

## CURRICULUM VITAE

STEVEN M. GIRVIN

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Mailing address:	Courier Delivery:	
Yale Quantum Institute	Yale Quantum Institute	<a href="mailto:steven.girvin@yale.edu">steven.girvin@yale.edu</a>
PO Box 208 334	Suite 436, 17 Hillhouse Ave.	(203) 432-5082 (office)
New Haven, CT 06520-8263	New Haven, CT 06511 USA	(203) 240-7035 (cell)

### EDUCATION:

BS Physics (Magna Cum Laude)	Bates College	1971
MS Physics	University of Maine	1973
MS Physics	Princeton University	1974
Ph.D. Physics	Princeton University	1977

Thesis Supervisor: J.J. Hopfield

Thesis Subject: Spin-exchange in the x-ray edge problem and many-body effects in the fluorescence spectrum of heavily-doped cadmium sulfide.

Postdoctoral Advisor: G. D. Mahan

American Institute of Physics, Oral History Interview, July, 2020:

<https://www.aip.org/history-programs/niels-bohr-library/oral-histories/44930>

### EMPLOYMENT:

2020-2021	Dual appointment at Brookhaven National Laboratory as Founding Director of the Co-Design Center for Quantum Advantage
2015-2017	Deputy Provost for Research, Yale University
2007-2015	Deputy Provost for Science and Technology, Yale University
2007	Assoc. Dir. Yale Institute for Nanoscience and Quantum Engineering
2005-	Eugene Higgins Professor of Physics, Yale University
2001-	Professor of Physics and Applied Physics, Yale University
1999-2001	Adjunct Professor of Chemistry, Indiana University
1992-2001	Distinguished Professor of Physics, Indiana University
1987-1992	Professor of Physics, Indiana University
1979-1987	Physicist, National Bureau of Standards
1977-1979	Postdoctoral Research Associate, Indiana University and Chalmers University, Göteborg, Sweden (with Professor G.D. Mahan)
1971-2,1974-6	Teaching Assistant, Princeton University
1970	Plasma Physics Summer Research Assistant, Yale University

## HONORS, AWARDS AND FELLOWSHIPS:

- 2017 Hedersdoktor (Honoris Causus Doctorate), Chalmers University of Technology
- 2007 Fellow, American Association for the Advancement of Science
- 2007 Foreign Member, Royal Swedish Academy of Sciences
- 2007 Member, Connecticut Academy of Sciences
- 2007 Oliver E. Buckley Prize of the American Physical Society  
(with AH MacDonald and JP Eisenstein)
- 2006 Member, National Academy of Sciences
- 2005 Eugene Higgins Professorship in Physics, Yale University
- 2004 Fellow, American Academy of Arts and Sciences
- 2003 First recipient of Yale's Conde Award for Teaching Excellence in  
Physics, Applied Physics and Astronomy
- 1992 Distinguished Professor, Indiana University
- 1989 Fellow, American Physical Society
- 1983 Department of Commerce Bronze Medal for Superior Federal Service
- 1971–1974 National Science Foundation Graduate Fellow (University  
of Maine and Princeton University)
- 1971 Phi Beta Kappa (Bates College)
- 1968–1971 Charles M. Dana Scholar (Bates College)

**GRANTS RECEIVED OR IN PROGRESS:**

Title	Agency	Start Date	End Date	Total
Strongly Correlated Quantum Systems	NSF	10/1/88	9/30/91	\$330,000
Strongly Correlated Quantum Systems	NCSA	10/1/89	9/30/90	200 Hours of CRAY CPU
Superconductors in Extremely Strong Magnetic Fields	DOE (MISCON)	9/15/90	9/15/91	\$100,000
Strongly Correlated Quantum Systems	NCSA	4/1/91	3/31/94	1,200 Hours of CRAY CPU
Quantum Effects in High-Temperature Superconductors	DOE (MISCON)	7/21/91	7/20/92	\$101,000
Strongly Correlated Quantum Systems	NSF	11/1/91	10/30/94	\$480,000
Quantum and Statistical Mechanics of High-Temperature Superconductors	DOE (MISCON)	7/21/92	7/20/93	\$120,000
Quantum and Statistical Mechanics of High-Temperature Superconductors	DOE (MISCON)	7/21/93	7/20/94	\$90,000
Condensed Matter Theory	NSF	11/1/94	10/30/97	\$528,000
Quantum and Statistical Mechanics of High-Temperature Superconductors	DOE (MISCON)	7/21/94	7/20/95	\$90,000
Quantum and Statistical Mechanics of High-Temperature Superconductors	DOE (MISCON)	7/21/95	7/20/96	\$90,000
Quantum and Statistical Mechanics of High-Temperature Superconductors	DOE (MISCON)	7/21/96	7/20/97	\$90,000
Magneto Transport in 2D Systems Int. Travel Grant	NSF-INT	9/1/96	10/30/98	\$39,020
Acquisition of a Distributed Computation and Immersive Visualization Environment for Complex Systems	NSF	9/1/96	8/31/98	\$1,204,208

Title	Agency	Start Date	End Date	Total
Condensed Matter Theory	NSF	11/1/97	10/30/00	\$597,000
Statistical Mechanics of High $T_c$ Superconductors	DOE (MISCON)	7/21/97	7/20/98	\$90,000
Statistical Mechanics of High $T_c$ Superconductors	DOE (MISCON)	7/21/98	7/20/99	\$90,000
Statistical Mechanics of High $T_c$ Superconductors	DOE (MISCON)	7/21/99	7/20/00	\$29,081
U.S. Summer School in Condensed Matter Physics	NSF	3/1/00	8/1/05	\$780,000
Condensed Matter Theory	NSF	11/1/00	10/30/03	\$522,000
Experiments in Quantum Coherence and Computation with Single Cooper-Pair Electronics	ARO-43387-PH-QC	4/1/02	6/31/05	\$1,254,384
Keck Foundation Center for Quantum Information Physics	Keck Foundation	2002	2005	\$1,200,00
Condensed Matter Theory	NSF	12/1/03	11/31/06	\$540,000
Center for Quantum Information Physics	NSF-ITR	9/1/03	8/21/07	\$2,800,000
Boulder Summer School in Condensed Matter and Materials Physics	NSF-DMR-6355660	3/1/05	2/28/10	\$1,366,401
RF Control and Measurement of Cooper Pair Box Qubits	LPS-ARO W911NF-05-1-0365	7/1/05	6/30/09	\$4,150,000
Condensed Matter Theory	NSF	12/1/06	11/31/10	\$540,000
Center for Quantum Information Physics	NSF-FRG	8/22/07	8/21/11	\$2,800,000

RF Control and Measurement of Cooper Pair Box Qubits	ARO-LPS	09/01/09	08/30/13	\$6,000,000
Yale High Performance Computational Center	NSF MRI	09/01/08	08/31/11	\$500,000
Condensed Matter Theory	NSF DMR-0603369	09/01/06	04/30/10	\$660,000
Materials Limits on Coherence in Charge Qubits	IARPA ARO	05/01/09	04/30/14	\$11,479,333
Boulder Summer School in Condensed Matter and Materials Physics	NSF-DMR-0969083	2010	2015	\$1,450,000
Condensed Matter Theory	NSF DMR-1004406	09/01/10	8/31/13	\$570,000
Condensed Matter Theory	NSF DMR-1301798	09/15/13	8/31/16	\$420,000
Quantum Computation and Communications: Error-Corrected Quantum Registers for a Modular Superconducting Quantum Computer	ARO-LPS	11/27/13	8/31/18	\$13,967,090
Condensed Matter Theory	NSF-DMR-1609326	9/1/2016	8/31/2019	\$420,000
Boulder Summer School in Condensed Matter and Materials Physics	NSF-DMR-1560837	1/1/17	12/31/21	\$1,260,000

Towards Fault-Tolerance in a Hardware-Efficient Modular Architecture (multi-PI)	ARO W911NF1810212	5/31/18	8/31/2022	\$16,000,000
Hybrid Quantum Systems (theory share)	DOE DE-SC0019406	9/14/18	9/14/2021	\$331,650
Co-Design Center for Quantum Advantage	DOE	9/1/2020	8/31/25	\$115,000,000
MURI: Towards Robust Scalable Quantum Random Access Memories (theory share with Shruti Puri)	AFOSR FA9550-21-1-0209	6/1/2021	5/31/2026	\$418,550
“Towards Fault-Tolerant Bosonic Quantum Computation” (Proposal and budget approved; start date is estimated)	ARO	1/1/2023	12/31/2027	\$17,837,571

## SELECTED PROFESSIONAL ACTIVITIES:

### LECTURESHIPS, INVITED LECTURES, SUMMER SCHOOLS

‘Progress and Prospects for the Second Quantum Revolution,’ 2021 Robert F. Christy Lecture, Caltech, October 21, 2021.

‘A Brief History of Superconducting Qubits,’ Plenary Lecture, QC40: Physics of Computation Conference 40th Anniversary, MIT Endicott House, May 6, 2021 (Video can be seen at: <https://m.youtube.com/watch?v=xjlGL4Mvq7A> )

‘Introduction to Quantum Error Correction and Fault Tolerance,’ Lecture Course at the Les Houches Summer School on Quantum Information Machines, July 1-26, 2019.

‘Entanglement Entropy, Maxwell’s Demon and Quantum Error Correction,’ Theory Winter School on Quantum Information Meets Many-Body Physics: Entanglement, Thermalization and Chaos, January 8-12, 2018, National Magnet Laboratory, Tallahassee, FL.

‘Schrödinger Cats, Maxwell’s Demon and Quantum Error Correction,’ 3 hours of lectures, Brandeis IGERT Summer School, June 25-26, 2018.

‘Introduction to Circuit QED,’ NSF/DOE Quantum Science Summer School (QS3): Fundamentals and Applications of Quantum Computing, Johns Hopkins University, June 5-7, 2017.

‘Introduction to Circuit QED,’ ITAMP/B2 Institute Winter Graduate School on AMO Physics, Tucson, AZ, January, 2017.

‘Introduction to Circuit QED,’ Workshop on Thermodynamics and non-equilibrium phenomena at quantum interfaces of light and matter, Cambridge University, Cambridge, UK, September 2016. .

‘Introduction to Circuit QED,’ Les Houches Summer School, July, 2016.

‘Introduction to Circuit QED,’ three pedagogical lectures at the Capri Spring School on Transport in Nanostructures 2016, Comune di Anacapri, Isola di Capri, Italy, April 10-16, 2016.

‘Introduction to Circuit QED,’ two pedagogical lectures at the QUTE-EUROPE Summer School 2015 on Quantum Simulation and Computation: From fundamentals to applications and implementations, Hindås, Sweden June 23, 2015.

‘Introduction to Circuit QED,’ Princeton-TAMU Summer School, Casper, WY, July 23, 2014.

‘Introduction to Circuit QED,’ Singapore Summer School of Physics, May 28 - June 1, 2012 (10 hours of pedagogical lectures).

‘Recent Progress in Circuit QED,’ Royal Swedish Academy of Sciences, Stockholm, Sweden, November 16, 2011.

‘Quantum Control of Mesoscopic Systems,’ Rapporteur Presentation, Centennial Solvay Conference, Brussels, Belgium, October, 2011.

‘Wiring up Quantum Systems: Fun with Artificial Atoms and Microwave Photons,’ Einstein Colloquium, Weizmann Institute of Science, Rehovot, Israel, March 17, 2011.

‘Superconducting Quantum Bits and Circuit QED,’ 11 hours of Lectures at Les Houches Summer School on ‘Quantum Machines,’ July 4-15, 2011, Les Houches, France.

‘Wiring Up Quantum Systems,’ Royal Swedish Academy of Sciences, Stockholm, Sweden, October 6, 2010.

‘Circuit QED: Quantum Optics of Electrical Circuits,’ Collège de France, January 28, 2008

Ingersoll Lecture, University of Wisconsin, October 3, 2007

‘Off-Diagonal Long-Range Order and Collective Excitations in the Fractional Quantum Hall Effect,’ Buckley Prize Lecture, APS March Meeting, March 6, 2007.

‘Quantum Mechanics with Electrical Circuits: Artificial Atoms with Wires Attached,’ AAAS Meeting, San Francisco, CA, February 17, 2007.

‘Quantum Optics of Electrical Circuits,’ 3 Lectures, PCCM Summer School, Princeton University, July 8-9, 2006.

‘Atomic Physics with Electrical Circuits,’ Plenary Lecture, Gordon Research Conference on Quantum Information, Il Ciocco, Italy, May 7, 2006.

‘Atomic physics and quantum optics with superconducting electrical circuits,’ Ehrenfest Colloquium, Leiden University, October 4, 2006

‘The Future of Condensed Matter Physics,’ Chinese Academy of Science, Beijing, P.R. China, June 8, 2005

‘The Future of Condensed Matter Physics,’ Purdue University Centennial Celebration, April 16, 2005

‘Theory of the Fractional Quantum Hall Effect,’ Séminaire Poincaré, Paris, France, November 13, 2004

‘The Future of Condensed Matter Physics,’ Plenary Lecture, March APS Meeting, Austin, TX, March 3, 2003.

Invited Lecture, “Physics of Quantum Bits and Quantum State Control in Electrical Circuits: Artificial Superconducting ‘Atoms’,” International Conference on Theoretical Physics, Paris, UNESCO, 22-27 July 2002.

Arthur O. Williams Lectureship, ‘Physics of Quantum Computers,’ Brown University, March 11, 2002.

Invited Lecture, ‘DC Transformer and DC Josephson(-like) Effect in Quantum Hall Bilayers,’ Nobel Symposium on Quantum Coherence, Chalmers University, Göteborg, Sweden, December 6, 2001.

Student Day Lecturer, ‘Quantum Spins and Quantum Phase Transitions,’ Int. Conf. on Recent Progress in Many-Body Theories, RPMBT-11, Manchester, England, July 8, 2001.

Invited lecture, ‘Theory of Edge Tunneling between two lateral Quantum Hall Systems,’ March APS Meeting, Seattle, WA, March 16, 2001.

Swedish Physical Society ‘Fysikdaggar’ Meeting for high school physics teachers in Sweden. Invited lecture, ‘Mr. Feynman’s Quantum Mechanics,’ Göteborg, Sweden, November 12, 1999. Developed two optics demonstrations suitable for use in high schools and developed a related web site for use by teachers [see <http://pantheon.yale.edu/~smg47/>]

Invited Lecture, ‘Exotic Order in Quantum Hall Ferromagnets,’ Centennial Symposium on the History of Semiconductors, American Physical Society Meeting, March, 1999 [Audio and slides available from the APS via a link on my web page.]

Visiting Professor, l’Institut Henri Poincaré, Paris, May–June, 1999

Lecturer at the Jerusalem Winter School, Jerusalem, Israel, January 1999

‘The Quantum Hall Effect: Novel Excitations and Broken Symmetries,’ 11 hours of lectures at L’Ecole d’Eté de Physique Théorique, Les Houches, France, July, 1998.

Center for Theoretical Physics Distinguished Lecturer, University of Maryland, College Park, MD, April 7-8, 1998

Indiana University Phi Beta Kappa Lecture, ‘Superconductivity for Poets,’ April 19, 1995

Lecturer at the Spring College in Condensed Matter on ‘Quantum Phases’, International Center for Theoretical Physics, Trieste, Italy, June 3–10, 1994

## PUBLIC LECTURES

‘Progress and Prospects for the Second Quantum Revolution and the Race to Build “Impossible” Computers,’ (Virtual) Public Lecture, Facility for Radioactive Isotope Beams, Michigan State University, October 2, 2022.

‘Progress and Prospects for the Second Quantum Revolution,’ Hamilton Lecture, Princeton University, Princeton, NJ, April 21, 2022.

Public conversation with author and Poynter Fellow, Philip Ball, on quantum weirdness and the second quantum revolution (with Steven Girvin and Douglas Stone, Yale Quantum Institute, September 27, 2018).

‘Moneta Sicura con la Fisica Quantistica?,’ Tavola Aperta, Istituto Italiano per gli Studi Filosofici, Naples Italy, April 8, 2016.

‘Exploring the Quantum: A conversation with Michel Devoret, Steven Girvin and Robert Schoelkopf,’ public lecture at the Segal Theatre, CUNY Graduate Center, New York, NY, November 2, 2011.

‘Quantum Money, Information and Computation,’ University of Maine Homecoming Weekend, October 25, 2008.

Public Panel Discussion, 2008 Solvay Conference, Brussels, Belgium, October, 2008.

‘Quantum Money, Teleportation and Computation,’ Aspen Center for Physics Public Lecture Series, July 20, 2006.

‘Quantum Money, Information and Computation,’ Boulder Summer School, University of Colorado, Boulder, CO, July 12, 2004

‘Mr. Feynman’s Quantum Mechanics: A Field Guide for Curious Characters,’ Boulder Summer School, University of Colorado, Boulder, CO, July 24, 2000.

