Title: Recent Gravitational Experiments and their Implications for Particle Physics

### **March 17 – Spring Break**

### **March 24**

David Nelson - Harvard University

Title: Gene Surfing in Microorganisms

### **March 31**

Judy Franz - American Physics Society

Title: An Adventure in Physics outside the Laboratory

### **April 7**

Markus Greiner - Stanford University

Title: Quantum Simulations with Ultracold Atoms

**April 14 – The Bethe Lectures**

Steve Chu - Stanford University

Title: What We Can Learn from Single Molecule Experiments of Biological Systems

**April 21 – The Salpeter Lecture**

Alexei Filippenko - UC at Berkeley

Title: Evidence from Type Ia Supernovae for an Accelerating Universe and Dark Energy

**April 28**

Elena Aprile - Columbia University

Subject: The Search for Dark Matter with the XENON Equipment

**Fall 2008 Schedule**

**September 8**

Paul McEuen - Cornell University

Title: Nano Carbon: From String Theory to Atomic Drums

**September 15**

John Clarke - UC Berkeley

Title: The Ubiquitous SQUID: From Cosmology to Medicine

**September 22**

Maxim Perelstein - Cornell University

Title: Physics Beyond the Standard Model: Questions for the LHC

**September 29**

Doug Glenzinski - FNAL

Title: Twilight at the Tevatron

**October 6**

Raman Sundrum - John Hopkins

Title: Extra Dimensions and the LHC

**October 13 - Fall Break**

**October 20 – The Bethe Lectures**

Robert Kirshner-Harvard University

Title: The Mystery of Dark Energy

**October 27**

Margaret Murnane - JILA & Univ. of Colorado

Title: Harnessing Attosecond Science for Coherent X-Ray Generation and Applications

**November 3**

Anders Ryd - Cornell University

Title: THE CMS Experiment: Meeting the LHC Challenge

**November 10**

John Beamish - University of Alberta, Canada

Title: Flow and Elastic Properties of Helium: Is It a “Supersolid”?

**November 17**

Ron Poling - University of Minnesota

Title: CESR and CLEO: Thirty Years Shaping the Standard Model

**November 24**

Natalie Mahowald - Cornell University

Title: Desert Dust, Climate and Biogeochemistry

**December 1**

Nergis Mavalvala - Massachusetts Institute of Technology

Title: Quantum Mechanics on Giant Scales

## **Spring 2009 Schedule**

### **January 19**

Piet Brouwer - Cornell University

Title: Quantum Transport without Planck's Constant

### **January 26**

Andrea Liu - University of Pennsylvania

Title: The Physics of Cell Crawling

**February 2 –The Kieval Lecture**

Paul Doherty - Exploratorium

Title: Physics at a Science Museum

**February 9**

Eva Silverstein - Stanford University

Title: Inflation, String Theory, and Signatures in the CMB

**February 16**

Andy Ruina - Cornell University

Title: Rotation with Zero Angular Momentum: Demonstrations of the Falling Cat Phenomenon Go Sour

**February 23**

Young-Kee Kim - Fermilab

Title:  $E = mc^2$ : High Energy and Intensity Opens Windows on the World

**March 2**

Kurt Gottfried - Cornell University

Title: Nuclear Terrorism

**March 9**

Jan Zaanen - Univ Leiden, The Netherlands

Title: Planckian Dissipation

**March 16 – Spring Break**

**March 23 – The Bethe Lectures**

Paul Chu - Houston/HKUST

Title: From BCS through HTS to RTS?

**March 30**

Andrzej Buras - Technical University in Munich

Title: An Excursion into the Attouniverse: Probing New Physics at Very Short Distance Scales Through Rare Processes

**April 6**

Alex Gaeta - Cornell University

Title: Interactions of Light with Atoms and Molecules in Photonic Crystal Fibers

**April 13**

John Learned - University of Hawaii

Title: The Age of Neutrino Physics: A Rapid Overview and Description of a New 10 Kiloton Instrument Called Hanohano

**April 20**

Arjun Yodh - Univ of Pennsylvania

Title: Melting, Frustration and Aging in Temperature-Sensitive Colloids

**April 27 – The Salpeter Lecture Series**

Giles Chabrier - Ecole Normale Supérieure de Lyon

Title: Recent Results in Exoplanet Formation, Structure and Evolution

**Fall 2009**

**August 31**

Dan Ralph - Cornell University

Title: Putting the Electron's Spin to Work

**September 7 - Labor Day**

**September 14**

Subir Sachdev - Harvard University

Title: Quantum Criticality: from Antiferromagnets to the Cuprate Superconductors

**September 21**



Peter Fisher – Massachusetts Institute of Technology  
Title: WiTricity: An Odd Adventure into the Real World

**September 28**

Itai Cohen - Cornell University  
Title: Flight of the Fruit Fly

**October 5**

Paul Ginsparg – Cornell University  
Title: Open Access: From Myth to Paradox

**October 12 - Fall Break**

**October 19**

Edward Farhi - MIT  
Title: A Quantum Computer Can Determine Who Wins a Game Faster Than a Classical Computer

**October 26**

Wolfgang Bauer - Michigan State University  
Title: Increasing the Number of Physics Majors - How Do We Do It?