‘Mr. Feynman’s Quantum Mechanics: A Field Guide for Curious Characters,’ Kavli Institute for Theoretical Physics, UCSB, Santa Barbara, CA, November 8, 2000.

Hamilton Lecturer, Princeton University, Princeton, NJ, March 30, 1993.

#### QUANTUM CIRCUITS, INC.

Member, Scientific Advisory Board, 2021-

#### AMERICAN PHYSICAL SOCIETY

Division of Quantum Information (DQI) Fellowship Committee, 2022-23

Rolf Landauer and Charles H. Bennett Award in Quantum Computing Selection Committee, 2019-20

Task Force on Open Access Publications, 2014

Nominating Committee Chair-Elect 2009-10, Chair 2010-11

Organizer, APS Tutorial on Solid State Implementations of Cavity QED, APS March Meeting, Baltimore, MD, March 12, 2006

APS Fellowship Committee, 2005-2007

Member at Large, Executive Committee, Division of Condensed Matter Physics, 2001-2004

Divisional Associate Editor, Physical Review Letters, 2000-2002

Participant, ‘Students Lunch with the Experts,’ March 2001 and March 2003 APS Meetings

Participant, ‘Lunch with High School Physics Teachers,’ March 2001 APS Meeting, Seattle

## NATIONAL ACADEMY of SCIENCES

Chair, Theory Screening Committee, Section 33, 2009

Member, NAS Strategic Planning Committee (2019)

Member, AMO 2020 Decadal Survey Committee (2018-2019)

## ROYAL SWEDISH ACADEMY of SCIENCES

Member, International Program Committee, Nobel Symposium on Emerging Quantum Technologies, 2018-22

## SIMONS FOUNDATION

Founding Member, Scientific Advisory Board for the Mathematical and Physical Sciences, 2011-13

Founding Member, Scientific Advisory Board for the Flatiron Institute, 2017-

## SOLVAY CONFERENCES

Public Panel Discussion, 2008 Solvay Conference on *Quantum Theory of Condensed Matter*

Rapporteur, 2011 Centennial Solvay Conference on *The Theory of the Quantum World*

Member, Organizing Committee, 2020 Solvay Conference on *The Physics of Quantum Information* (Delayed due to Covid-19 to May, 2022)

## JOURNAL CLUB FOR CONDENSED MATTER PHYSICS

Corresponding Member, 2005-

Member, Advisory Board, 2019- <https://www.condmatjclub.org/>

## NSF QUANTUM LEAP CHALLENGE INSTITUTE for ROBUST QUANTUM SIMULATION, (U. Maryland)

Member, External Advisory Board, 2021-26

## THOULESS INSTITUTE FOR QUANTUM MATTER, University of Washington

Member, External Advisory Board, 2019-

Invited Speaker, Inaugural Conference, January 18-20, 2020

## INSTITUTE FOR QUANTUM INFORMATION AND MATTER (IQIM), Caltech

Member, Advisory Board, 2011-13, 2018-22

## JOINT QUANTUM INSTITUTE (NIST-U. Maryland)

Member, PFC Advisory Board, 2009-2019

Chair, NIST Independent Review Panel, 2010

CENTER FOR QUANTUM INFORMATION AND CONTROL (CQUIC), U. New Mexico

Chair of the External Advisory Board, 2016-2020

WALLENBERG CENTER FOR QUANTUM TECHNOLOGY

Chair of the Scientific Advisory Board, 2018-

PRINCETON UNIVERSITY

Member, Physics Department Advisory Council, 2009-15 (Chair, 2011, 2014)

Chair, Provost's External Evaluation Committee for the Princeton Initiative in Quantum Science and Engineering, 2022-23

MIT-HARVARD CENTER FOR ULTRACOLD ATOMS

Member, Advisory Board, 2008-2011

NORDIC INSTITUTE for THEORETICAL PHYSICS (NORDITA)

Member, Scientific Advisory Committee, 2011-14

Member, Scientific Advisory Committee for the NORDITA - Wallenberg Initiative in Networks and Quantum Information (WINQ), 2021-

WINQ Faculty Search Committee, 2022

INSTITUTE FOR THEORETICAL ATOMIC, MOLECULAR AND OPTICAL PHYSICS (Harvard Smithsonian ITAMP)

Member, Advisory Board, 2008-2011

GORDON RESEARCH CONFERENCES

Member-at-Large of the Council, 2009-2011

KAVLI INSTITUTE FOR THEORETICAL PHYSICS

Chairman of the Advisory Board, Institute of Theoretical Physics, University of California at Santa Barbara (1997–98) [Member of the Board (1995–99)]

co-Director (with M. P. A. Fisher, A. H. MacDonald and S. DasSarma), ITP Program on Disorder and Interactions in Quantum Hall and Mesoscopic Systems, Institute for Theoretical Physics, UCSB, Santa Barbara, CA August-December, 1998

High Tc Program and General Member (Sabbatical Leave) ITP, September 2000 - June 2001.

Chair, KITP Director Search Committee, 2009-10

Scientific Advisor, Program on ‘Many-Body Localization’ (2015)

Scientific Advisor, Program on ‘Many-Body Physics with Light’ (2015)

#### ASPEN CENTER FOR PHYSICS

General Member, July 1990–1994; 1999-2004.

Member, Nominations Committee and Summer Program Committee, 1991–1993.

Member, NSF Grant Renewal Committee, 2000

Member, Admissions Committee, 1995, 2001

Member, Nominations Committee, 2003

Member, Presidential Search Committee, 2003-4

Co-organizer (with J. Serene) of Workshop on Unconventional Superconductors, July 3–August 6, 1989.

Co-organizer (with A. H. MacDonald and S. DasSarma) of Workshop on ‘New Phases in Low-Dimensional Electron Systems,’ July 5 - August 5, 2000.

Co-Organizer (with M. Devoret, L. Glazman, and C. Marcus), 2006 Aspen Center for Physics Workshop ‘Coherence, Interactions and Control in Mesoscopic Systems’

THEORETICAL PHYSICS INSTITUTE, University of Minnesota (Member of the Advisory Board, 2009-14)

#### BOULDER SUMMER SCHOOL IN CONDENSED MATTER PHYSICS

Co-founder of the Boulder Summer School in Condensed Matter and Materials Physics, held annually in Boulder, CO for a period of 4 weeks beginning in July, 2000. See: <http://boulderschool.yale.edu/>

#### INSTITUTE OF PHYSICS (IOP)

Member, Prize Selection Committee, IOP Publishing Awards for Quantum Science, 2023

## CONFERENCES

Member, Organizing committee of IWSSQC (10th International Workshop on Solid State Quantum Computing)

Co-organizer (with Jonathan Keeling, Michael Hartmann and Peter Littlewood), Theo Murphy Meeting on ‘Many body quantum optics and correlated states of light,’ Chicheley Hall, Kavli Royal Society International Centre, Buckinghamshire, October 28-29, 2013.

Co-Organizer (with Seamus Davis), Gordon Research Conference on Strongly Correlated Electronic Systems, Mt. Holyoke, MA, June 18-22, 2006.

Member, International Advisory Board, International Conference on Low Temperature Physics

LT24 (2004-2005)

LT29 (2019-22)

Vice Chair, 2004 Condensed Matter Gordon Conference on Strongly Correlated Electrons

Co-organizer, Boulder Summer School on ‘Coherence in Atomic and Condensed Matter Systems,’ July, 2004.

Co-organizer, Minnesota Theoretical Physics Institute Meeting on ‘Correlation Effects in Bose Condensates and Optical Lattices’, May 2-4, 2003

Member, Programme Committee of the European Physical Society Condensed Matter Division Conference, Brighton, England, 7-11 April, 2002

Member, National Advisory Committee, 2001 International Conference on Strongly Correlated Electron Systems, 2000-2001

Member, Advisory Committee for International Conference on Physical Phenomena at High Magnetic Fields-IV, Tallahassee, FL, October 19-25, 2001

Co-organizer, First Lunqvist Research Conference on the Advancing Frontiers of Condensed Matter Physics: “Quantum Phases of Strongly Interacting Electrons in Low-dimensions”, ICTP, Trieste, Italy, July 26-30, 1999.

Member, Advisory Committee for International Conference on Electron Transport in Mesoscopic Systems, Göteborg, Sweden, August 12-15, 1999

Member, Advisory Committee for International Conference on Physical Phenomena at High Magnetic Fields-III, Tallahassee, FL, October 24-27, 1998

Organizer, Winter School on “Anyons, Fractional Statistics and 2D Magnetism”, International Center for Condensed Matter Physics, Brasilia, Brazil, July 8–19, 1991.

Co-organizer Midwest Solid State Theory Meeting, Bloomington, IN, October 9–10, 1989.

Member of first delegation of western scientists to be permitted to visit the Institute of Solid State Physics, Chernogolovka, USSR as part of the “First Soviet-American Bilateral Meeting on Electronic Properties of Two-Dimensional Systems”, June 1988.

Member Program Committee for Sixth International Conference on Electronic Properties of Two-Dimensional Systems, 1987.

## PANELS, BOARDS AND COMMITTEES

Member, NSF Confidential Proposal Review Panel, 2020

Member, NSF Confidential Preproposal Review Panel, 2020

Member, External Advisory Board, NSF Physics Frontier Center for the Physics of Biological Function (Princeton and CUNY), 2017-22

Chair, Divisional Evaluation Committee (tenure committee), Yale-NUS College (2018-19)

Member, External Review Committee, Oxford University Department of Physics, 2014

Member, Fritz London Prize Committee, 2013-14, Chair, 2015-17, Past Chair, 2018-20

External Review Committee for Department of Physics, Bates College, 2007

Member, Search Committee for Chair in Theoretical Condensed Matter Physics, Fine Theoretical Physics Institute, University of Minnesota, 2006-7

Member, NSF Nano-Science Review Panel, 2005

Chair, External Advisory Committee, U. Chicago MRSEC, 2004-2006

External Honors Theses Examiner, Bates College, April 2004

Member, 2004 NSF ad hoc Committee on Theoretical Physics

Member, International Advisory Board, Nanodev Center, Chalmers University, Göteborg, Sweden (2003–)

Member, NSERC External Review Committee, Canadian Institute for Advanced Research, 2002

Member, External Visiting Committee, Institute for Fundamental Theory, University of Florida, 2002–

Buckley Prize Committee of the American Physical Society, Vice Chair (2000), Chair (2001)

Member, External visiting committee reviewing all science departments at Brown University, October 17-19, 1999.

Member, Board of Directors, Habitat for Humanity, Monroe County Chapter 1999-2001.

Member, McMillan Prize Committee, 1999-2002

Member, External Review Committee, Department of Physics, University of Virginia, February, 1998

Member, Special Emphasis Panel on the Materials Theory Program [NSF Internal Review], 1997

Member, National Research Council Panel writing the decadal report on Condensed Matter and Materials Physics, 1996–1998. Coauthor (with C. Wieman) of the chapter on quantum physics for the Physics Overview Volume (2000).

Member, Advisory Board for Radio Program “A Moment of Science”, 1993–2001.

Member, NSF Site Visit Panel for the Stanford MRL, October 29–30, 1991.

Member, NSF Presidential Young Investigator Award Review Panel, December 12–13, 1989.

### **Postdoctoral Associates and Visitors Supervised**

Pui K. Lam	Michael J. DeWeert
Michael D. Johnson	Geoffrey Canright
Claudius Gros	René Côté
Arthur Smith	Mats Wallin
Kieran Mullen	Charles Hanna
Volker Meden	Carsten Timm
William Atkinson	Hsiu-Hau Lin
Heidi Kjønsgberg	Ramin Abolfath
Erik S. Sørensen	Juergen König
Ankiet Nguyen	John Schliemann
Aashish Clerk	Krishnendu Sengupta
Adam Durst	M-H Chung (visiting Prof.)
Alexandre Blais	Andreas Isacson
Florian Marquardt	Min-Chul Cha (visiting Prof.)
Jay Gambetta	Kyungsun Moon (visiting Prof.)
Vadim Oganessian	Jens Koch
Andreas Nunnenkamp	Eran Ginossar
Lev Bishop	Kjetil Børkje
Dong Zhou	Simon Nigg
Matti Silveri	Claudia De Grandi
Huaxui Zheng	Richard Brierley
Yaxing Zhang	Juha Salmilehto
José Lebreuilly	Shruti Puri
Micheline Soley	Baptiste Royer
Kevin Smith	Daniel Weiss

## Ph.D. Students Supervised

Carlo Canali (1992)	Min-Chul Cha (1992)
Asad Rana (1994)	Kun Yang (1994)
Kyungsun Moon (1994)	Ross Hyman (1996)
Patrik Henelius (1998)	Jairo Sinova (1999)
Ning Ma (2001)	Kuiru Li (2002)
Aditi Mitra (2002)	Prabuddha Chakraborty (2004)
Ren-Shou Huang (2004)	Lev Bishop(2010)
George Mias (2007)	Terri Yu (MS, 2012)
Martin Lindén (visitor 2002)	Anders Vestergren (visitor 2002)
Roberto Doretto (visitor 2002)	Mara Baraban (2010)
John Challis (2009)	Uri Vool (2017) (co-dir. with M. Devoret)
Alex Petrescu (2015) (co-dir. with Karyn Le Hur)	Pavel Kurilovich (2019-21)
Connor Hann (2021)	Shraddha Singh (2019-)
Shifan Xu (2021-) (co-dir. with Yongshan Ding)	

## Senior Theses Supervised

K. Canfield (2003)	T. Athanassiadou (2003)
A. Mukherjee (2003)	Clifford Cheung (2004)
J. Chen (2006)	Daniel Rubin (2007)
David Price (2008)	Eli Luberoff (2009)
Jack O'Connor (2009)	Chris Zeng (2014)
Dante Bolzan (2018)	Ryan Lim (2018-19)
Gideon Lee (2020-21)	Michael Ogego (2020-21)
Huaijin (Jean) Wang (2021-22)	Will Sun (2021-22)
Allen Mi (2022)	Gabriel Mesa (2022)
Richard Li (2022)	

## SEMINARS, COLLOQUIA AND INVITED TALKS AT CONFERENCES

Steven M. Girvin

1. “Electron-phonon Dynamics and Transport Anomalies in Random Metal Alloys”, University of Virginia, Charlottesville, VA, September 1979.
2. “Transport in Random Metal Alloys”, American Physical Society, New York, NY, March 1980.
3. “Theory of Transport Anomalies in Random Metals”, University of Maryland, College Park, MD, May 1980.
4. “Transport Anomalies in Highly Disordered Metal Alloys”, Department of Physics, University of Pennsylvania, Philadelphia, PA, October 1980.
5. “Transport Anomalies in Highly Disordered Metal Alloys”, Department of Physics, University of Chicago, Chicago, IL, October 1980.
6. “Superionic Conductors”, Amoco Research Center, Naperville, IL, October 1980.
7. “Resonance Photoemission Satellites in  $d$  Band Materials”, 26th Magnetism and Materials Conference, Dallas, TX, November 1980.
8. “Transport Anomalies in Highly Disordered Metal Alloys”, Physics Department Colloquium, Texas A & M University, College Station, TX, November 1980.
9. “The Quantum Hall Effect”, Physics Department, Indiana University, Bloomington, IN, April 1981.
10. “Field Theory of Anderson Localization”, Physics Department, Indiana University, Bloomington, IN, April 1981.
11. “The Quantum Hall Effect”, Second International Conference on Precision Measurements and Fundamental Constants, NBS, Gaithersburg, MD, June 1981.
12. “Quantum Mechanics of Randomly Disordered Systems”, Statistical Physics Seminar, NBS, Gaithersburg, MD, June 4, 1981.
13. “Field Theory of Anderson Localization: A New Approach”, NORDITA Workshop in Condensed Matter Physics, Göteborg, Sweden, June 19, 1980.
14. “Theory of the Quantum Hall Effect”, NORDITA Headquarters, Copenhagen, Denmark, June 26, 1981.
15. “Quantum Hall Effect: Role of Inversion Layer Geometry and Random Impurity Potential”, Fourth International Conference on Electronic Properties of Two-Dimensional Systems”, New London, NH, August 25, 1981.

16. "The Quantum Hall Effect", Physics Department Colloquium, Notre Dame University, South Bend, IN, September 23, 1981.
17. "The Quantum Hall Effect", Physics Department Colloquium, Cornell University, Ithaca, NY, November 16, 1981.
18. "Theoretical Aspects of the Quantized Hall Effect", Center for Absolute Physical Quantities Colloquium, NBS, Gaithersburg, MD, March 17, 1982.
19. "Thermopower of Inversion Layer Landau Levels", American Physical Society Meeting, Dallas, TX, March 1982.
20. "New Field Theory Formulation of Localized States in Disordered Systems", American Physical Society Meeting, Dallas, TX, March 1982.
21. "The Quantum Hall Effect and the Fine Structure Constant", Physics Department, Case Western University, Cleveland, OH, January 19, 1983.
22. "The Quantum Hall Effect and the Fine Structure Constant", Physics Department, University of Virginia, Charlottesville, VA, January 28, 1983.
23. "The Quantum Hall Effect and the Fine Structure Constant", Physics Department Colloquium, Indiana University, Bloomington, IN, February 23, 1983.
24. "Fractional Quantum Numbers and the Anomalous Quantum Hall Effect", Surface Science Division Seminar, NBS, Gaithersburg, MD, March 3, 1983.
25. "Anomalous Quantum Hall Effect", (co-author M. Jonson) American Physical Society Meeting, Los Angeles, CA, March 21, 1983.
26. "Inversion Layer Thermopower in High Magnetic Fields", (co-author M. Jonson) American Physical Society Meeting, Los Angeles, CA, March 21, 1983.
27. "The Quantum Hall Effect and the Fine Structure Constant", Physics Department, Howard University, Washington, D.C., April 8, 1983.
28. "Some Thoughts on Anomalous Quantum Hall Effect", Department of Physics and Astronomy, University of Maryland, College Park, MD, May 4, 1983.
29. "The Anomalous Quantum Hall Effect", Solid State Theory Group, Exxon Research Laboratories, Elizabeth, NJ, May 31, 1983.
30. "The Quantum Hall Effect", Physics Department Seminar, University of Delaware, Newark, DE, September 27, 1983.
31. "Rough Surfaces and Random Interfaces: Scattering of Light and Electrons", Statistical Engineering Division Seminar, NBS, October 11, 1983.
32. "The Quantum Hall Effect", Chalmers University, Göteborg, Sweden, November 17, 1983.

33. "The Quantum Hall Effect", Physics Department Colloquium, Purdue University, W. Lafayette, IN, February 2, 1984.
34. "The Quantum Hall Effect", Physics Department, Brown University, Providence, RI, March 8, 1984.
35. "The Quantum Hall Effect", Physics Division, National Research Council of Canada, Ottawa, Canada, May 18, 1984.
36. "Review of the Present Status of the Quantum Hall Effect", Aspen Center for Physics Workshop, Aspen, CO, July 3, 1984.
37. "Collective Excitation Gap in the Fractional Quantum Hall Effect", AT&T Bell Laboratory, Murray Hill, NJ, October 31, 1984.
38. "The Quantum Hall Effect", Solid State Theory Seminar, Oak Ridge National Laboratory, Oak Ridge, TN, November 2, 1984.
39. "Rotons in Superfluid Helium and the Fractional Quantum Hall Effect", Center for Basic Standards Colloquium, National Bureau of Standards, Gaithersburg, MD, January 9, 1985.
40. "Introduction to the Quantum Hall Effect", James Franck Institute Colloquium, University of Chicago, Chicago, IL, January 15, 1985.
41. "Rotons in Superfluid Helium and the Fractional Quantum Hall Effect", Department of Physics, University of Chicago, Chicago, IL, January 16, 1985.
42. "The Quantum Hall Effect", Department of Physics, Catholic University, Washington, D.C., February 21, 1985.
43. "Rotons in Superfluid Helium and the Fractional Quantum Hall Effect", Physics Department, Princeton University, Princeton, NJ, March 6, 1985.
44. "Rotons and Vortices in Superfluid Helium and The Fractional Quantum Hall Effect", Physics Department, University of Maryland, College Park, MD, March 11, 1985.
45. "Collective Excitation Gap in the Fractional Quantum Hall Effect", American Physical Society Meeting, Baltimore, MD, March 26, 1985.
46. "Rotons and Vortices in Superfluid Helium and the Fractional Quantum Hall Effect", Physics Department, SUNY, Stony Brook, NY, April 26, 1985.
47. "Rotons and Vortices in Superfluid Helium and the Fractional Quantum Hall Effect", Physics Department, University of Minnesota, Minneapolis, MN, May 6, 1985.
48. "Introduction to the Quantum Hall Effect with Applications to Ga As Heterostructures", Center for Microelectronics and Information Science, University of Minnesota, Minneapolis, MN, May 7, 1985.

49. “Rotons, Vortices and Superfluidity in the Fractional Quantum Hall Effect”, Institute of Theoretical Physics, University of California, Santa Barbara, CA, June 4, 1985.
50. “Introduction to the Quantum Hall Effect”, Department of Materials Science, Harry Diamond Laboratories, Adelphi, MD, August 12, 1985.
51. “Fractional Quantum Hall Effect: Superfluidity, Magneto-Rotons and Fractionally Charged Vortices”, International Conference on Magnetism and Magnetic Materials, San Francisco, CA, August 30, 1985.
52. “Introduction to the Quantum Hall Effect”, Physics Department, Texas A&M University, College Station, TX, September 26, 1985.
53. “Introduction to the Quantum Hall Effect”, University of British Columbia, Vancouver, B.C., Canada, October 17, 1985.
54. “Wave Functions for the Fractional Quantum Hall Effect”, Department of Physics, University of Maryland, College Park, MD, October 28, 1985.
55. “The Quantum Hall Effect”, Physics Department, University of Maryland, College Park, MD, October 29, 1985.
56. “Collective Excitations in the Fractional Quantum Hall Effect”, Physics Department, University of Maryland, College Park, MD, November 11, 1985.
57. “Unsolved Problems in the Quantum Hall Effect”, Physics Department, University of Maryland, College Park, MD, November 18, 1985.
58. “Collective Excitations in the Fractional Quantum Hall Effect”, Institute of Theoretical Physics, Chalmers University, Göteborg, Sweden, December 4, 1985.
59. “The Fractional Quantum Hall Effect: Superfluidity, Rotons and Fractionally Charged Vortices”, University of Virginia, Physics Department, Charlottesville, VA, February 28, 1986.
60. “Collective Excitations in the Fractional Quantum Hall Effect: Superfluidity, Phonons, Rotons, and Fractionally Charged Vortices”, American Physical Society Meeting, Las Vegas, NV, March 31, 1986.
61. “The Fractional Quantum Hall Effect: Superfluidity, Phonons, Rotons and Fractionally Charged Vortices”, Department of Physics, Massachusetts Institute of Technology, Cambridge, MA, June 3, 1986.
62. “Collective Excitations in the Fractional Quantum Hall Effect”, Fourth Summer Institute of Theoretical Physics, Queen’s University, Kingston, Ontario, Canada, July 15, 1986.
63. “Collective Excitations in the Fractional Quantum Hall Effect”, NORDITA Conference on Fundamental Effects in Semiconductors, Copenhagen, Denmark, August 7, 1986.

64. “The Quantum Hall Effect”, Virginia Commonwealth University, Physics Dept., Richmond, VA, November 18, 1986.
65. “Off-Diagonal Long-Range Order, Oblique Confinement and the Fractional Quantum Hall Effect”, University of Minnesota, Physics Dept., Minneapolis, MN, November 13, 1986.
66. “The Fractional Quantum Hall Effect: Fractionally Charged Vortices, Electrons and Bosons and Other Mysteries”, Physics Department Colloquium, Indiana University, Bloomington, IN, January 21, 1987.
67. “Introduction to Replica Field Theory Methods for Random Systems”, National Research Council of Canada, Ottawa, Ontario, Canada, February 9, 1987.
68. “The Fractional Quantum Hall Effect: Fractionally Charged Vortices, Electrons as Bosons and Other Mysteries”, Surface Science Division Seminar, National Bureau of Standards, Gaithersburg, MD, February 25, 1987.
69. “Off-Diagonal Long-Range Order in the Fractional Quantum Hall Effect”, American Physical Society Meeting, New York Hilton, New York, NY, March 20, 1987.
70. “Theoretical Aspects of the Quantum Hall Effect”, National Academy of Sciences, Washington, D.C., March 24, 1987.
71. “The Fractional Quantum Hall Effect: Fractionally Charged Vortices, Electrons as Bosons and Other Mysteries”, Yale University, New Haven, CT, April 6, 1987.
72. “Phonons, Rotons and Fractionally-Charged Vortices in the Quantum Hall Effect”, NATO Advanced Study Institute on Interfaces, Quantum Wells, and Superlattices, Banff, Alberta (August 16–29, 1987).
73. “Off-Diagonal Long-Range Order in the Quantum Hall Effect”, NATO Advanced Study Institute on Interfaces, Quantum Wells, and Superlattices, Banff, Alberta (August 16–29, 1987).
74. “Off-Diagonal Long-Range Order in the Quantum Hall Effect”, Workshop on “Non-Integrable Phases in Dynamical Systems”, Theoretical Physics Institute, University of Minnesota, Minneapolis, MN, October 1, 1987.
75. “Collective Excitations and Off-Diagonal Long-Range Order in the Fractional Quantum Hall Effect”, 35th Midwest Solid State Physics Conference, University of Notre Dame, Notre Dame, IN, October 20, 1987.
76. “Phonons, Rotons and Fractionally-Charged Vortices in the Quantum Hall Effect”, Physics Department, University of Cincinnati, Cincinnati, OH, October 29, 1987.
77. “Collective Excitations and Fractionally-Charged Vortices in the Quantum Hall Effect”, Physics Department, Cornell University, Ithaca, NY, February 8, 1988.

78. "Collective Excitations and Fractionally-Charged Vortices in the Quantum Hall Effect", Physics Department, Ohio State University, Columbus, OH, April 4, 1988.
79. "Hidden Topological Order in Quantum Spin Chains", Physics Department, Ohio State University, Columbus, OH, April 5, 1988.
80. "Collective Excitations and Fractionally-Charged Vortices in the Quantum Hall Effect", Ohio University, Athens, OH, May 13, 1988.
81. "Hidden Topological Order in Quantum Spin Chains and the Fractional Hall Effect", AT&T Bell Labs, Murray Hill, NJ, April 28, 1988.
82. "Collective Excitations in the Fractional Quantum Hall Effect", Soviet-American Seminar on Electronic Properties of Two-Dimensional Systems, Moscow, USSR, June 1, 1988.
83. "Hidden Topological Order in Quantum Spin Chains and the Fractional Hall Effect", Nobel Symposium on Physics of Low-Dimensional Systems, Gräftåvallen, Sweden, June 8, 1988.
84. "Phonons, Rotons and Fractionally-Charged Vortices in the Quantum Hall Effect", Purdue University, W. Lafayette, IN, September 1, 1988.
85. "Hidden Topological Order in the Fractional Quantum Hall Effect and Quantum Spin Chains", Midwest Solid State Theory Meeting, Cincinnati, OH, October 14, 1988.
86. "Exact Solution of a One-Component, One-Dimensional Coulomb Plasma", Mathematical Physics Seminar, Indiana University, Bloomington, IN, November 3, 1988.
87. "Berry's Phase and Geometry", Mathematical Physics Seminar, Indiana University, Bloomington, IN, November 10, 1988.
88. "Hidden Topological Order in Quantum Spin Chains", University of Virginia, November 17, 1988.
89. "Collective Excitations in the Fractional Quantum Hall Effect", University of Pennsylvania, November 22, 1988.
90. "The Quantum Hall Effect", University of Wisconsin, December 2, 1988.
91. "Introduction to Fractional Statistics", Theoretical Physics Institute, University of Minnesota, February 16, 1989.
92. "Hidden Topological Order in Quantum Spin Chains", Department of Physics, University of Minnesota, February 17, 1989.
93. "Universal Aspects of Transport in Low-Dimensional Systems", Electron Physics Group, NIST, Gaithersburg, MD, March 15, 1989.

94. “Hidden Topological Order in Quantum Spin Chains”, March APS Meeting, St. Louis, MO, March 23, 1989.
95. “Introduction to Fractional Statistics”, Institute of Theoretical Physics, Chalmers University, Göteborg, Sweden, June 8, 1989.
96. “Mean-Field Theory of Fractional Statistics”, Aspen Center for Physics, Aspen, CO, July 10, 1989.
97. “Introduction to Fractional Statistics”, Cornell University, Ithaca, NY, September 21, 1989.
98. “Introduction to Fractional Statistics”, University of Oregon, Eugene, OR, October 26, 1989.
99. “Hidden Topological Order in Integer Quantum Spin Chains”, University of Oregon, Eugene, OR, October 27, 1989.
100. “Introduction to Fractional Statistics”, James Franck Institute, University of Chicago, Chicago, IL, November 13, 1989.
101. “Introduction to Fractional Statistics”, Physics Colloquium, Indiana University, Bloomington, IN, January 31, 1990.
102. “Introduction to Fractional Statistics”, SUNY, Buffalo, NY, February 15, 1990.
103. “Introduction to Fractional Statistics”, Iowa State University, Ames, Iowa, February 26, 1990.
104. “Introduction to Fractional Statistics”, Ohio State University, Columbus, Ohio, April 17, 1990.
105. “Anyons!”, University of Florida, Gainesville, FL, April 26, 1990.
106. “Exactly Soluble Model of Fractional Statistics”, Princeton University, Princeton, NJ, May 29, 1990.
107. “Universal Resistance at the Superconductor-Insulator Transition”, Oak Ridge National Laboratory, Oak Ridge, TN, June 18, 1990.
108. “Some Uses of  $h/e^2$ ”, International Center of Theoretical Physics, Trieste, Italy, August 11, 1990.
109. “Introduction to Fractional Statistics”, University of Notre Dame, Notre Dame, IN, September 5, 1990.
110. “Theory and Implications of the Fractional Quantum Hall Effects”, NATO *Science Forum '90*, Biarritz, France, September 17, 1990.
111. “Introduction to Fractional Statistics”, University of Michigan, Ann Arbor, MI, October 17, 1990.

112. "Introduction to Fractional Statistics", Georgia Institute of Technology, Atlanta, GA, November 7, 1990.
113. "Exactly Soluble Model of Fractional Statistics", University of Illinois, Urbana, IL, November 12, 1990.
114. "Universality and the Superconductor-Insulator Transition in Two Dimensions", Brown University, Providence, RI, November 15, 1990.
115. "Quantum Effects in High-Temperature Superconductors", MISCON Annual Review Meeting, Purdue University, W. Lafayette, IN, January 17, 1991.
116. "Introduction to Fractional Statistics", IUPUI, Indianapolis, IN, January 31, 1991.
117. "Introduction to Fractional Statistics", University of Rochester, Rochester, NY, February 20, 1991.
118. "Introduction to Fractional Statistics", Northwestern University, Evanston, IL, April 3, 1991.
119. "Introduction to Fractional Statistics", Kent State University, Kent, OH, April 11, 1991.
120. "Universal Conductivity at the Superconductor-Insulator Transition in Two-Dimensional Films", Argonne National Lab, Argonne, IL, May 7, 1991.
121. "Universal Conductivity at the Superconductor-Insulator Transition in Two-Dimensional Films", NORDITA, Copenhagen, Denmark, May 17, 1991.
122. "Introduction to Fractional Statistics", Michigan State University, E. Lansing, MI, October 8, 1991.
123. "Universal Conductivity at the Superconductor-Insulator Transition in Two Dimensions", Yale University, New Haven, CT, October 30, 1991.
124. "Universal Conductivity at the Superconductor-Insulator Transition in Two Dimensions", Notre Dame University, South Bend, IN, February 28, 1992.
125. "Universal Conductivity at the Superconductor-Insulator Transition in Two Dimensions", AT&T Bell Laboratories General Colloquium, Murray Hill, NJ, March 3, 1992.
126. "Introduction to Fractional Statistics", Louisiana State University, Baton Rouge, LA, April, 24, 1992.
127. "Introduction to Fractional Statistics", Awards Colloquium, University of Louisville, Louisville, KY, May 1, 1992.
128. "Universal Conductivity of Dirty Bosons in Two Dimensions", McMaster University, Hamilton, Ontario, May 20, 1992.

129. “Quantum and Statistical Mechanics of High-Temperature Superconductors”, DOE Review of Research Projects, Washington, DC, July 29, 1992.
130. “Introduction to Fractional Statistics”, Penn. State University, State College, PA, September 24, 1992.
131. “Introduction to Luttinger Liquids”, University of Umeå, Umeå, Sweden, October 7, 1992.
132. “Renormalization Group Analysis of Luttinger Liquids”, Chalmers University, Göteborg, Sweden, October 9, 1992.
133. “Physics for Poets”, Titled Professors Dinner, IUPUI, Indianapolis, IN, October 30, 1992.
134. “Universal Conductivity of Dirty Bosons in Two Dimensions”, Cornell University, Ithaca, NY, November 11, 1992.
135. “Universal Conductivity of Dirty Bosons in Two Dimensions”, University of Virginia, Charlottesville, VA, December 3, 1992.
136. “Introduction to Fractional Statistics”, University of Virginia, Charlottesville, VA, December 4, 1992.
137. “Quantum and Statistical Mechanics of High-Temperature Superconductors”, MISCON Meeting, Columbia, MO, January 28, 1993.
138. “Just What is Superconductivity Anyway?”, Indiana University, Bloomington, IN, February 3, 1993.
139. “Introduction to Fractional Statistics”, Johns Hopkins University, Baltimore, MD, February 18, 1993.
140. “Just What is Superconductivity Anyway?”, Indiana State University, Terre Haute, IN, March 17, 1993.
141. “Vortex Glass Transition with Columnar Defects”, University of Minnesota, Minneapolis, MN, April 20, 1993.
142. “The Quantum Hall Effect: Universal Physics From Dirty Devices”, University of Minnesota, Minneapolis, MN, April 21, 1993.
143. “Vortex Glass Transition with Columnar Defects”, University of Illinois, Urbana, IL, May 7, 1993.
144. “Vortex Glass Transition with Columnar Defects”, Stanford University, Stanford, CA, May 13, 1993.
145. “Introduction to Fractional Statistics”, University of Stockholm, Stockholm, Sweden, June 4, 1993.