**November 2**

Zvi Bern - UCLA  
Title: Harmony of Scattering Amplitudes: From Quantum Chromodynamics to Gravity

**November 9**

Steve Ritz - NASA  
Title: Fermi at 17 Months

**November 16**

Humphrey Maris - Brown University  
Title: "Experiments with Single Electrons in Liquid Helium"

**November 23**

Jennifer Mass - Winterthur Museum  
Title: Art Meets Science: Discovering Hidden Images and Vanishing Masterpieces in Paintings

**November 30**

Bart Selman - Cornell University  
Title: Solving Large-Scale Computational Problems Using Insights from Statistical Physics

## **Spring 2010 Schedule**

### **January 25**

Vinay Ambegaokar - Cornell University

Title: Entropy and Time

### **February 1**

Matthew Fisher - CalTech

Title: Quantum Crystals, Quantum Choreography and Quantum Computing

### **February 8**

Eugene Demler - Harvard University

Title: Learning About Order from Noise

### **February 15**

Andrew Mackenzie - University of St. Andrews  
Title: Complex Oxides: A New Playground for Physics and Technology

**February 22**

Stan Leibler-The Rockefeller University  
Title: Protein Sectors: History Versus Function

**March 1**

David DiVincenzo - IBM T. J. Watson Research Center  
Title: Prospects for Realizing Quantum Computers

**March 8**

Nathan Seiberg - Institute for Advanced Study, Princeton  
Title: Supersymmetry and its Breaking

**March 15**

Chris Polly - Fermilab  
Title: Precision precession: How the history of g-2 wound its way to Fermilab

**March 22 - Spring Break**

**March 29**

Yuval Grossman - Cornell University  
Title: Flavor Physics

**April 5**

Chad Orzel - Union College  
Title: My Dog About Science: Why Public Communication of Science is Important , and How Social Media Can Help

**April 12**

Jiwoong Park - Cornell University  
Title: Accurate Carbon Nanostructures

**April 19**

Chris Myers -Cornell University  
Title: The Curiosity of Dimensionality in Systems Biology

**April 26**

Persis Drell - Stanford  
Title: The Turn On of LCLS: The X-Ray Free-Electron Laser at SLAC

**May 3**

Kathryn Moler - Stanford University  
Title: Mesoscopic Magnetic Measurements

**May 10 – The Salpeter Lecture**

David Spergel – Princeton

Title: The Cosmic Microwave Background as a Probe on the Very Early Universe

## **Fall 2010 Schedule**

### **August 30**

Sol Gruner - Cornell University

Title: Biomolecules Under Pressure: Why it Matters

### **September 6 - Labor Day**

### **September 13**

Steve Strogatz - Cornell University

Title: Writing About Math for The New York Times

### **September 20**

Alyssa Apsel - Cornell University

Title: Firefly Radios: Biologically Inspired Ultra-low Power Radio Networks

### **September 27**

Louis Taillefer - Sherbrooke University  
Title: The Two Mysteries of Superconductivity

**October 4**

Daniel Schrag - Harvard University  
Title: A Path Forward on Climate and Energy

**October 4 – 8 - Messenger Lecture Series**

**The Future of Fundamental Physics**

**Nima Arkani-Hamed - IAS Princeton**

**October 4:** Setting the Stage: Space-Time and Quantum Mechanics

**October 5:** Our “Standard Models” of Particle Physics and Cosmology, and Their Discontents

**October 6:** Space-Time is Doomed; What Replaces It?

**October 7:** Why is There a Macroscopic Universe?

**October 8:** A New Golden Age of Experiments: What We Might Know By 2020

**October 11 - Fall Break**

**October 18**

Andrew Millis - Columbia University  
Title: Materials with Strong Electronic Correlations: The (Theoretical) End of the Beginning?