146. “Luttinger Liquids”, Royal Institute of Technology, Stockholm, Sweden, June 7, 1993.
147. “Ferromagnetism in the Two-Layer Quantum Hall Effect”, Chalmers University, Göteborg, Sweden, June 11, 1993.
148. “Luttinger Liquids”, NORDITA, Copenhagen, Denmark, June 21, 1993.
149. “Quantum and Statistical Mechanics of Vortices”, MISCOS Meeting, Notre Dame University, South Bend, IN, July 7, 1993.
150. “Ferromagnetism in the Double-Layer Quantum Hall Effect”, University of Texas, Austin, TX, September 28, 1993.
151. “Just What is Superconductivity Anyway?”, University of Texas, Austin, TX, September 29, 1993.
152. “Just What is Superconductivity Anyway?”, University of Kansas, Lawrence, KS, October 25, 1993.
153. “Ferromagnetism in the Double-Layer Quantum Hall Effect”, University of Florida, Gainesville, FL, November 15, 1993.
154. “Ferromagnetism in the Double-Layer Quantum Hall Effect”, Florida State University, Tallahassee, FL, November 17, 1993.
155. “The Quantum Hall Effect: Universal Physics from Dirty Devices”, University of Oregon, Eugene, OR, February 10, 1994.
156. “The Quantum Hall Effect: Universal Physics from Dirty Devices”, University of British Columbia, Vancouver, BC, February 11, 1994.
157. “The Quantum Hall Effect: Universal Physics from Dirty Devices”, University of Washington, Seattle, WA, February 14, 1994.
158. “Skyrmions, Merons and Vortices in Double-Layer Quantum Hall Systems”, University of Washington, Seattle, WA, February 14, 1994.
159. “Spontaneous Interlayer Coherence in Double-Layer Quantum Hall Systems”, Workshop on Compressible States in the Quantum Hall Effect, Institute for Theoretical Physics, University of Minnesota, Minneapolis, MN, May 1, 1994.
160. Five Lectures at the Spring College in Condensed Matter on ‘Quantum Phases’, International Center for Theoretical Physics, Trieste, Italy, June 3–10, 1994. [“The Superconductor-Insulator Transition I”, “The Superconductor-Insulator Transition II”, “The Superconductor-Insulator III”, “The Vortex Glass Transition with Columnar Defects”, “Spontaneous Phase Coherence in Double Layer Quantum Hall Systems”]
161. “Phase Transitions and Broken Symmetries in Double Layer Quantum Hall Systems”, NORFA Summer School, ‘Physics in 2 + 1 Dimensions’, Spåtin, Norway (1994).

162. “Quantum Hall Effect in Double-Layer Systems”, 11th Int. Conf. on High Magnetic Fields in Semiconductor Physics, MIT, Cambridge, MA, August 8, 1994.
163. “Quantum and Thermal Fluctuations in Short-Coherence-Length Superconductors”, Aspen Center for Physics, Aspen, CO, July, 1994.
164. “Quantum Hall Effect in Double-Layer Systems”, National Institute of Standards and Technology, Gaithersburg, MD, August 4, 1994.
165. ‘Superfluid Helium in Fractal Aerogel,’ James Franck Institute, University of Chicago, January 10, 1995.
166. ‘Superfluid Helium in Fractal Aerogel,’ Purdue University, January 13, 1995.
167. ‘The Quantum Hall Effect: Universal Physics From Dirty Devices,’ University of California, Santa Barbara, CA, February 7, 1995.
168. ‘Topological Excitations in Quantum Hall Ferromagnets,’ Institute for Theoretical Physics, UCSB, Santa Barbara, CA, February, 1995
169. ‘The Quantum Hall Effect: Universal Physics From Dirty Devices,’ Brown University, March, 1995.
170. ‘Topological Excitations in Quantum Hall Ferromagnets,’ Harvard University, Cambridge, MA, March 10, 1995.
171. ‘The Quantum Hall Effect: Universal Physics From Dirty Devices,’ University of Kentucky, April 7, 1995.
172. ‘The Quantum Hall Effect: Universal Physics From Dirty Devices,’ University of Tennessee, April 10, 1995.
173. ‘The Quantum Hall Effect: Universal Physics From Dirty Devices,’ Wayne State University, Detroit, MI, April 13, 1995.
174. ‘Superconductivity for Poets,’ Indiana University Phi Beta Kappa Lecture, April 19, 1995.
175. ‘Topological Excitations in Quantum Hall Ferromagnets,’ National High Field Magnet Laboratory, Tallahassee, FL, May 6, 1995.
176. ‘Superfluid Helium in Fractal Aerogel,’ Chalmers University, Göteborg Sweden, May 30, 1995.
177. ‘Superfluid Helium in Fractal Aerogel,’ Royal Insititute of Technology, Stockholm, Sweden, May 31, 1995.
178. Lecture Series, ‘Introduction to Quantum Critical Phenomena,’ [A series of 5 lectures] Chalmers University, Göteborg, Sweden, June, 1995.

179. 'Topological Excitations in Quantum Hall Ferromagnets,' Laboratoire de Physique des Solides, Université Paris-Sud Orsay, France, July, 1995.
180. 'Quantum Critical Fluctuations in 1D Josephson Junction Arrays,' Service de Physique de l'Etat Condensé, Saclay, Gif sur Yvette, France, July, 1995.
181. 'How to Estimate Anything,' Research Experience for Undergraduates lecture, IUUCF, Bloomington, IN, July 14, 1995.
182. 'The Quantum Hall Effect: Universal Physics From Dirty Devices,' Case Western Reserve University, Cleveland, OH, September 6, 1995.
183. 'Superfluid Helium in Fractal Aerogel,' University of Oklahoma, Norman, OK, September 22, 1995.
184. 'Superfluid Helium in Fractal Aerogel,' University of Illinois, Urbana, IL, October 27, 1995.
185. 'Topological Excitations in Quantum Hall Ferromagnets,' Pacific Conference on Condensed Matter Theory: Complex Materials and Strongly Correlated Systems, Seoul, Korea, December 2, 1995.
186. 'Superfluid Helium in Fractal Aerogel,' Service de Physique de l'Etat Condensé, Saclay, Gif sur Yvette, France, January 18, 1996.
187. 'Introduction to the Quantum Hall Effect,' Plenary Lecture, Moriond Conference, Les Arcs, France, January 24, 1996.
188. 'Topological Excitations in Quantum Hall Ferromagnets,' Moriond Conference, Les Arcs, France, January 25, 1996.
189. 'Scaling and Non-Linear Response at the Quantum Hall Critical Point,' Conference on the Quantum Hall Effect, Theoretical Physics Institute, U. Minnesota, Minneapolis, MN, May 4, 1996.
190. 'How to Estimate Anything,' Research Experience for Undergraduates lecture, IUUCF, Bloomington, IN, June 5, 1996.
191. 'Scaling and Non-Linear Response at the Quantum Hall Critical Point,' Scuola Normale, Pisa, Italy, June 27, 1996.
192. 'Topological Excitations in Quantum Hall Ferromagnets,' International Center for Theoretical Physics, Trieste, Italy, July 3, 1996.
193. 'Conference Summary,' Adriatico Research Conference: The Electron Quantum Liquid in Systems of Reduced Dimensions, International Center for Theoretical Physics, Trieste, Italy, July 5, 1996.
194. 'Introduction to Quantum Phase Transitions,' Purdue University, West Lafayette, IN, August 22, 1996.

195. ‘Topological Excitations in Quantum Hall Ferromagnets,’ Midwest Theory Meeting, University of Illinois, Urbana, IL, October 26, 1996.
196. ‘Quantum and Classical Fluctuations in Superconductors and Josephson Junction Arrays,’ Gordon Conference, Ventura, CA, January 12, 1997.
197. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ Indiana University, Bloomington, IN, January 29, 1997.
198. ‘Introduction to the Quantum Hall Effect,’ University of Colorado, Boulder, CO, February 5, 1997.
199. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ Berkeley, February 10, 1997.
200. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ Princeton, NEC, Rutgers “Three Corners Seminar”, Princeton, NJ, March 5, 1997.
201. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ Stanford University, Stanford, CA, February 11, 1997.
202. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ University of Cincinnati, Cincinnati, OH, April 23, 1997.
203. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ Institute for Theoretical Physics, UCSB, Santa Barbara, CA, May 2, 1997.
204. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ University of Wisconsin, Madison, WI, May 9, 1997.
205. ‘Nonlinear Transport near Quantum Critical Points,’ Aspen Center for Physics, Aspen, CO, July 28, 1997.
206. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ Washington University, St. Louis, MO, September 3, 1997.
207. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ Brown University, October 2, 1997.
208. ‘Exotic Quantum Order in Low-Dimensional Systems,’ Symposium on Advancing Frontiers of Condensed Matter Science,’ U. Pennsylvania, October 13, 1997.
209. ‘Coherent States in Lasers, Atoms Lasers, and Bose-Einstein Condensates,’ Indiana University Condensed Matter Seminar, Bloomington, IN, January 20, 1998.
210. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ Rutgers University, New Brunswick, NJ, January 28, 1998.
211. ‘Dynamical universality classes of the superconducting phase transition,’ Midwest Superconductivity Consortium Meeting, Columbus, OH, January 30, 1998.

212. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ UC Irvine, Irvine, CA, February 3, 1998.
213. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ UCSD, La Jolla, CA, February 4, 1998.
214. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ Ohio State University, Columbus, OH, March 2, 1998.
215. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ Center for Theoretical Physics Distinguished Lecture, University of Maryland, College Park, MD, April 7-8, 1998.
216. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ Mathematics, Astronomy and Physics Division Colloquium, California Institute of Technology, May 7, 1998.
217. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ Université Paul Sabatier, Toulouse, France, July 2, 1998.
218. ‘The Quantum Hall Effect: Novel Excitations and Broken Symmetries,’ 11 hours of lectures at Centre de Physique, Les Houches, France, July, 1998.
219. ‘Colloidal Attractions: Size Counts,’ Program on Electrostatic Effects in Complex Fluids and Biophysics, Institute for Theoretical Physics, Santa Barbara, CA, September 2, 1998
220. ‘Introduction to the Fractional Quantum Hall Effect: Quantum Plasmas and Fractional Charges,’ Director’s Blackboard Lunch, Institute for Theoretical Physics, Santa Barbara, CA, September 14, 1998.
221. ‘When Like Charges Attract: Physics of Colloids,’ Indiana University Condensed Matter Seminar, Bloomington, IN, September 13, 1998.
222. ‘Introduction to High Temperature Superconductivity,’ Board on Physics and Astronomy (NAS) Meeting Colloquium, Irvine, CA, November 1, 1998.
223. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ McMaster University Colloquium, Hamilton, ON, November 4, 1998.
224. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ Waterloo University Colloquium, Waterloo , ON, November 5, 1998.
225. ‘Effect of  $1/f$  Noise on Decoherence, Quantum Phase Transitions, and Quantum Computing,’ Royal Institute of Technology (KTH), Stockholm Sweden, December 11, 1998.
226. ‘Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,’ Nobel Prize Symposium, Chalmers Technical University, Göteborg, Sweden, December 14, 1998.

227. 'Quantum Phase Transitions,' 4 Lectures at the Jerusalem Winter School, Jerusalem, Israel, January 4-10, 1999.
228. 'Nuclear Physics Meets the Quantum Hall Effect,' Weizmann Institute, Rehovot, Israel, January 13, 1999.
229. 'Attractive Interactions Between Like-Charged Colloids,' Lucent Bell Laboratories, Murray Hill, NJ, February 4, 1999.
230. 'Skyrmions, NMR, and Giant Nuclear Specific Heat in Quantum Hall Ferromagnets,' Columbia University Colloquium, New York, NY, February 5, 1999.
231. 'Novel Quantum Phenomena: Introduction to Fractional Charge,' Solid State Sciences Committee (NAS), Washington, DC, February 17, 1999.
232. 'Nuclear Physics Meets the Quantum Hall Effect,' Purdue University Colloquium, West Lafayette, IN, February 11, 1999.
233. 'Novel Quantum Phenomena,' Forum of the Solid State Sciences Committee of the National Academy, February 17, 1999.
234. 'What was this year's Nobel Prize all about?,' Bates College, Lewiston, ME, March 5, 1999.
235. 'Exotic Order in Quantum Hall Ferromagnets,' Centennial Symposium on the History of Semiconductors, American Physical Society, March 25, 1999. [Audio and transparencies available on the APS Web Site.]
236. 'Introduction to Swihart Modes,' seminar in honor of Jim Swihart's retirement, Department of Physics, Indiana University, Bloomington, IN, April 30, 1999.
237. 5 lectures on the quantum Hall Effect at Institut Henri Poincaré, Paris, May, 1999.
238. 'Ferromagnetism in Single and Double Layer Quantum Hall Systems,' Lalonde des Maures, France, May, 1999.
239. 'Field Tilt Anisotropy of Quantum Hall Striped Phases,' ICTP, Trieste, Italy, July, 1999.
240. 'Quantum and Classical Magnetism in LiHoF<sub>4</sub>,' Department of Chemistry, Indiana University, September 6, 1999.
241. 'Kosterlitz-Thouless Phase Transitions in Double-Layer Quantum Hall Systems,' David Thouless Fest, U. Washington, Seattle, Washington, September 17, 1999.
242. 'Mr. Feynman's Quantum Mechanics,' Fysikdaggar ('Physics Days'), Swedish Physical Society Meeting for High School Teachers, Göteborg, Sweden, November 12, 1999.
243. 'Nuclear Physics Meets the Quantum Hall Effect,' University of Lund, Lund, Sweden, November 10, 1999.

244. ‘Nuclear Physics Meets the Quantum Hall Effect,’ SUNY Stony Brook Colloquium, November 30, 1999.
245. ‘Nuclear physics meets the quantum hall effect: skyrmions, NMR and giant nuclear specific heat in quantum hall ferromagnets,’ ESF Conference on Non-Fermi Liquid Effects in Metallic Systems with Strong Electronic Correlation, Newton Institute, Cambridge University, Cambridge, UK, January 6, 2000.
246. ‘Nuclear Physics Meets the Quantum Hall Effect,’ University of Michigan, Ann Arbor, MI, January 20, 2000.
247. ‘Nuclear Physics Meets the Quantum Hall Effect,’ MIT, Cambridge, MA, February 3, 2000.
248. ‘Nuclear Physics Meets the Quantum Hall Effect,’ Yale University, New Haven, CT, February 4, 2000.
249. ‘Nuclear Physics Meets the Quantum Hall Effect,’ James Franck Institute, University of Chicago, Chicago, IL, February 29, 2000.
250. ‘Nuclear Physics Meets the Quantum Hall Effect,’ Johns Hopkins University, Baltimore, MD, March 30, 2000.
251. ‘Tunneling and Interlayer Phase Coherence in 3, 2, and 1 Dimensions,’ National High Field Magnet Laboratory, Tallahassee, FL, April 7, 2000.
252. ‘Tunneling and Interlayer Phase Coherence in 3, 2, and 1 Dimensions,’ University of Sherbrooke, Sherbrooke, PQ, Canada, May 17, 2000.
253. ‘Tunneling in and Interlayer Phase Coherence 3, 2, and 1 Dimensions,’ McGill University, Montreal, PQ, Canada, May 18, 2000.
254. ‘Just What is Superconductivity Anyway? An Embarrassingly Simple Introduction,’ Boulder Summer School, Boulder, CO, July, 6, 2000.
255. ‘Introduction to the Kosterlitz-Thouless Phase Transition,’ Boulder Summer School, Boulder, CO, July, 7, 2000.
256. ‘Mr. Feynman’s Quantum Mechanics: A Field Guide for Curious Characters,’ (public lecture), University of Colorado, Boulder, CO, July 24, 2000.
257. ‘Tunneling and Phase Diagram for Bilayer QHE Systems at  $\nu = 1$ ,’ Aspen Center for Physics, Aspen, CO, July 27, 2000.
258. ‘Physics of ‘Which Layer?’ Uncertainty,’ University of Colorado, Boulder, CO, September 13, 2000.
259. ‘Open Questions for the New Millenium: Whither Condensed Matter and Materials Physics?,’ Workshop on Materials Theory II, National Science Foundation, Alexandria, VA, October 6, 2000.

260. ‘Physics of ‘Which Layer?’ Uncertainty,’ ITP Colloquium, Institute for Theoretical Physics, UCSB, Santa Barbara, CA, October 18, 2000.
261. ‘Physics of ‘Which Layer?’ Uncertainty,’ Princeton University, Princeton, NJ, October 23, 2000.
262. ‘Collective Modes in Quantum Hall Systems,’ on the occasion of Phil Platzman’s 40th Anniversary at Bell Labs, Lucent Technologies, Murray Hill, NJ, October 27, 2000.
263. ‘Ten Fundamental Questions in Condensed Matter and Materials Physics,’ Institute for Theoretical Physics, UCSB, Santa Barbara, CA, November 6, 2000.
264. ‘Mr. Feynman’s Quantum Mechanics: A Field Guide for Curious Characters,’ (public lecture) Institute for Theoretical Physics, UCSB, Santa Barbara, CA, November 8, 2000.
265. ‘Introduction to Cooper Pair Boxes, Qubits, and Decoherence,’ Institute for Theoretical Physics, UCSB, Santa Barbara, CA, December 15, 2000.
266. ‘Physics of ‘Which Layer?’ Uncertainty,’ U. Toronto, Toronto, CA, January 11, 2001
267. ‘Physics of ‘Which Layer?’ Uncertainty,’ Stanford University, Stanford, CA, January 16, 2001
268. ‘Physics of ‘Which Layer?’ Uncertainty,’ Cornell University, Ithaca, NY, January 25, 2001
269. ‘Physics of ‘Which Layer?’ Uncertainty,’ IPST University of Maryland, College Park, MD, January 29, 2001
270. ‘Introduction to Noise Spectra (with applications to glassy dynamics in solids and Bose Einstein Condensates),’ UCSB, Santa Barbara, CA, February 6, 2001
271. ‘Physics of ‘Which Layer?’ Uncertainty,’ Caltech, Pasadena, CA, February 12, 2001.
272. ‘Physical Realizations of Quantum Bits: Ion Traps and Josephson Junctions,’ Caltech, Pasadena, CA, February 13, 2001).
273. ‘Physics of ‘Which Layer?’ Uncertainty,’ USC, Los Angeles, CA, February 16, 2001.
274. ‘Physics of ‘Which Layer?’ Uncertainty,’ UCSD, La Jolla, CA, February 21, 2001.
275. ‘Physical Realization of Quantum Bits: Trapped Ions and Cooper Pair Boxes,’ ITP Colloquium, Santa Barbara, CA, February 28, 2001.
276. ‘Theory of Edge Tunneling between two lateral Quantum Hall Systems,’ invited talk, March 2001, APS Meeting, Seattle, WA, March 16, 2001.
277. ‘Nuclear Physics Meets the Quantum Hall Effect: Skyrmions, NMR and Giant Nuclear Specific Heat,’ LNS Colloquium, Cornell University, Ithaca, NY, April 19, 2001.

278. ‘Physics of ‘Which Layer?’ Uncertainty,’ U. Arizona, Tucson, Arizona, May 4, 2001.
279. ‘Quantum Spins and Quantum Phase Transitions,’ Student Day Lecture, Int. Conf. on Recent Progress in Many-Body Theories, RPMBT-11, Manchester, England, July 8, 2001.
280. ‘Josephson Effect and Coherent Tunneling in Quantum Hall Bilayers,’ 11th International Conference on Recent Progress in Many-Body Theories, RPMBT-11, Manchester, England, July 11, 2001.
281. ‘Physical Realization of Quantum Bits: Trapped Ions and Cooper Pair Boxes,’ Solid State and Optics Seminar, Yale University, September 19, 2001.
282. ‘Broken Symmetry and Josephson Effect in QHE Bilayers,’ Colloquium, SUNY Stony Brook, October 16, 2001.
283. ‘Introduction to Josephson Junctions and the Superconducting Single Electron Transistor,’ Yale quantum computing interest group, October 30, 2001.
284. ‘Introduction to Josephson Junctions II: Macroscopic Quantum Tunnelling,’ Yale quantum computing interest group, November 13, 2001.
285. ‘DC Transformer and DC Josephson(-like) Effect in Quantum Hall Bilayers,’ Colloquium, Harvard, November 19, 2001.
286. ‘DC Transformer and DC Josephson(-like) Effect in Quantum Hall Bilayers,’ Nobel Symposium on Quantum Coherence, Chalmers University, Göteborg, Sweden, December 6, 2001.
287. ‘DC Transformer and DC Josephson(-like) Effect in Quantum Hall Bilayers,’ U. Minnesota, February 5, 2002.
288. ‘Physics of Quantum Bits’, Colloquium, University of Florida, Gainesville, February 28, 2002.
289. ‘Physics of Quantum Computers,’ Arthur O. Williams Lectureship, Brown University, March 11, 2002.
290. ‘DC Transformer and DC Josephson(-like) Effect in Quantum Hall Bilayers,’ Brown University, March 12, 2002
291. ‘Physics of Quantum Bits and Quantum State Control in Electrical Circuits: Artificial Superconducting ‘Atoms’,’ Boston University, April 12, 2002
292. ‘DC Transformer and DC Josephson(-like) Effect in Quantum Hall Bilayers,’ Penn State April 24, 2002
293. ‘Physics of Quantum Bits and Quantum State Control in Electrical Circuits: Artificial Superconducting ‘Atoms’,’ Penn State April 25, 2002

294. 'Quantum Computation,' Plenary Lecture, CIAR Annual Meeting, Toronto, May 4, 2002.
295. 'Quantum State Control in Electrical Circuits: Artificial Superconducting Atoms,' APS Div. of Atomic Mol. and Optical Physics Meeting, Williamsburg, VA, May 31, 2002.
296. Invited Lecture, "Physics of Quantum Bits and Quantum State Control in Electrical Circuits: Artificial Superconducting 'Atoms'," International Conference on Theoretical Physics, Paris, UNESCO, 22-27 July 2002.
297. 'Superconducting Quantum Bits that (Really!) Work,' NIST, August 21, 2002.
298. 'Superconducting Quantum Bits that (Really!) Work,' MIT Colloquium, September 12, 2002.
299. 'Quantum Computation,' New England Chapter Meeting of Sigma Xi, Worcester Polytechnic, Worcester, MA, October 12, 2002.
300. 'Superconducting Quantum Bits that (Really!) Work,' Rice University Colloquium, Houston, TX, January 15, 2003.
301. 'Superconducting Quantum Bits that (Really!) Work,' IBM Almaden Colloquium, San Jose, CA, January 17, 2003.
302. 'Superconducting Quantum Bits that (Really!) Work,' University of British Columbia, Vancouver, BC, January 20, 2003.
303. 'Superconducting Quantum Bits that (Really!) Work,' Stanford University Colloquium, Palo Alto, CA, January 21, 2003.
304. 'Superconducting Quantum Bits that (Really!) Work,' UC Berkeley Colloquium, Berkeley, CA, January 27, 2003.
305. 'Superconducting Quantum Bits that (Really!) Work,' University of Pennsylvania Colloquium, Philadelphia, PA, February 19, 2003.
306. 'The Future of Condensed Matter Physics,' Plenary Session, March APS Meeting, Austin, TX, March 3, 2003.
307. 'Superconducting Quantum Bits that (Really!) Work,' Boston College Colloquium, Boston, MA, March 12, 2003.
308. 'Mr. Feynman's Quantum Mechanics: A Field Guide for Curious Characters,' Bates College, Lewiston, ME, March 14, 2003.
309. 'Mr. Feynman's Quantum Mechanics: A Field Guide for Curious Characters,' Morse College Fellows Meeting, Yale University, March 24, 2003.
310. 'Superconducting Quantum Bits that (Really!) Work,' McMaster University Colloquium, Hamilton, ON, April 2, 2003.

311. 'Superconducting Quantum Bits that (Really!) Work,' Waterloo University Colloquium, Waterloo, ON, April 3, 2003.
312. 'Prospects for Strong Cavity QED in Superconducting Electrical Circuits,' Chemistry Dept., Yale University, April 10, 2003.
313. 'Prospects for Strong Cavity QED in Superconducting Electrical Circuits,' Penn. State University, State College, PA, April 12, 2003.
314. 'Superconducting Quantum Bits that (Really!) Work,' University of North Carolina, Chapel Hill, NC, April 14, 2003.
315. 'Prospects for Strong Cavity QED in Superconducting Electrical Circuits,' University of Maryland, College Park, MD, May 1, 2003.
316. 'Prospects for Strong Cavity QED in Superconducting Electrical Circuits,' University of Minnesota, May 4, 2003.
317. 'Mr. Feynman's Quantum Mechanics: A Field Guide for Curious Characters,' Yale Science Forum, Yale University, May 9, 2003.
318. 'Prospects for Strong Cavity QED in Superconducting Electrical Circuits,' Atomic Physics Gordon Conference, Tilton, NH, June 17, 2003.
319. 'Radiation-Induced Magnetoresistance Oscillations in a 2D Electron Gas,' at the International Symposium 'Quantum Hall Effect: Past, Present and Future', Stuttgart, Germany, 2 July - 5 July 2003.
320. 'Radiation-Induced Magnetoresistance Oscillations in a 2D Electron Gas,' 15th Int. Conf. on the Electronic Properties of Two-Dimensional Electron Gases, Nara Japan, July 14-18, 2003.
321. 'Prospects for Strong Cavity QED in Superconducting Electrical Circuits,' ARO/ARDA Quantum Computing Program Review, Nashville, TN, August 18-22, 2003.
322. 'Prospects for Strong Cavity QED in Superconducting Electrical Circuits,' Rutgers University, September 9, 2003.
323. 'Quantum Money and the Physics of Quantum Information,' New England Section of the American Physical Society and the American Association of Physics Teachers Joint Meeting, Bates College, Lewiston, ME, October 3, 2003.
324. 'Quantum Bits and Cavity Quantum Electrodynamics in Electrical Circuits,' Princeton University (Colloquium), October 16, 2003.
325. 'Prospects for Strong Cavity QED in Superconducting Electrical Circuits,' Brandeis University (Colloquium), October 28, 2003.
326. 'What was this year's Nobel Prize all about?,' Inaugural Chairman's Tea, Physics Department, Yale University, October 31, 2003.

327. 'Prospects for Strong Cavity QED in Superconducting Electrical Circuits,' Workshop on Fundamentals of Solid State Quantum Information Processing, Lorentz Center, Leiden University, December 8-12, 2003.
328. 'Quantum Bits and Cavity Quantum Electrodynamics in Electrical Circuits,' Columbia University (Colloquium), February 16, 2004.
329. 'Quantum Bits and Cavity Quantum Electrodynamics in Electrical Circuits,' Amherst College (Colloquium), March 4, 2004.
330. 'Quantum Bits and Cavity Quantum Electrodynamics in Electrical Circuits,' University of Colorado (Colloquium), Boulder, CO, March 10, 2004
331. 'Doing Atomic Physics with Electrical Circuits: Strong Coupling Cavity QED,' University of Texas (Colloquium), April 28, 2004
332. 'Doing Atomic Physics with Electrical Circuits: Strong Coupling Cavity QED,' Texas A&M University (Colloquium), April 29, 2004
333. 'Doing Atomic Physics with Electrical Circuits: Strong Coupling Cavity QED,' ITAMP Meeting on Atomic and Mesoscopic Physics, Harvard University, May 12, 2004
334. 'Doing Atomic Physics with Electrical Circuits: Strong Coupling Cavity QED,' Caltech (Colloquium), May 20, 2004
335. 'Circuit QED: Quantum Optics with Wires Attached,' Norwegian Technical University, Trondheim, Norway, June 7, 2004
336. 'Circuit QED: Quantum Optics with Wires Attached,' NORDITA, Copenhagen, Denmark, June 11, 2004
337. 'Quantum Money, Teleportation and Computation', Public Lecture, University of Colorado, Boulder, CO, July 12, 2004
338. 'Introduction to Superconducting Josephson Junction Quantum Bits', Boulder Summer School for Condensed Matter and Materials Physics, Boulder, CO, July 14, 2004
339. 'Circuit Quantum Electrodynamics', Boulder Summer School for Condensed Matter and Materials Physics, Boulder, CO, July 15, 2004
340. 'Circuit Quantum Electrodynamics', Aspen Center for Physics, July 20, 2004
341. 'Circuit Quantum Electrodynamics', Caltech Conference on Quantum Control, Pasadena, CA, August 21, 2004
342. 'Physics of Quantum Computation', Johns Hopkins University Colloquium, Baltimore, MD, September 16, 2004
343. 'Quantum Money, Teleportation and Computation', Haverford College, Haverford, PA, September 23, 2004

344. ‘Physics of Quantum Computation’, Haverford College, Haverford, PA, September 24, 2004
345. ‘Quantum Money, Teleportation and Computation’, Chairman’s Tea, Yale University Department of Physics, October 1, 2004
346. ‘Circuit Quantum Electrodynamics’, UCSB, Santa Barbara, CA, October 15, 2004
347. ‘Introduction to the Fractional Quantum Hall Effect, Poincaré Lecture, Institut Henri Poincaré, Paris, France, November 13, 2004
348. ‘Quantum Optics of Electrical Circuits’, Harvard-MIT Center for Cold Atoms, Cambridge, MA, December 7, 2004
349. ‘Recent Advances in Quantum Computation and Quantum Optics of Electrical Circuits’, Colloquium for Editors of Physical Review Letters, Ridge, NY, January 6, 2005.
350. ‘Quantum Optics of Electrical Circuits’, Ohio State University, Columbus, OH, January 10, 2005.
351. ‘Introduction to Quantum Computation’, Colloquium, Dartmouth College, Hanover, NH, February 18, 2005.
352. ‘Quantum Mechanics of Electrical Circuits’, Colloquium, University of Utah, Salt Lake City, UT, April 14, 2005.
353. ‘The Future of Condensed Matter Physics’, Purdue University Physics Department Centennial Celebration, W. Lafayette, IN, April 16, 2005.
354. ‘Quantum Optics of Electrical Circuits’, 5th ICQS annual workshop, ‘Macroscopic Quantum Phenomena’, Chinese Academy of Sciences, Beijing, China, June 7, 2005.
355. ‘The Future of Condensed Matter Physics’, ZhongGuanCun Forum of the Chinese Academy of Sciences, Beijing, China, June 8, 2005.
356. ‘Quantum Optics of Electrical Circuits’, 5th ICQS annual workshop, ‘Macroscopic Quantum Phenomena’, Chinese Academy of Sciences, Nanjing, China, June 10, 2005.
357. ‘Quantum Mechanics of Electrical Circuits,’ Yale Graduate Student Research Seminar, 9/5/05.
358. ‘Theory of Superconducting Qubit Measurement and Control,’ ARO/NSA Site Visit, 10/11/05
359. Yale Saturday Science Program, ‘Mr. Feynman’s Quantum Mechanics,’ 10/15/05
360. Yale Physics Olympics Lecture Demonstration Show, 10/22/05
361. Yale Society of Physics Students, ‘Cowboy and Cowgirl Physics: Lariats, Lassos, and Mirages,’ 10/28/05

362. ‘Quantum Optics of Electrical Circuits’, Michigan State University, East Lansing Michigan, 11/2/05.
363. ‘Quantum Optics of Electrical Circuits’, U. Massachussetts, Amherst, MA, 12/1/05.
364. ‘Cavity QED with Superconducting Electrical Circuits,’ GDEST Conference on “Quantum Information and Coherence”, Munich, Germany, 12/8/05.
365. ‘Quantum Money, Teleportation and Computation,’ Public Lecture for the Regroupement Québécois sur les Matériaux de Pointe (RQMP), Sherbrooke Science Museum, Sherbrooke, Quebec, 12/15/05.
366. ‘Quantum Noise and Amplification,’ University of Sherbrooke, Sherbrooke, Quebec, 12/16/05.
367. ‘Cavity QED with Electrical Circuits’, European Physical Society Meeting, Dresden, Germany, March 27, 2006.
368. ‘Atomic Physics with Electrical Circuits’, CATCOM06 Meeting, Max Planck Institute, Dresden, Germany, March 28, 2006.
369. ‘Atomic Physics with Electrical Circuits’, Plenary Lecture, Gordon Research Conference on Quantum Information, Il Ciocco, Italy, May 7, 2006.
370. ‘Cavity QED with Electrical Circuits’, Los Alamos National Laboratory, May 25, 2006.
371. ‘Quantum Non-Demolition Measurements and Back Action in Circuit QED,’ Aspen Center for Physics, Aspen, CO, July 13, 2006
372. ‘Quantum Money, Teleportation and Computation: New Mysteries from the Quantum World’, Heinz Pagels Public Lecture, Aspen Colorado, July 20, 2006.
373. ‘Quantum Optics of Electrical Circuits,’ 3 Lectures, PCCM Summer School, Princeton University, July 8-9, 2006.
374. ‘Resolving Single Photons in Circuit QED,’ LPS-ARO Program Review, Buckhead, GA, August 14, 2006.
375. ‘Quantum Money, Teleportation and Computation,’ Colloquium, Syracuse University, September 21, 2006.
376. ‘Circuit QED,’ seminar, Syracuse University, September 22, 2006.
377. ‘Atomic physics and quantum optics with superconducting electrical circuits’, Ehrenfest Colloquium, Leiden University, October 4, 2006.
378. ‘Atomic physics and quantum optics with superconducting electrical circuits’, Colloquium, Utrecht University, October 5, 2006.
379. ‘Quantum Noise and Amplification,’ Leiden University, October 6, 2006.