**October 25**

Holger Mueller - UC Berkeley  
Title: Gravitational Redshift, Equivalence Principle, and Matter Waves

**October 27 – The Thomas Gold Lecture, Special Joint Physics-Astronomy Colloquium**

Rashid Sunyaev - Max Planck Institute for Astrophysics, Garching, Germany  
Title: The Richness and Beauty of the Physics of Cosmological Recombination

**November 1**

Richard Schnee - Syracuse University  
Title: What’s the Matter in the Universe? Direct Searches for WIMP Dark Matter

**November 8**

Csaba Csaki - Cornell University  
Title: Electroweak Symmetry Breaking and the Physics of the TeV Scale

**November 15**

Peter Wittich - Cornell University  
Title: CMS: The LHC Era Begins

**November 22**

Charles Marcus - Harvard University  
Title: Building Schrödinger's Chip

**November 29**

David Meyerhofer - University of Rochester  
Title: Inertial Confinement Fusion: On the Path to Ignition

**Spring 2011 Schedule**

**January 24**

Ben Kilminster - Fermilab  
Title: Massive Search Pushes Higgs Particle into Corner at Fermilab

**January 31**

Aaron Pierce – University of Michigan  
Title: Developments in the Hunt for the Identity of the Dark Matter

**February 7**

Henry Chapman – Center for Free-Electron Laser Science DESY  
Title: Femtosecond X-Ray Protein Nanocrystallography

**February 14**

Michael Lawler – SUNY Binghamton / Cornell University  
Title: Electronic Liquid Crystal Correlations in the Pseudogap States of High Tc Superconductors

**February 21 – The Krumhansl Lecture**

Nynke Dekker – Kavli Institute of NanoScience, TU Delft

Title: Single-Molecule Torque Spectroscopy for Biophysical Investigations

**February 28 – The Cooper Lecture**

Wim Leemans – Lawrence Berkeley National Laboratory

Title: Laser Plasma Accelerators: From Dream Towards Reality

**March 7 – Cancelled**

**March 14 – The Salpeter Lectures**

Sara Seager - MIT

Title: Exoplanet Mass, Radius, and the Physics of Exoplanetary Interiors

**March 21 - Spring Break**

**March 28**

William Bertsche – Swansea University

Title: Trapped Antihydrogen

**April 4**

Anders Ryd – Cornell University

Title: First Year of CMS Operation: Operational Experience and First Physics Results

**April 11 – The Bethe Lectures**

Wolfgang Ketterle - MIT

Title: Superfluid Gases Near Absolute Zero Temperature

**April 18**

Matias Zaldarriaga – IAS Princeton

Title: The Initial Conditions of the Hot Big Bang

**April 25**

Lars Bildsten – KITP UC Santa Barbara

Title: Diverse Energy Sources for Supernovae

**May 2 - Cancelled**

## **Fall 2011 Schedule**

### **August 29**

David Mermin – Cornell University

Title: What has quantum mechanics to do with factoring? Things I wish they had told me about Shor's algorithm.

### **September 5 – Labor Day**

### **September 12 – Cooper Lecture**

Thomas Mason – UCLA

Title: Entropy and Geometry: From Directed Self-Assembly to Phase Behavior of Custom-Shaped Colloids

### **September 19**

Julia Thom – Cornell University

Title: The First Year of LHC Data: What We've Found and What We Haven't

### **September 26 – The Bethe Lectures**

Paul Alivisatos – Lawrence Berkeley National Laboratory

Title: The Science of Nanocrystals in Six Easy Pieces

### **October 3**

Matthias Liepe – Cornell University



Title: RF Superconductivity. What Makes the Cornell ERL Go?

**October 10 – Fall Break**

**October 17**

Christian Ott – Caltech

Title: Stellar Collapse, Core-Collapse Supernovae, and the Formation of Stellar-Mass Black Holes

**October 24**

Charles Kane – University of Pennsylvania

Title: From Topological Insulators to Majorana Fermions

**October 31 – The Kieval Lecture**

Sean Carroll – UCLA

Title: The Origin of the Universe and the Arrow of Time

**November 7**

Jonathan Feng – UC Irvine

Title: Dark Particles: WIMPS and Beyond

**November 14 – Cancelled**

**November 21**

Roberto Car – Princeton University

Title: Quantum Mechanics and Hydrogen Bonds

**November 28**

Stewart Prager – Princeton Plasma Physics Laboratory

Title: The Path to Magnetic Fusion Energy

## **Spring 2012 Schedule**

### **January 23**

Liam McAllister – Cornell University

Title: Cosmological Windows on Planck-Scale Physics

### **January 30**

Michael Crommie – UC Berkeley

Title: The Electrons in Your Pencil: Observations of a Carbon Flatland

### **February 6**

Yanbei Chen – Caltech

Title: Kilogram-scale Mirrors as Quantum Objects

### **February 13**

Charles Bennett – IBM Research

Title: Quantum Information, the Ambiguity of the Past, and the Complexity of the Present

### **February 20**

Alex Gaeta – Cornell University

Title: Temporal Magnification, Compression, and Cloaking of Light

### **February 27**

Rafael Lang – Purdue University

Title: Dark Matter and How To Discern It

### **March 5 – The Parratt Lecture**

Carl Lineberger – JILA/CU Boulder

Title: Energy Flow and Sequestration in Partially Solvated ICN and ICN-:  
Small molecules trying to act large

**March 12 – The Salpeter Lecture**

Eliot Quataert – UC Berkeley

Title: Searching for the Electromagnetic Counterparts to Gravitational Wave Sources

**March 19 – Spring Break**

**March 26**

Michael Peskin – Stanford University

Title: The Search for New Elementary Particles at the CERN Large Hadron Collider

**April 2**

Vivek Sharma – UC San Diego

Title: The Hunt for the Higgs Boson at CERN

**April 9 – The Thomas Gold Lecture**

Maria Zuber – MIT

Title: The Geophysics of Mercury from the MESSENGER Mission

**April 16**

Doug Smith – UC San Diego

Title: Single-molecule studies of polymer physics and viral DNA packaging

**April 23 – Cancelled**

**April 30 – The Bethe Lectures**

Lisa Randall – Harvard University

Title: Particle Physics Today

## **Fall 2012 Schedule**

### **August 27**

John A. Johnson – Caltech

Title: Hot on the Trail of Warm Planets Orbiting Cool M Dwarfs

Host: Eanna Flanagan

### **September 3 – Labor Day**

#### **September 10**

Sean Hartnoll – Stanford University

Title: Ohm's Law and Black Holes

Host: Liam McAllister

#### **September 17**

Kyle Shen – Cornell University

Title: Teaching Electrons New Tricks in Artificial Quantum Materials

#### **September 24**

Markus Luty – UC Davis

Title: The Higgs Confronts Three Universes at the LHC

Host: Csaba Csaki

#### **October 1**

Ivan Bazarov – Cornell University

Title: Cornell High Brightness Photoinjector: Beyond the “Star Wars”

### **October 8 – Fall Break**

#### **October 15 – The Bethe Lectures**

John Carlstrom – University of Chicago

Title: Cosmological Physics with the Cosmic Microwave Background: New results from the South Pole Telescope

Host: Ira Wasserman

**October 22**

Michael Brenner – Harvard University

Title: Linear Algebra and the Shape of Bird Beaks

Host: Jane Wang

**October 29 – Cancelled**

**November 5**

Kyle Cranmer – New York University

Title: Discovery! How we did it and what we know so far

Host: Jim Alexander

**November 12**

Jonathan Lunine – Cornell University

Title: Saturn's Moon Titan From the Inside Out

**November 19**

Lisa Whitehead – University of Houston

Title: Neutrino Mixing and the Daya Bay Experiment

Host: Julia Thom-Levy

## **Spring 2013**

### **January 21 – The Cooper Lecture**

Robert Beichner – North Carolina State University

Title: The SCALE-UP Classroom

Host: Rob Thorne

### **January 28**

Tim Healey – Cornell University

Title: Nonlinear Problems for Thin Elastic Structures and the Ubiquitous Isola Bifurcation

Host: Andre LeClair

### **February 4 – The Thomas Gold Lectures**

David Jewett – UCLA

Title: Comets and the Origin and Evolution of the Solar System

Host: Jonathan Lunine

### **February 11**

Abhay Pasupathy – Columbia University

Title: Is Magnetism Important in the Pnictide Superconductors?

Host: Séamus Davis & Dan Ralph

### **February 18**

Jesse Thaler – MIT

Title: The Shape of Jets to Come: Boosting the Search for New Physics at the LHC

Host: Maxim Perelstein

### **February 25**

Zahid Hasan – Princeton University

Title: Topological Surface States: Discovery and Recent Results

Host: Kyle Shen

### **March 4**

Harold Hwang – Stanford University

Title: Emergent Phenomena at Oxide Interfaces

Host: Kyle Shen

**March 11**

Frank Guerts – Rice University  
Title: Putting Hot Matter on a Map  
Host: Peter Wittich

**March 18 – Spring Break****March 25 – The Bethe Lectures**

Gordon Baym – University of Illinois at Urbana-Champaign  
Title: Two slit diffraction with highly charged particles: Niels Bohr's consistency argument that the electromagnetic field must be quantized.  
Host: Erich Mueller

**April 1**

Senthil Todadri – MIT  
Title: How might a Fermi surface die?  
Host: Eun-Ah Kim

**April 8**

Shamit Kachru – Stanford University  
Title: New Horizons in Black Hole Physics and Holography  
Host: Liam McAllister