380. ‘Quantum Money, Teleportation and Computation,’ St. Joseph’s University, Philadelphia, PA, October 19, 2006.
381. Yale Physics Olympics Demonstration Lecture, October 21, 2006.
382. ‘Quantum Money, Teleportation and Computation,’ Perspectives in Science Class, Yale, November 3, 2006.
383. ‘Atomic physics and quantum optics with superconducting electrical circuits’, Argonne National Laboratory, November 15, 2006.
384. ‘Mr. Feynman’s Quantum Mechanics,’ Yale Society of Physics Students Lecture, November 17, 2006.
385. ‘Full Quantum Theory of Optical Cooling of Nano-Mechanical Systems,’ Workshop on Quantum Electromechanical Systems (QEM-2), Morro Bay, CA, December 14, 2006.
386. ‘Circuit Quantum Electrodynamics,’ Colloquium, U. Toronto, January 18, 2007.
387. ‘Quantum Mechanics with Electrical Circuits: Artificial Atoms with Wires Attached,’ Invited lecture, AAAS Meeting, San Francisco, CA, February 17, 2007 (unable to deliver due to inclement weather).
388. ‘Collective Excitations in the Quantum Hall Effect,’ Buckley Prize Lecture, American Physical Society, March 6, 2007.
389. ‘Quantum Money, Teleportation and Computation,’ National Taiwan University, Taipei, Taiwan, March 20, 2007.
390. Mini-Course on Circuit QED (5 Lectures), National Taiwan University, Taipei, Taiwan, March 21-22, 2007.
391. ‘Circuit QED: What is the Electric Field of a Single Photon?’, Yale University Colloquium, March 30, 2007.
392. ‘Bayesian Analysis for QND Measurements,’ Quantum Computation Group Meeting, Yale Applied Physics, April 9, 2007.
393. ‘How big was the earthquake caused by the New Haven Coliseum Implosion?’, Yale Society of Physics Students Lecture, April 13, 2007.
394. ‘Circuit QED: What is the Electric Field of a Single Photon?’, IBM Research, Yorktown Heights, NY, April 20, 2007.
395. ‘Circuit QED: What is the Electric Field of a Single Photon?’, University of Washington, Seattle, WA, May 14, 2007.
396. ‘Quantum Money, Teleportation and Computation,’ Union College, Schenectady, NY, May 17, 2007.

397. 'Circuit QED: What is the Electric Field of a Single Photon?', University of Chicago, May 24, 2007.
398. 'Circuit QED: What is the Electric Field of a Single Photon?', UCLA, May 31, 2007.
399. 'Circuit QED: Quantum Optics of Electric Circuits,' Niels Bohr International Academy Workshop on Solid State Quantum Information Systems, Copenhagen, Denmark, June 27, 2007.
400. 'Circuit QED: Quantum Optics with Superconducting Qubits,' Center for Advanced Studies, Oslo Norway, June 28, 2007.
401. 'Recent Results in Circuit QED', 2007 QUEST (LANL) Meeting, Santa Fe, NM, July 24, 2007.
402. 'Recent results with the transmon qubit,' LPS-ARO Program Review, Minneapolis, MN, August 13, 2007.
403. 'Circuit QED: Quantum Optics with Superconducting Qubits,' Symposium on 200 Years of Physics, Chalmers University, Göteborg, Sweden, August 31, 2007.
404. 'Quantum Money, Teleportation and Computation,' Ingersoll Lecture, University of Wisconsin, October 3, 2007.
405. 'Circuit QED: What is the electric field of a single photon?,' University of Wisconsin, October 4, 2007.
406. 'Circuit QED: What is the electric field of a single photon?,' Berkeley University Colloquium, December 3, 2007.
407. 'Quantum Money, Teleportation and Computation,' Berkeley SPS Lecture, December 5, 2007.
408. 'Decoherence of Superconducting Qubits,' Workshop on Decoherence in Superconducting Qubits (DiSQ) Berkeley, CA, December 7, 2007.
409. 'Introduction to Quantum Opto-mechanics,' DARPA Workshop on Optomechanical Systems, Washington DC, December 10, 2007.
410. 'Circuit QED: What is the electric field of a single photon?,' Cornell University Colloquium, January 21, 2008.
411. 'Circuit QED: What is the electric field of a single photon?,' College de France, Paris, France, January 28, 2008.
412. 'Quantum Noise, Measurement and Amplification,' Gordon Research Conference on Mechanical Systems in the Quantum Regime, Ventura, CA, February 17, 2008
413. 'A Conversation with Brian Greene', Thomas J. Golden Fellowship, St. Thomas More Center, Yale University, April 17, 2008.

414. 'Kalman Filters and Quantum Trajectories,' MLS Seminar, Yale University, April 21, 2008.
415. 'Circuit QED': Quantum Optics and Quantum Computation with Josephson Junctions, Landau Centennial, Moscow, June 22-26, 2008.
416. 'Circuit QED': Quantum Optics and Quantum Computation with Josephson Junctions, Joint Quantum Institute, U. Maryland, College Park, MD, September 8, 2008.
417. 'Quantum Money, Information and Computation,' University of Maine, Orono, Maine, October 24, 2008.
418. 'Quantum Measurement, Noise and Amplification,' Yale University Physics Colloquium, November 21, 2008.
419. 'Quantum Engineering: Building Robust Quantum Bits,' Yale Institute for Nano-Science and Quantum Engineering, December 5, 2008.
420. 'Circuit QED: Quantum Optics of Electrical Circuits and Microwave Photons,' IEEE Boston Photonics Section, MIT Lincoln Laboratories, April 22, 2009.
421. 'Quantum Measurements, Noise and Amplification,' JASON meeting, McLean, VA, April 25, 2009.
422. 'Circuit QED: Quantum Optics of Electrical Circuits and Microwave Photons,' Allen Goldman Fest, University of Minnesota, May 3, 2009.
423. 'Recent Progress in Circuit QED: Demonstration of Two-Qubit Quantum Algorithms', Harvard-MIT Center for Ultra-Cold Atoms, Cambridge MA, May 5, 2009.
424. 'Overview of Charge Based Qubits and Circuit QED,' 2009 Nobel Symposium on Quantum Information Processing, Goöteborg, Sweden, May 27, 2009.
425. 'Metrology of Entangled States in Circuit QED', College de France, June 2, 2009, Paris, France.
426. 'Quantum Money, Information and Computation,' École Polytechnique, June 5, 2009, Palaiseau, France.
427. 'Quantum Money, Information and Computation,' Arnold Sommerfeld Lecture I, LMU, June 8, 2009, Munich, Germany.
428. 'Quantum Measurements, Noise and Amplification,' Arnold Sommerfeld Lecture II, LMU, June 10, 2009, Munich, Germany.
429. 'Metrology of Entangled States in Circuit QED,' Arnold Sommerfeld Lecture III, LMU, June 12, 2009, Munich, Germany.
430. 'Metrology of Entangled States in Circuit QED,' Department of Physics, UCSB, September 25, 2009.

431. 'Introduction to Quantum Information Processing with Superconducting Qubits,' KITP Workshop Seminar, September 25, 2009.
432. 'Quantum Money,' Southern Connecticut State University, New Haven, CT, October 30, 2009.
433. 'Quantum Signals: Noise and Amplification,' Boston University Physics Department Colloquium, Boston, MA, November 10, 2009.
434. 'The Race to Build a Quantum Computer,' Tilde Science Cafe, Branford, CT, February 20, 2010.
435. 'Circuit QED,' Girvin Fest, National High Field Magnet Laboratory, Tallahassee, FL, April 2, 2010.
436. 'Circuit QED,' CAMOS Meeting, National Research Council, Washington, DC, April 6, 2010.
437. 'High Fidelity Multi-Qubit Readouts for Superconducting Qubits,' Institute for Quantum Computing, University of Waterloo, May 17, 2010.
438. 'Quantum Measurements, Noise, and Amplification: From Gedanken Experiments to the Real World,' Aalto University, Helsinki, Finland, June 2, 2010.
439. 'Circuit QED: Quantum Electrodynamics of Superconducting Circuits and Qubits,' Aalto Colloquium, Helsinki, Finland, June 2, 2010.
440. 'Quantum Measurements, Noise, and Amplification: From Gedanken Experiments to the Real World,' Oulu University, Helsinki, Finland, June 3, 2010.
441. 'Circuit QED: Physics of Microwave Photons and Superconducting Qubits,' (three lectures) Windsor Summer School 2010, Windsor, England, August 7-14, 2010.
442. 'High-Fidelity Multi-Qubit Readout in Circuit QED,' ARO Program Review, Cincinnati, OH, August 18, 2010.
443. 'Refrigerating Rabi Flops: Engineering Dissipation,' Monday Lunch Seminar, Yale University, September 20, 2010.
444. 'Wiring Up Quantum Systems,' Royal Swedish Academy of Sciences, Stockholm, Sweden, October 6, 2010.
445. 'Wiring Up Quantum Systems,' Royal Institute of Technology, Stockholm, Sweden, October 7, 2010.
446. 'The Future of Quantum Condensed Matter,' Johns Hopkins University Futures Seminar on Physics and Astronomy, Baltimore, Maryland, October, 14, 2010.
447. 'Quantum Measurements, Noise and Amplification,' CUNY Graduate Center, New York, NY, October 29, 2010.

448. 'The Race to Build a Quantum Computer,' Yale Engineering and Science Recruiting Weekend Masters Class, February 20, 2011.
449. 'Wiring up Quantum Systems: Fun with Artificial Atoms and Microwave Photons,' Physics Colloquium, Tel Aviv University, Tel Aviv, March 13, 2011.
450. 'Wiring up Quantum Systems: Fun with Artificial Atoms and Microwave Photons,' Einstein Colloquium, Weizmann Institute of Science, Rehovot, Israel, March 17, 2011.
451. 'Quantum Money, Information and Computation: New Mysteries from the Quantum World,' Franklin and Marshall College, Lancaster, PA, March 21, 2011.
452. 'The Race to Build a Quantum Computer,' Williams College, Williamstown, MA, May 6, 2011.
453. 'Recent Progress in Circuit QED,' 18th Central European Workshop on Quantum Optics, Madrid, Spain, May 30, 2011.
454. 'Recent Progress in Circuit QED,' Advanced many-body and statistical methods in mesoscopic systems, June 27 - July 2, 2011, Constanta, Romania.
455. 'Superconducting Quantum Bits and Circuit QED,' 11 hours of Lectures at Les Houches Summer School on 'Quantum Machines,' July 4-15, 2011, Les Houches, France.
456. 'Quantum Control and Quantum Error Correction with Superconducting Qubits,' ARO Quantum Computing Program Review, Denver, CO, August 17, 2011.
457. 'Circuit QED,' Haldane 60th Birthday Fest, Princeton University, Princeton, NJ, September 13, 2011.
458. 'Circuit QED,' University College London, September 16, 2011.
459. 'Quantum Control of Mesoscopic Systems,' Rapporteur Presentation, Centennial Solvay Conference, Brussels, Belgium, October, 2011.
460. 'Exploring the Quantum: A conversation with Michel Devoret, Steven Girvin and Robert Schoelkopf,' public lecture at the Segal Theatre, CUNY Graduate Center, New York, NY, November 2, 2011.
461. 'Wiring Up Quantum Systems,' Royal Swedish Academy of Sciences, Stockholm, Sweden, November 16, 2011.
462. 'Wiring Up Quantum Systems,' Indiana University Physics Colloquium, Bloomington, IN, December 8, 2011.
463. 'Black Box Circuit Quantization,' CSQ Program Review, San Francisco, CA, January 18, 2012.
464. 'Quantum Measurements and Back-Action (Spooky and Otherwise),' Monday Lunch Seminar, Yale University, Department of Applied Physics, February 13, 2012.

465. 'Circuit QED Simulation of Interacting Bosons with Microwave Polaritons,' Invited Talk (BAPS.2012.MAR.P10.3), American Physical Society, Boston, MA, February 29, 2012.
466. 'Wiring up Quantum Systems: Fun with Artificial Atoms and Microwave Photons,' University of Colorado Boulder, Colloquium, April 4, 2012.
467. 'Quantum Measurements and Back-Action (Spooky and Otherwise),' University of Colorado Boulder, Condensed Matter Seminar, April 5, 2012.
468. 'Circuit QED,' Phil Platzman Memorial Symposium, University of Chicago, May 4, 2012.
469. 'Introduction to Circuit QED,' Singapore Summer School of Physics, May 28 - June 1, 2012 (10 hours of pedagogical lectures).
470. 'Circuit QED,' Materials and Methods of Superconductivity Conference, Washington, DC, August 3, 2012.
471. '(Some) Outstanding Questions in Quantum Science,' Quantum Science Gordon Conference, Stonehill College, Easton, MA, August 14, 2012.
472. 'Quantum Reservoir Engineering,' Center for Quantum Devices Kick-Off Event, Niels Bohr Institute, Copenhagen, September 28, 2102
473. 'Quantum Reservoir Engineering in Circuit QED,' Laboratoire Pierre Aigrain Seminar, École Normale Supérieure, Paris, October 1, 2012
474. 'Quantum Measurements and Back Action (Spooky and Otherwise),' Institute Colloquium, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, October 8, 2012
475. 'Quantum Measurements and Back Action (Spooky and Otherwise),' IBM Physical Sciences Colloquium, TJ Watson Research Center, Yorktown Heights, NY, October 26, 2012
476. 'Quantum Money, Information and Computation,' Colloquium, Oklahoma State University, November 1, 2012.
477. 'Wiring up Quantum Systems: Fun with Artificial Atoms and Microwave Photons,' Perimeter Institute Colloquium, Waterloo, Ontario, Canada, November 27, 2012
478. 'Circuit QED: Wiring up Quantum Systems,' S. Chandrasekhar Discussion Meeting, Indian Institute of Sciences, Bangalore, India, December 20, 2012.
479. 'Introduction to Circuit QED,' Winter School on Dirac Material and Quantum Computation, 3 hours of lectures at the Indian Institute of Sciences, Bangalore, India, December 16-18, 2012.

480. ‘Introduction to Circuit QED,’ ITAMP B2 Winter School, 3 hours of lectures at the University of Arizona, Tucson, AZ, January 5-8, 2013.
481. ‘Quantum Engineering (Really) Big Schrödinger Cats,’ Sankar Das Sarma 60th Birthday Fest, College Park, Maryland, March 17, 2013.
482. ‘Circuit QED: Wiring up Quantum Systems,’ Pitt Quantum Initiative, U. Pittsburgh, April 19, 2013.
483. ‘Stabilizer quantum error correction toolbox for superconducting qubits,’ CIFAR Quantum Cavities Meeting, Montreal, Canada, May 3, 2013.
484. ‘Circuit QED: Superconducting Qubits Coupled to Microwave Photons,’ Combined meetings of the 10th Rochester Conference on Coherence and Quantum Optics, CQO-X, and the Second Conference on Quantum Information and Measurement, QIM-2CQO Meeting, Rochester, NY, June 17, 2013.
485. ‘Circuit QED: Wiring up Quantum Systems,’ TOPNES Symposium, Edinburgh, Scotland, September 2, 2013.
486. ‘Quantum control toolbox and bath engineering in the strong-dispersive limit of circuit QED,’ Theo Murphy Meeting on ‘Many body quantum optics and correlated states of light,’ Chicheley Hall, Kavli Royal Society International Centre, Buckinghamshire, October 29, 2013.
487. ‘Taming the World’s Largest Schrödinger Cat,’ University of Chicago Physics Colloquium, Chicago, IL, November 14, 2013.
488. ‘Quantum Measurements and Back Action (Spooky and Otherwise),’ Princeton University School of Engineering PRISM/PCCM Seminar, Princeton, NJ, April 23, 2014.
489. ‘Introduction to Circuit QED,’ Princeton-TAMU Summer School, Casper, WY, July 23, 2014.
490. ‘Taming the World’s Largest Schrödinger Cat,’ Advanced Workshop on Landau Zener Interferometry and Quantum Control in Condensed Matter, IYTE, Izmir, Turkey, October 1, 2014.
491. ‘Quantum Measurements and Back Action (Spooky and Otherwise),’ University of New Mexico, January 15, 2015.
492. ‘Circuit Quantum Electrodynamics: Care and Feeding of the World’s Largest Schrödinger Cat,’ University of New Mexico, January 16, 2015.
493. ‘Circuit Quantum Electrodynamics: Care and Feeding of the World’s Largest Schrödinger Cat,’ UC Santa Cruz ‘Young Fest,’ February 8, 2015.
494. ‘Taming the World’s Largest Schrödinger Cat,’ ETH Zurich Colloquium, March 26, 2015.