**April 15 – The Salpeter Lecture**

Eve Ostriker – University of Maryland, College Park  
Title: Salpeter Lecture - Self-Regulation of Star Formation in Disk Galaxies  
Host: Jonathan Lunine

**April 22****Suchitra Sebastian - Cambridge University**

Title: Quantum oscillations as a tool to crack the mystery of unconventional superconductivity  
Host: n/a Faculty Candidate

**April 29****François Bouchet - Institut d'Astrophysique de Paris**

Title: Planck Main Cosmological Results  
Host: Liam McAllister





## **Fall 2013**

### **September 9**

Eun-An Kim – Cornell University

Title: Recent Theoretical Advances in the Study of High-Tc Superconductivity using a 'Middle-top/down' Approach

### **September 16**

James Lattimer – SUNY Stony Brook

Title: Measuring Neutron Stars

Host: Saul Teukolsky

### **September 23**

Michelle Wang – Cornell University

Title: Solving Mysteries of Biology – The Power of One

### **September 30 – A.D. White Professor – At – Large Lectures**

Nima Arkani-Hamed – IAS Princeton

Title: Space-Time, Quantum Mechanics and Scattering Amplitudes

Host: Csaba Csaki & Yuval Grossman

### **October 7**

J.C. Seamus Davis – Cornell University

Title: How Supermassive Electrons Reveal the Magnetic Mechanism of Correlated Superconductivity

### **October 14 – Fall Break**

### **October 21**

Nigel Goldenfeld – University of Illinois at Urbana – Champaign

Title: Phase Transitions in Early Life: Clues from the Genetic Code

Host: Carl Franck

### **October 28**

Zhirong Huang – Stanford University

Title: Free-Electron Lasers: from Star Wars to Molecular Movies

Host: Georg Hoffstaetter

### **November 4**

Robert J. Lang – Lang Origami

Title: From Flapping Birds to Space Telescopes: The Mathematics of Origami

Host: Itai Cohen

### **November 11 – The Bethe Lectures**

Fabiola Gianotti – CERN

Title: Challenges and Accomplishments of the ATLAS Experiment at the Large Hadron Collider

Host: Anders Ryd

### **November 18**

Enectali Figueroa – MIT

Title: What's the Matter with the Universe?

Host: Michael Niemack

**November 25**

Dam Thanh Son – University of Chicago

Title: Viscosity, Quark Gluon Plasma, and String Theory

Host: Maxim Perelstein

**December 2 – The Ralls Lecture**

Ann Nelson – University of Washington

Title: Uses of the Higgs

Host: Csaba Csaki

## **Spring 2014**

### **January 27**

Frans Pretorius – Princeton University

Title: Black Holes: Probes of the Cosmos and Fundamental Physics

Host: Eanna Flanagan

### **February 3 – The Cooper Lecture**

Catherine Kallin – McMaster University

Title: Topological Superconductivity

Host: Eun-Ah Kim

### **February 10**

Tom Kinoshita – Cornell University

Title: Tenth-Order QED Contribution to the Electron  $g - 2$  and High Precision Test of QED and Standard Model

### **February 24 – The Kieval Lecture**

Peter Schiffer – University of Illinois at Urbana-Champaign

Title: Frustration by Design: Artificial Spin Ice

Host: Seamus Davis

### **March 3**

Giorgio Gratta – Stanford University

Title: The EXO Program and the Quest for Majorana Neutrino Masses

Host: Jim Alexander

### **March 10**

Peter Galison – Harvard University

Title: Wastelands and Wilderness: Nuclear Lands

Hosts: Jim Sethna/Katheel Vogel

### **March 17 – The Krumhansl Lecture**

Michael Devoret – Yale University

Title: Superconducting Artificial Atoms: The Quest for Unlimited Qubit Coherence

Host: Paul McEuen

### **March 24**

Mukund Vengalattore – Cornell University

Title: Imprinting the Quantum: Measure still for Measure

### **March 31 – Spring Break**

### **April 7 – The Bethe Lectures**

David Awschlaom – University of Chicago

Title: Beyond Electronics: Abandoning Perfection for Quantum Technologies  
Host: Jeevak Parpia

**April 14 – The Gold Lecture**

J. Richard Bond – Canadian Institute for Theoretical Astrophysics  
Title: Unveiling Fundamental Physics from the First Light, Revealing Simplicity & Complexity in the Universe at Large  
Host: Ira Wasserman

**April 21 – The Salpeter Lecture**

Adam Showman – University of Arizona  
Title: Weather on Remote Worlds: The Atmospheric Circulation of Exoplanets  
Host: Dong Lai

**April 28 – The Messenger Lecture**

Lenny Susskind – Stanford University  
Title: The Birth of the Universe and the Origin of Laws of Physics  
Host: Paul Ginsparg

**May 5**

Liam McAllister & Mike Niemack – Cornell University  
Title: Quantum Gravity in the Sky? CMB Measurements as a Window on Planck-Scale Physics

## **Fall 2014**

### **September 8**

Maxim Perelstein – Cornell University

Title: What Can We Learn from the Higgs?

### **September 15**

Subir Sachdev – Harvard University

Title: Unveiling the Order of the High Temperature Superconductors

Host: Eun-Ah Kim

### **September 22 – The Bethe Lectures**

Juan Maldacena – Institute for Advanced Study

Title: Quantum Mechanics and the Geometry of Spacetime

Host: Liam McAllister

### **September 29**

Itai Cohen – Cornell University

Title: Bringing Physics into the Fold: Origami Inspired Mechanical Meta-materials

### **October 6**

Chris Henley – Cornell University

Title: How to Trigger Left-Right Asymmetry in Organisms: Snails, Roots, and Maybe your Brain

### **October 13 – Fall Break**

### **October 20**

Erich Mueller – Cornell University

Title: The Search for Modulated Superconductivity

### **October 27**

Anders Ryd – Cornell University

Title: The CMS Detector Upgrade for the High Luminosity LHC

### **November 3 – The Gold Lecture (CANCELLED)**

Reinhard Genzel–Univ. of California Berkeley and Max Planck Institute for Extraterrestrial Physics

Title: The Galactic Center Massive Black Hole

Host: Gordon Stacey

### **November 10**

Duncan Brown – Syracuse University

Title: Gravitational Waves: A New Frontier in 21<sup>st</sup> Century Astronomy and Astrophysics

Host: Eanna Flanagan

### **November 17**

Raymond Ashoori – Cornell University

Title: A New Method for Electron Tunneling Spectroscopy of Semiconductors, Insulators, and Graphene  
Host: Paul McEuen

**November 24**

Matthew Reece – Harvard University

Title: Supersymmetry After the LHC's First Run

Host: Csaba Csaki

**December 2 (CANCELLED)**

Simona Murgia – UC Irvine

Title: Indirect Detection of Dark Matter with Gamma Rays: Constraints and Intriguing Hints

Host: Maxim Perelstein

## **Spring 2015**

### **January 26**

Lawrence Gibbons – Cornell University

Title: Taking the Muon for a Spin (in the World's Largest Penning Trap)

### **February 2**

John Bush – MIT

Title: Hydrodynamic Quantum Analogs: Droplets Walking on the Impossible Pilot Wave

Host: Itai Cohen

### **February 9**

Daniel Harlow – Princeton University

Title: Black Holes, Quantum Information, and the Emergence of Spacetime

Host: Eanna Flanagan

### **February 16 No Colloquium – February Break**

### **February 23 – The Salpeter Lecture**

Daniel Eisenstein – Harvard

Title: A New Decade of Cosmic Structure

Host: Rachel Bean

### **March 2**

Christopher Tully – Princeton University

Title: One Second after the Big Bang

Host: Jim Alexander

### **March 9**

Simona Murgia – UC-Irvine

Title: Indirect Detection of Dark Matter with Gamma Rays

Host: Maxim Perelstein

### **March 16 – The Bethe Lectures**

William Bialek – Princeton University

Title: Are Biological Networks Poised at Criticality?

Host: Sol Gruner

### **March 23**

Brad Marston – Brown University

Title: The Quantum and Fluid Mechanics of Global Warming

Host: Cyrus Umrigar

### **March 30 – No Colloquium Spring Break**

## **April 6**

Dong Lai – Cornell University

Title: Astrophysics of Extreme Exoplanetary Systems

Host: Eanna Flanagan

**April 13**

Steve Kivelson – Stanford University

Title: High Temperature Superconductivity Near a Nematic Quantum Critical Point

Host: Eun-Ah Kim

**April 20**

Ian Spielman – University of Maryland and NIST

Title: Gauge Fields in Multi-level Atoms: Magnetism and Synthetic Dimensions

Host: Erich Mueller

**April 27 – The Cooper Lecture**

Michael Roukes – Caltech

Title: Integrated Neurophotonics: Toward Massively-Parallel Mapping of Brain Activity

Host: Jeevak Parpia

**May 4 (CANCELLED)**



## **Fall 2015**

### **August 31**

Leslie Rosenberg – University of Washington

Title: Searching for Dark-Matter Axions

Host: Lawrence Gibbons

### **September 7 – No Colloquium Labor Day**

### **September 14**

Chao-Lin Kuo – Stanford University

Title: The BICEP/Keck Program and the Search for Inflationary Gravitational Waves