495. ‘Circuit QED: Taming the World’s Largest Schrödinger Cat,’ Physical Review Editors Colloquium, Ridge, NY, May 7, 2015.
496. ‘Introduction to Circuit QED,’ two pedagogical lectures at the QUTE-EUROPE Summer School 2015 on Quantum Simulation and Computation: From fundamentals to applications and implementations, Hindås, Sweden June 23, 2015.
497. ‘Quantum bath Engineering for multi-qubit systems,’ 30 Years of Quantronics Workshop, Paris, France, June 24, 2015.
498. ‘Quantum bath Engineering for multi-qubit systems,’ Joint Quantum Institute, University of Maryland, College Park, MD, September 14, 2015.
499. ‘Quantum Money, Information and Computation,’ Michigan State University *Science at the Edge: Interdisciplinary Physics Seminar*, East Lansing, MI, September 25, 2015.
500. ‘Basic Concepts in Quantum Information,’ Physics Colloquium, Yale University, New Haven, CT, December 7, 2015.
501. ‘Introduction to Circuit QED and Quantum Bath Engineering,’ Physics of Quantum Electronics, Snowbird Utah, January 3-8, 2016.
502. ‘Quantum Bath Engineering for Circuit QED Systems,’ Solvay Workshop on ‘Quantum Simulation with Cold Matter and Photons,’ Brussels, February 8-11, 2016.
503. ‘Circuit QED and Schrödinger Cat States of Photons,’ Università di Napoli ‘Federico II’, April 8, 2016.
504. ‘Moneta Sicura con la Fisica Quantistica?,’ Tavola Aperta, Istituto Italiano per gli Studi Filosofici, Naples Italy, April 8, 2016.
505. ‘Introduction to Circuit QED and Quantum Bath Engineering,’ three pedagogical lectures at the Capri Spring School on Transport in Nanostructures 2016, Comune di Anacapri, Isola di Capri, Italy, April 10-16, 2016.
506. ‘Elementary Introduction to the Basics of Dissipation in Superconducting Circuit QED,’ Decoherence in Superconducting Qubits II (DiSQ2), University of Maryland, College Park, Maryland, April 21, 2016.
507. ‘Introduction to Quantum Bath Engineering and Quantum Simulations in Circuit QED,’ Stanford University (Kivelson group seminar), May 18, 2016.
508. ‘Quantum Error Correction for Bosonic Modes,’ Condensed Matter and Beyond: A Symposium in Honor of John Chalker’s 60th Birthday, Department of Physics, Oxford University, Oxford, UK, July 1-2, 2016.
509. ‘Quantum Error Correction for Bosonic Modes in Circuit QED,’ 4.5 hours of lectures at Les Houches Summer School: Current Trends in Atomic Physics, Les Houches, France, July 15-29, 2016.

510. ‘Quantum Error Correction for a Bosonic Mode,’ ARO Program Review, Westminster, CO, August 9, 2016.
511. ‘Introduction to Quantum Bath Engineering and Quantum Simulations in Circuit QED,’ Quantum Thermodynamics Summer School, 19-24 September, 2016, Cambridge University, Cambridge UK.
512. ‘Basic Concepts in Quantum Information,’ University of Rhode Island Physics Colloquium, October 14, 2016, Kingston, RI.
513. ‘Quantum Error Correction: Building a (Nearly) Perfect Computer from Imperfect Parts,’ Quantum Technology Conference, Chalmers University, Gothenburg, Sweden, December 13, 2016.
514. ‘Introduction to Circuit QED,’ ITAMP Winter School, January 5, 2017.
515. ‘Quantum State Manipulation and Measurement in Circuit QED,’ ITAMP Winter School, January 6, 2017.
516. ‘Quantum Error Correction in Circuit QED,’ ITAMP Winter School, January 7, 2017.
517. ‘Field Guide to the Second Quantum Revolution,’ Frontiers in Quantum Coherent Science Conference, University of California, Berkeley, CA, January 9, 2017.
518. ‘Field Guide to the Second Quantum Revolution,’ Colloquium, Max Planck Institute for Quantum Optics, Garching, Germany, February 7, 2017.
519. ‘Elementary Tutorial on Loss Mechanisms in Circuit QED,’ Monday Lunch Seminar, Yale Quantum Institute, February 27, 2017.
520. ‘Schrödinger Cats and Photonic Quantum Information Processing,’ Physics Colloquium, Northwestern University, April 21, 2017.
521. ‘Schrödinger Cats and Photonic Quantum Information Processing,’ Göteborg Mesoscopic Lecture, Chalmers University of Technology, Göteborg, Sweden, May 4, 2017.
522. ‘The Second Quantum Revolution,’ Honorary Doctorate Celebration, Chalmers University of Technology, Göteborg, Sweden, May 5, 2017.
523. ‘LECTURE I: Linear Microwave Optics,’ NSF/DOE Quantum Science Summer School: Fundamentals and Applications of Quantum Computing, Johns Hopkins University, June 5-7, 2017.
524. ‘LECTURE II: Introduction to Circuit QED,’ NSF/DOE Quantum Science Summer School: Fundamentals and Applications of Quantum Computing, Johns Hopkins University, June 5-7, 2017.
525. ‘LECTURE III: Schrödinger cats and Quantum Error Correction,’ NSF/DOE Quantum Science Summer School: Fundamentals and Applications of Quantum Computing, Johns Hopkins University, June 5-7, 2017.

526. ‘Schrödinger Cats, Maxwell’s Demon and Quantum Error Correction,’ Frontiers of Quantum and Mesoscopic Thermodynamics - FQMT17, Prague, Czech Republic, July 14, 2017.
527. ‘Using quantum measurement techniques to accelerate axion dark matter searches,’ Table-Top Experiments with Skyscraper Reach Workshop at MIT, August 9-11, 2017.
528. ‘Using quantum measurement techniques to accelerate axion dark matter searches,’ International Workshop on Quantum Sensing with Quantum Correlated Systems, Max Planck Institute for Complex Systems, Dresden, Germany, September 25-29, 2017.
529. ‘Schrödinger Cats and Photonic Quantum Information Processing,’ Physics Colloquium, EPFL, Lausanne, Switzerland, October 2, 2017.
530. ‘Quantum Error Correction: Building a (Nearly) Perfect Computer from Imperfect Parts,’ Florida State University, Tallahassee, FL, October 26, 2017.
531. ‘Entanglement Entropy, Maxwell’s Demon and Quantum Error Correction,’ Two Lectures at Theory Winter School on Quantum Information Meets Many-Body Physics: Entanglement, Thermalization and Chaos, January 8-12, 2018, National Magnet Laboratory, Tallahassee, FL.
532. ‘Schrödinger Cats, Maxwell’s Demon and Quantum Error Correction (That Works),’ Fermi National Accelerator Laboratory Colloquium, January 17, 2018.
533. ‘Schrödinger Cats, Maxwell’s Demon and Quantum Error Correction (That Works),’ Columbia University Physics Colloquium, January 29, 2018.
534. ‘Schrödinger’s Cat Meets Maxwell’s Demon: Quantum Error Correction (That Works),’ 20th Annual SQuInT Workshop, February 22-24, 2018, Santa Fe, New Mexico
535. ‘Schrödinger Cats, Maxwell’s Demon and Quantum Error Correction,’ University of Texas, Physics Colloquium, March 21, 2018.
536. ‘Schrödinger Cats, Maxwell’s Demon and Quantum Error Correction,’ Texas A&M, Physics Colloquium, March 22, 2018.
537. ‘Schrödinger Cats, Maxwell’s Demon and Quantum Error Correction,’ New York University Physics Colloquium, April 12, 2018.
538. ‘Quantum Information Processing with Microwave Photons,’ Wallenberg Centre for Quantum Technologies, Chalmers University, Göteborg, Sweden, May 28, 2018.
539. ‘Quantum Information Processing with Microwave Photons,’ QuTech Colloquium, Technical University of Delft, Netherlands, June 5, 2018.
540. ‘Schrödinger Cats, Maxwell’s Demon and Quantum Error Correction,’ 3 hours of lectures, Brandeis IGERT Summer School, June 25-26, 2018.

541. ‘Quantum Information Processing with Microwave Photons,’ NEQSys Kick-Off Meeting, Brookhaven National Laboratory, Upton, NY, October 26, 2018.
542. ‘Schrödinger’s Cat meets Maxwell’s Demon: Quantum Error Correction (That Works),’ CityTech (CUNY Brooklyn), November 8, 2018.
543. ‘Quantum Information Processing with Microwave Photons,’ QuDev Seminar, University of Copenhagen, Copenhagen, Denmark, November 16, 2018.
544. ‘Schrödinger’s Cat meets Maxwell’s Demon: Quantum Error Correction (That Works),’ Washington University physics colloquium, December 12, 2018.
545. ‘Quantum Control of Light and Sound at Microwave Frequencies,’ Physical and Quantum Electronics Conference, Snowbird, January 6-11, 2019.
546. ‘Quantum Error Correction with Photonic Logical Qubits,’ IARPA LogiQ Technical Exchange Meeting, January 24, 2019, Dallas, Texas.
547. ‘Introduction to Quantum Error Correction: Schrödinger meets Maxwell’s Demon,’ Molecular and Quantum Computing Symposium, Brown University, Providence, RI, March 8-9, 2019.
548. ‘Quantum Information Processing with Microwave Photons,’ iQuISE student seminar, MIT, Cambridge, MA, April 25, 2019.
549. ‘Introduction to Quantum Error Correction and Fault Tolerance,’ Wallenberg Centre for Quantum Technologies Industry Conference, Göteborg, Sweden, May 21, 2019.
550. ‘Bosonic Codes for Continuous Variable Quantum Information Processing: Theory and Experiment,’ DAMOP Annual Meeting, May 27-31, 2019, Milwaukee, WI.
551. ‘Introduction to Quantum Error Correction and Fault Tolerance,’ 6 hours of lectures at the Les Houches Summer School on Quantum Information Machines, Les Houches, France, July 2-12, 2019.
552. ‘Controlling Many-Body States of Light,’ Invited Lecture, International Conference on Designing Artificial Quantum Matter #DAQM, Donostia-San Sebastián, Spain July 19, 2019.
553. ‘Biased-Noise Qubits and Gates Using Stabilized Cats,’ ARO Quantum Computing Program Review, Raleigh-Durham, NC, August, 15 2019.
554. ‘Introduction to Quantum Error Correction: Schrödinger meets Maxwell’s Demon,’ Michigan State Colloquium, September 19, 2019.
555. ‘Circuit QED: Quantum Sensing, Information Processing and Error Correction with Microwave Photons,’ Physics and Applied Physics Colloquium, Stanford University, Stanford, CA, October 15, 2019.

556. ‘Introduction to Quantum Error Correction: Schrödinger meets Maxwell’s Demon,’ Brandeis University Physics Colloquium, October 22, 2019.
557. ‘Introduction to the 2nd Quantum Revolution: Information Processing in the 21st Century,’ presentation to the CEO and leadership team of Pitney-Bowes, Corp., Stamford, CT, October 29, 2019.
558. ‘Introduction to Quantum Error Correction: Schrödinger meets Maxwell’s Demon,’ University of Wisconsin Physics Colloquium, November 8, 2019.
559. ‘Introduction to Circuit QED and Quantum Error Correction: Schrödinger meets Maxwell’s Demon,’ International Conference on Condensed Matter Physics (IEMPHYS-19), Kolkata, India, November 14-15, 2019 (via video).
560. ‘Introduction to Quantum Error Correction: Schrödinger meets Maxwell’s Demon,’ University of Oklahoma Physics Colloquium, November 21, 2019.
561. ‘Richard Feynman and Scientific Imagination,’ Yale University Franke Program Ideas Salon with Katie Lofton and Steven Girvin, December 2, 2019.
562. ‘Circuit QED: Non-linear quantum optics and quantum information processing with microwave photons and artificial atoms,’ Roy Glauber Memorial Workshop, Harvard University, January 15, 2020.
563. ‘Circuit Quantum Electrodynamics: Quantum Control of Many-Body States of Light,’ Thouless Institute for Quantum Matter Inaugural Workshop,’ University of Washington, Seattle, January 20, 2020.
564. ‘The Race to Build Quantum Computers,’ Simons Foundation Colloquium, New York City, February 12, 2020.
565. ‘The Outlook for Quantum Computation,’ New Lab Quantum Summit, Brooklyn Navy Yard, February 27, 2020.
566. ‘Circuit QED: Encoding quantum information in harmonic oscillators: theory and experiment,’ Physical Review Invited Session: Forefront Research Across Disciplines (Session J37), American Physical Society March Meeting, Denver, Colorado, March 3, 2020. [Delivered via ‘Virtual Science Forum’ on March 6, 2020 due to COVID-19 cancelation of the APS meeting.]
567. ‘Quantum Noise and Measurement-Induced Dephasing (for beginners),’ YQI MLS Tutorial Lecture, June 22, 2020 (recording available online on Yale Quantum Institute website).
568. ‘Introduction to Quantum Error Correction and Fault-Tolerance, Lecture I: Classical Concepts,’ YQI MLS Tutorial Lecture, June 29, 2020 (recording available online on Yale Quantum Institute website).

569. ‘Introduction to Quantum Error Correction and Fault-Tolerance, Lecture II: Classical Fault-Tolerance and Error Thresholds for Concatenation of Repetition Codes’, YQI MLS Tutorial Lecture, July 6, 2020 (recording available online on Yale Quantum Institute website).
570. ‘Introduction to Quantum Error Correction and Fault-Tolerance, Lecture III: QEC and the Knill-Laflamme Conditions’, YQI MLS Tutorial Lecture, July 13, 2020 (recording available online on Yale Quantum Institute website).
571. ‘Introduction to Quantum Error Correction and Fault-Tolerance, Lecture IV: Comparison of Qubit Codes and Bosonic Codes’, YQI MLS Tutorial Lecture, July 20, 2020 (recording available online on Yale Quantum Institute website).
572. ‘Quantum Amplifiers and Hawking Radiation,’ Harvard-MIT Student “Chilloquium,” July 20, 2020 [virtual].
573. ‘Programmable Quantum Simulation of Molecular Vibrational Spectra using Boson Sampling in Circuit QED,’ Diller Quantum Center Seminar, Technion, Haifa, Israel, July 23, 2020 [virtual].
574. IBM Qiskit Global Summer School Commencement Panel Discussion, July 30, 2020 [<https://www.youtube.com/watch?v=7dfw8k2p1to>]
575. ‘Quantum Computing and the Second Quantum Revolution,’ podcast, July 30, 2020 <https://www.policypunchline.com/episodes/2020/7/30/quantum-computing-and-the-second-quantum-revolution>
576. ‘Programmable Quantum Simulation with Superconducting Qubits and Microwave Photons,’ University of Virginia Physics Colloquium, September 4, 2020 [virtual].
577. IBM Quantum Summit 2020, Panel on ‘Advancing Science and Technology of Quantum,’ September 17, 2020 [virtual].
578. ‘The Race to Build Quantum Computers,’ Brookhaven National Laboratory Internship Program lecture for undergraduates, September 30, 2020 [virtual].
579. ‘Programmable Quantum Simulation of Molecular Vibrational Spectra using Boson Sampling in Circuit QED,’ Joint Quantum Institute Colloquium, U. Maryland/NIST, October 5, 2020 [virtual].
580. ‘Quantum Simulations and Quantum Error Correction in Circuit QED,’ Plenary Lecture, Quantum 2020 Virtual Conference, 19-22 October, 2020 (<https://iopublishing.org/quantum2020/>).
581. ‘Progress and Prospects for the Second Quantum Revolution,’ Stony Brook University Physics Colloquium, November 10, 2020 [virtual].
582. ‘Progress and Prospects for the Second Quantum Revolution,’ University of Colorado Physics Colloquium, November 11, 2020 [virtual].