Host: Mike Niemack

### **September 21**

Kathryn Zurek – Lawrence Berkeley National Lab

Title: New Theories for Dark Matter: Hunting Beyond the WIMP

Host: Csaba Csaki

### **September 28 – The Gold Lecture**

Reinhard Genzel – Univ. of California, Berkeley and Max Planck Institute

Title: The Galactic Center Massive Black Hole

Host: Gordon Stacey

### **October 5**

Frank de Groot – Utrecht University

Title: In-situ X-ray Spectromicroscopic Experiments

Host: Ken Finkelstein

### **October 12 – No Colloquium Fall Break**

### **October 19 – The Bethe Lectures**

Hitoshi Murayama – UC Berkeley

Title: When a Symmetry Breaks

Host: Csaba Csaki

### **October 26 – The Cooper Lecture**

Zhi-Xun Shen – Stanford University

Title: High Temperature Superconductivity – Insights from Einstein's Electrons

Host: Kyle Shen

### **November 2 – The Krumhansl Lecture**

Ana Maria Rey – JILA, NIST, and University of Colorado, Boulder

Title: Building with Crystals of Light and Quantum Matter: From Clocks to Computers

Host: Erich Mueller

**November 9**

Dunghai Lee – UC Berkeley

Title: A Novel Nematic Quantum in Iron-based Superconductor

Host: Seamus Davis

**November 16**

John Terning – UC Davis

Title: Quantum Phase Transitions and the Higgs

Host: Csaba Csaki

**November 23**

Angela Olinto – University of Chicago

Title: News from the Extreme Energy Cliff

Host: Ira Wasserman

**November 30 – The Kavli Lecture**

Leo Kouwenhoven – Delft

Title: Majorana Fermions: From Particle Physics on a Chip to Topological Quantum Computing

Host: Paul McEuen

## **Spring 2016**

### **February 1**

Claudia de Rham – Case Western Reserve  
Title: Our Accelerating Universe and Modified Gravity  
Host: Liam McAllister

### **February 8 – Kristin Ralls Memorial Lecture**

Gabriel Orebi Gann – UC Berkeley  
Title: Here Be Dragons: Mysteries of the Neutrino  
Host: Peter Wittich

### **February 15 – No Colloquium February Break**

### **February 22 – Parratt Lecture**

R. J. Dwayne Miller – Max Planck Institute and the University of Toronto  
Title: Mapping Atomic Motions with Ultrabright Electrons: The Chemists' Gedanken Experiment Enters the Lab Frame  
Host: Ritchie Patterson

### **February 29**

André LeClair – Cornell University  
Title: A New Approach towards a Proof of the Riemann Hypothesis

### **March 7 – Kieval Lecture**

Erik Demaine – MIT  
Title: Folding Paper: Visual Art Meets Mathematics  
Host: Paul McEuen

### **March 14**

Oliver Bruening – CERN  
Title: The LHC and the HL-LHC Upgrade Project  
Host: Ralf Eichhorn

### **March 21 – The Bethe Lectures**

Francis Halzen – University of Wisconsin-Madison  
Title: IceCube: The Discovery of High-Energy Cosmic Neutrinos  
Host: Yuval Grossman

### **March 28 – No Colloquium Spring Break**

### **April 4**

Martin Wegener – Karlsruhe Institute of Technology  
Title: Transforming and Cloaking with Metamaterials: Optics, Mechanics, and Thermodynamics  
Host: Itai Cohen

**April 7 – Terzian Lecture – Joint Astronomy and Physics Colloquium**

Kip Thorne – Caltech

Title: Probing the Warped Side of our Universe with Gravitational Waves and Computer Simulations

Host: Saul Teukolsky

**April 11**

Jim Sethna – Cornell University

Title: Sloppy Models, Differential Geometry, and How Science Works

**April 18 – A.D. White Professors-at-Large**

Nima Arkani-Hamed – Institute for Advanced Study, Princeton, New Jersey

Title: The Future of Collider Physics, on the Earth and in the Sky

Host: Yuval Grossman

**April 25 – Thomas Gold Lecture**

Simon White – Max Planck Institute for Astrophysics in Garching, Germany

Title: The Planck Satellite Mission: Full Mission Results on Cosmology and Cosmic Structure Formation

Host: Ira Wasserman

**May 2 – Salpeter Lecture**

Fiona Harrison – Caltech

Title: A New View of the High Energy Universe: Science Highlights from the Nuclear Spectroscopic Telescope Array (NuSTAR) Mission

Host: Dong Lai

**May 9**

Michael Shelley – NYU

Title: Self-assembly and Collective Behavior in Active Matter Systems

Host: Itai Cohen

## **Fall 2016**

### **August 29**

Adam Cohen – Harvard University  
Title: Bringing Bioelectricity to Light  
Host: Itai Cohen

### **September 5 – No Colloquium Labor Day**

### **September 12**

Douglas Stone – Yale University  
Title: Einstein and Quantum Mechanics: It's Not What You Think  
Host: Peter Wittich

### **September 19**

Stephen Quake – Stanford University  
Title: Single Cell Genomics  
Host: Katja Nowack

### **September 26**

Liam McAllister – Cornell University  
Title: The Discrete Character of Physical Law from String Theory to the CMB

### **October 3**

Itai Cohen – Cornell University  
Title: Using a Confocal Rheoscope to Investigate Soft Squishy Materials

### **October 10 – No Colloquium Fall Break**

### **October 17 – Parratt Lecture**

John Rogers – Northwestern University  
Title: Soft, Biocompatible Optoelectronic Interfaces to the Brain  
Host: Itai Cohen

### **October 24**

Hidenori Takagi – Max Planck Institute for Solid State Research and Department of Physics, Univ. of Tokyo  
Title: Spin-orbit Coupling meets with Electron Correlations – A Guided Tour to Exotic Electronic States of 5d Transition Metal Oxides  
Host: Kyle Shen

### **October 31**

Carl Haber – Lawrence Berkeley National Lab  
Title: The Restoration of Early Sound Recordings using Optical Scanning and Image Analysis  
Host: Peter Wittich

### **November 7 – Kristin Ralls Memorial Lecture**

Anette Hosoi – MIT  
Title: Marine Mammals and Fluid Rectifiers: The Hydrodynamics of Hairy Surfaces  
Host: Itai Cohen

**November 14**

Dimitri Basov – Columbia University

Title: Quantum Materials: Insights from Near Field Nano-Optics

Host: Kyle Shen

**November 21**

Herbert Dreiner –Universität Bonn

Title: The Bonn Physics Show—By Students for Kids, an Exciting Outreach and Education Project

Host: Csaba Csaki

**November 28 – The Bethe Lectures**

Anton Zeilinger – University of Vienna

Title: Quantum Communication with Entangled Photons

Host: David Mermin

## **Spring 2017**

### **January 30**

Peter Wittich – Cornell University

Title: The Future of the Large Hadron Collider

### **February 6**

Séamus Davis – Cornell University

Title: Emergence of Electronic Liquid Crystal Phases in Correlated Superconductors

### **February 13**

Gennady Shvets – Cornell University

Title: Science and Applications of Optical Metamaterials

### **February 20 – No Colloquium February Break**

### **February 27**

Natasha Holmes – Cornell University

Title: From Cookbook to Authentic Research: Rethinking Introductory Physics Lab Courses

### **March 6 – Krumhansl Lecture**

Vidya Madhavan – University of Illinois at Urbana-Champaign

Title: Massless and Massive Electrons: Relativistic Physics in Condensed Matter Systems

Host: Kyle Shen

### **March 13**

Mariangela Lisanti – Princeton University

Title: Hunting for Dark Matter in the Gamma-Ray Sky

Host: Csaba Csaki

### **March 20 – Cooper Lecture**

Kent Irwin – Stanford University

Title: Searching for Axion and Hidden Photon Dark Matter with Electromagnetic Resonators: The Dark Matter Radio Experiment (DM Radio)

Host: Mike Niemack

### **March 27 – The Henley ‘Non-Spherical Cow’ Lecture**

Joseph Curtin – Joseph Curtin Studios, LLC

Title: Can Stradivari’s Sound be Measured?

Host: Peter Wittich

### **April 10 – The Terzian Lecture**

Shri Kulkarni – Caltech

Title: The Restless Universe (Palomar Transient Factory)

Host: Ira Wasserman

### **April 17**

Georg Hoffstaetter – Cornell University

Title: A New Kind of Particle Accelerator: The Cornell-BNL ERL Test Accelerator for eRHIC Prototyping and Bright-Beam Applications

**April 24 – The Bethe Lectures**

Joshua Frieman – Fermilab and the University of Chicago

Title: Probing Cosmic Acceleration with the Dark Energy Survey

Host: Jim Alexander

**May 1 – Kieval Lecture**

Justin Khoury – University of Pennsylvania

Title: New Approaches to Dark Matter

Host: Eanna Flanagan

**May 8 – Thomas Gold Lecture**

Adam Burrows – Princeton University

Title: The Multi-Dimensional Core-Collapse Supernova Mechanism

Host: Lisa Kaltenegger

**May 9 – First Distinguished Carl Sagan Lecture**

Lord Martin Rees – The United Kingdom's Astronomer Royal

Title: Real and Counterfactual Universes

Host: Lisa Kaltenegger