583. ‘Towards Many-Body Quantum Simulations of Interacting Bosons in Circuit QED,’ CTQM Seminar, JILA, Boulder, CO, November 13, 2020 [virtual].
584. ‘Bosonic Codes and Biased-Noise Qubits,’ C2QA Quantum Devices Thrust Kickoff Meeting, November 13, 2020 [virtual].
585. ‘Bosonic Codes for Quantum Error Correction in Circuit QED,’ Invited Talk, Session on the 20th Anniversary of GKP QEC Codes, 2020 Byron Bay Quantum Workshop, November 19, 2020 [virtual].
586. ‘Circuit QED: Quantum Electrodynamics of Microwave Circuits and Superconducting Qubits,’ Brookhaven National Lab Monday Quantum Journal Club, December 14, 2020 (virtual)
587. ‘Bosonic Codes and Quantum Error Correction in Circuit QED,’ ARQC Seminar, Johns Hopkins University, January 6, 2021 (virtual).
588. ‘Boson Sampling and Quantum Simulations in Circuit QED,’ IBM-Qiskit Quantum Information Science Seminar, January 15, 2021 [<https://youtu.be/miK5y8BYlwQ>]
589. “The Second Quantum Revolution and the Race to Build ‘Impossible’ Computers,” Yale University Quantum Computing Club Colloquium, February 9, 2021 [virtual].
590. ‘Progress and Prospects for the Second Quantum Revolution,’ Rutgers Physics Colloquium, February 10, 2021 [virtual].
591. “The Second Quantum Revolution and the Race to Build ‘Impossible’ Computers,” Tilde Science Cafe, March 6, 2021 [virtual].
592. ‘Circuit QED: Encoding quantum information in harmonic oscillators,’ Physical Review Invited Session: Forefront Research Across Disciplines, American Physical Society March Meeting (virtual), March 16, 2021.
593. ‘Overview of C2QA Research Plans,’ Air Force Research Laboratory – Co-design Center for Quantum Advantage joint meeting, March 16, 2021 [virtual].
594. ‘Using Boson Sampling for Efficient Simulation of Molecular Spectra on a Small Quantum Processor,’ National University of Singapore, Centre for Quantum Technologies Colloquium, March 25 (GMT+8), 2021 [virtual].
595. ‘Continuous-Variable Quantum Information Processing,’ Keynote address, Wallenberg Centre for Quantum Technologies (WACQT) web-workshop, “Enabling technology and algorithms for quantum computing,” on April 13-14, 2021 [virtual].
596. ‘Dissipation: Friend and Foe,’ Plenary Speaker, Roundtable on Quantum technologies in Dissipative Environments, online SPICE-Workshop ‘Dissipative Phases of Interacting Quantum Matter,’ May 4, 2021 [virtual].

597. ‘A Brief History of Superconducting Qubits,’ QC40: Physics of Computation Conference 40th Anniversary, MIT Endicott House, May 6, 2021 (Video can be seen at: <https://m.youtube.com/watch?v=xjlGL4Mvq7A> )
598. ‘Instruction Set Architecture for Control of Hybrid Qubit/Oscillator Systems in Circuit QED,’ European Horizon 2020 NONGAUSS Workshop (virtual), Palacký University, Danmarks Tekniske Universitet, and Sorbonne Université, May 18-20, 2021.
599. “Quantum Computing: Near and Long-Term Foreign Policy Implications,” US Department of State, Washington, DC (virtual), May 21, 2021 (presenter and panel member).
600. ‘Bosonic Quantum Error Correction Codes and Quantum Simulations in Circuit QED,’ web-Conference on “Recent advances in Quantum Computation and Quantum Information science” at Bhabha Atomic Research Centre (BARC), Mumbai, India, May 27, 2021 [virtual].
601. ‘The Second Quantum Revolution and the Race to Build “Impossible” Computers, Brookhaven National Lab C2QA Quantum Computing Summer School, June 30, 2021 [virtual].
602. ‘Introduction to Circuit QED: Quantum Optics and Quantum Information Processing with Microwave Photons,’ International Quantum Summer 2021 Summit at Stony Brook University, August 16, 2021 [virtual].
603. ‘Circuit QED: Encoding quantum information in harmonic oscillators,’ International conference on theoretical physics, “From quasi-classics to Bose condensation and everything in between,” dedicated to Valery Pokrovsky on his 90-th anniversary, L.D.Landau Institute, Chernogolovka, Russia, August 17-20, 2021 [virtual].
604. ‘The Second Quantum Revolution and the Race to Build “Impossible” Computers, Inaugural Lecture, High School Quantum Science Association (<https://hsqsa.org>), September 18, 2021.
605. ‘Introduction to Circuit QED: Quantum Optics and Quantum Information Processing with Microwave Photons,’ Physics Colloquium, The Ohio State University, October 12, 2021 (virtual).
606. ‘Progress and Prospects for the Second Quantum Revolution,’ 2021 Christy Lecture, Caltech, October 21, 2021.
607. ‘Towards Many-Body Quantum Simulations of Interacting Bosons in Circuit QED,’ Institute for Quantum Information and Matter seminar, Caltech, October 22, 2021.
608. ‘Introduction to Circuit QED: Quantum Optics and Quantum Information Processing with Microwave Photons,’ ‘QuCoLiMa-Talk’ within the Transregional Collaborative Research Center “Quantum Cooperativity of Light and Matter,” Erlangen, Mainz, Saarbrücken, October 26, 2021 (Virtual).

609. ‘The Race to Build a Quantum Computer,’ 221st Interurban Clinical Club Meeting, November 5, 2021.
610. ‘Circuit QED: Quantum Optics and Quantum Information Processing with Superconducting Electrical Circuits,’ (virtual) plenary lecture, 7th Quantum Optics and Quantum Information Meeting (KOBIT), Turkey (<https://kobit.org.tr/>), February 3, 2022.
611. ‘Progress and Prospects for the Second Quantum Revolution,’ Hamilton Lecture, Princeton University, April 21, 2022.
612. ‘Progress and Prospects for the Second Quantum Revolution,’ SOLARIS: XII CONGRESS OF PHYSICS AND MATHEMATICS UDLAP, Universidad de las Américas Puebla, Mexico.
613. ‘Quantum Signal Processing and Instruction Set Architectures for Qubit/Cavity Systems,’ Wallenberg Centre for Quantum Technologies ‘Student Day,’ Chalmers University Göteborg, Sweden, May 12, 2022.
614. ‘Overview of Quantum Devices,’ Solvay Conference, Brussels, Belgium, May 19, 2022.
615. ‘Quantum Signal Processing and Instruction Set Architectures for Qubit/Cavity Systems,’ Quantum Cavities 2022 (QC22), Jouvence, Quebec, May 29 – June 1, 2022.
616. ‘Programmable Quantum Simulators for Condensed Matter and Lattice Gauge Models,’ WINQ Workshop, Nordita, June 10, 2022.
617. ‘Quantum Simulations and Quantum Error Correction with Bosonic Modes,’ Nordita Quantum Connections Workshop, Lidingö, Stockholm, Sweden, June 13-24, 2022.
618. ‘Quantum Error Correction: Why Bosons are better than Qubits,’ Rutgers Math/Phys Lebowitz Seminar, June 29, 2022.
619. ‘Towards simulation of correlated quantum matter and lattice gauge theories with circuit QED,’ Enrico Fermi Varenna Summer School 2020: Course 209 - Quantum Fluids of Light and Matter - QFLM2020 (Covid delayed to July1-7, 2022).
620. ‘Continuous variable quantum information processing and experimental quantum error correction beyond the break-even point,’ Distinguished Lecturer Series, Max Planck Institute, Erlangen, Germany, July 14, 2022.
621. Overview lecture, ‘Quantum Computation, Error Correction, and Simulation with Superconducting Qubits and Bosonic Modes,’ Nobel Symposium 166, Lund, Sweden, June, 2020; Covid delayed to August 25-28, 2022.
622. ‘Introduction to Quantum Error Correction with Superconducting Qubits and Microwave Photons,’ Sixth Quantum Africa Conference (QA6), Kigali, Rwanda (virtual), September 12, 2022.

623. ‘Progress and Prospects for the Second Quantum Revolution and the Race to Build “Impossible” Computers,’ (Virtual) Public Lecture, FRIB, Michigan State University, October 2, 2022.
624. ‘Grand Challenges for the 2nd Quantum Revolution,’ SQMS Annual Meeting Plenary Lecture, Fermi National Accelerator Laboratory, October 17, 2022 (virtual).
625. ‘Introduction to Quantum Error Correction with Superconducting Qubits and Microwave Photons,’ Quantum 2022, Wenzhou, China (virtual), 22-23 October 2022.
626. ‘Bosonic Modes: Instruction Sets for Quantum Control and Quantum Error Correction Beyond the Break-Even Point,’ MIT iQuise Lecture, Cambridge, MA, November 3, 2022.
627. ‘Quantum Computation, Error Correction, and Simulation with Superconducting Qubits and Bosonic Modes,’ 4th International Symposium on Quantum Physics and Quantum Information Sciences (QPQIS-2022), hosted by Beijing Academy of Quantum Information Sciences (BAQIS), on 30th November – 1st December 2022 (Beijing time). (Virtual)

## PUBLICATIONS

1. E.B. Hooper, Jr. and S M. Girvin, "Characteristics of Turbulence in a Reflex-arc Plasma", *J. of Applied Physics* **42**, 4832 (1971).
2. S.M. Girvin and K.R. Brownstein, "Alternatives to the Dirac Equation", *Phys. Rev.* **D12**, 2337 (1975).
3. S.M. Girvin and J.J. Hopfield, "Exchange Effects in the Li K Edge", *Phys. Rev. Lett.* **37**, 1091 (1976); *Proceedings of the International Conference on the Physics of X-Ray Spectra* (Gaithersburg, MD, 1976).
4. S.M. Girvin and G.D. Mahan, "Cation Disordering in  $\text{Ag}_2\text{HgI}_4$  and  $\text{Cu}_2\text{HgI}_4$ ", *Solid State Comm.* **23**, 629 (1977).
5. S.M. Girvin, "Fluorescence Spectrum of Heavily Doped Cadmium Sulphide", *Phys. Rev.* **B17**, 1877 (1978).
6. S.M. Girvin, "Thermoelectric Power of Superionic Conductors", *J. Solid State Chem.* **25**, 65 (1978); *Proceedings of the Second International Meeting on Solid Electrolytes* (St. Andrew's, Scotland, 1978).
7. G.D. Mahan and S.M. Girvin, "Blume-Capel Model for Plane-Triangular and fcc Lattices", *Phys. Rev.* **B17**, 4411 (1978).
8. S.M. Girvin, "New Method for the Ising Model Phase Diagram", *J. Phys. C: Solid State Physics* **11**, L427 (1978).
9. S.M. Girvin, "Critical Conductivity of the Lattice Gas", *J. Phys. C: Solid State Physics* **11**, L751 (1978).
10. S.M. Girvin, "Thermoelectric Power in Half-Filled Bands", *Phys. Rev.* **B19**, 1302 (1979).
11. M. Jonson and S.M. Girvin, "Electron-Phonon Dynamics and Transport in Random Metal Alloys", *Phys. Rev. Lett.* **43**, 1447 (1979).
12. S.M. Girvin and G.D. Mahan, "Exact Results for the Quantum Diffusion of Many Particles in a Stochastic Medium", *Phys. Rev.* **B20**, 4896 (1979).
13. S.M. Girvin and D.R. Penn, "Theory of Coherence Effects in Photoinduced Auger Events: Resonant Satellites in Metals with Filled d-Bands", *Phys. Rev.* **B22**, 4081 (1980).
14. S.M. Girvin and M. Jonson, "Dynamical Electron-Phonon Interaction and Conductivity in Random Metal Alloys", *Phys. Rev.* **B22**, 3583 (1980).
15. S.M. Girvin and D.R. Penn, "Resonant Satellites in Photoemission and Auger Spectra of d-Band Metals", *J. of Applied Physics* **52**, 1650 (1981).

16. J.A.D. Matthew and S.M. Girvin, “The Breadths of Resonant Photoemission Satellites and Electron Excited Direct Recombination Emission”, *Phys. Rev.* **B24**, 2249 (1981).
17. R.W. Rendell and S.M. Girvin, “Hall Voltage Dependence on Inversion Layer Geometry in the Quantum Hall Effect Regime”, *Phys. Rev.* **B23**, 6610 (1981).
18. A.J. Melmed, M. Martinka, S.M. Girvin, T. Sakurai and Y. Kuk, “Analysis of High Resistivity Semiconductor Specimens for an Energy-Compensated Time-of-Flight Atom Probe”, *Appl. Phys. Lett.* **39**, 416 (1981).
19. D.T. Pierce, S.M. Girvin, J. Unguris and R.J. Celotta, “Adsorbed Current Spin Detector”, *Rev. Sci. Instr.* **52**, 1437 (1981).
20. S.M. Girvin, R.W. Rendell and G.W. Bryant, “New Field Theory Formulation of Localized States in Disordered Systems”, *J. Phys. C: Solid State Physics* **14**, L881 (1981).
21. S.M. Girvin, D.R. Penn and G.D. Mahan, “Dispersion Relation Approach to the X-Ray Edge Problem”, *Phys. Rev.* **B24**, 6971 (1981).
22. S.M. Girvin and R.W. Rendell, “Quantum Hall Effect: Role of Inversion Layer Geometry and Random Impurity Potential”, *Surface Science* **113**, 39 (1982).
23. S.M. Girvin, M. Jonson and P.A. Lee, “Interaction Effects in Disordered Landau Level Systems in Two Dimensions”, *Phys. Rev.* **B26**, 1651 (1982).
24. S.M. Girvin and M. Jonson, “Inversion Layer Thermopower in High Magnetic Field”, *J. Phys. C: Solid State Physics* **15**, L1147 (1982).
25. Terrence Jach and S.M. Girvin, “Momentum Transfer Dependence of Fano Lineshape in Electron-Energy-Loss Spectra of Nickel”, *Phys. Rev.* **B27**, 1489 (1983).
26. M. Cage and S.M. Girvin, “The Quantum Hall Effect I”, *Comments on Solid State Physics* **11**, 1 (1983).
27. S.M. Girvin and M. Cage, “The Quantum Hall Effect II”, *Comments on Solid State Physics* **11**, 47 (1983).
28. R.W. Rendell and S.M. Girvin, “Quantum Hall Effect: Role of Inversion Layer Geometry and Random Impurity Potential”, in *Precision Measurements and Fundamental Constants II* (National Bureau of Standards (U.S.) Special Publication **617**, 1984), p. 557, edited by B.N. Taylor and W.D. Phillips.
29. S.M. Girvin and T. Jach, “Interacting Electrons in Two-Dimensional Landau Levels: Results for Small Clusters”, *Phys. Rev.* **B28**, 4506 (1983).
30. M.E. Cage, R.F. Dziuba, B.F. Field, E.R. Williams, S.M. Girvin, A.C. Gossard, D.C. Tsui and R.J. Wagner, “Dissipation and Dynamic Nonlinear Behavior in the Quantum Hall Regime”, *Phys. Rev. Lett.* **51**, 1374 (1983).

31. M. Jonson and S.M. Girvin, “The Thermoelectric Effect in a Weakly Disordered Inversion Layer Subject to a High Magnetic Field”, *Phys. Rev.* **B29**, 1939 (1984).
32. S.M. Girvin, “Anomalous Quantum Hall Effect and Two-Dimensional Classical Plasmas: Analytic Approximations for Correlation Functions and Ground State Energies”, *Phys. Rev.* **B30**, 558 (1984).
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### Patents granted and pending

#### OCR 6869

V. V. Albert, R. T. Brierley, S. M. Girvin, L. Jiang, M. Michael, J. Salmilehto, M. Silveri  
*Techniques for Quantum Error Correction Codes using Bosonic Modes and related systems and methods*

**Patent granted:**

**U.S. Patent No. 11,037,068 dated 6/15/2021**

**Japan Patent No. 6947408 dated 9/21/2021**

**China Patent No. ZL201680070790.8 dated 4/26/2022**

**Singapore Patent No. 11201803912Y dated 10/21/2022**

**Prosecution pending in**

**EP/16892925.5, ROK/10-2018-7019047, HK/18113992.1, and CAN/3,004,750**

#### OCR7138

C. Shen, K. Noh, V. Albert, S. Krastanov, M. Devoret, R. Schoelkopf, S. Girvin and L. Jiang  
*Quantum Channel Construction with Circuit Quantum Electrodynamics*

**Patent granted:**

**U.S. Patent No. 10,776,709 dated 9/15/2020**

**Prosecution pending in**

**EP/17869543.3, and CAN/3043201**

#### OCR7262

L. Jiang, S. Girvin, B. Lester, Y. Gao, R. Schoelkopf  
*Robust Quantum Logical Gates*

**Patent granted:**

**U.S. Patent No. 11,451,231 dated 9/20/2022**

**Prosecution pending in**

EP/19751562.0, SG/11202005645R, ROK/10-2020-7021833, JP/2020-536949, CN/201980007288.6, CAN/3085954, and HK/62021030147.4

**OCR7263**

S. Rosenblum, P. Reinhold, L. Jiang, S. Girvin, L. Frunzio, M. Devoret, R. Schoelkopf  
*Hardware-efficient fault-tolerant operations with superconducting circuits*

**Patent granted:**

**U.S. Patent No. 11,449,384 dated 9/20/2022**

**Prosecution pending in**

**EP/19751978.8, SG/11202005642V, ROK/10-2020-7021832, JP/2020-536948, CN/201980007243.9, CAN/3085955, and HK/62021030148.2**

**OCR7430**

S. Puri, A. Grimm, P. Campagne-Ibarcq, S. Girvin, M. Devoret

*Quantum information processing with an asymmetric error channel*

**Prosecution pending in**

**US/17/253,460, EP/19866408.8, SG/11202012790Y, ROK/10-2021-7003027, JP/2020-572761, CN/201980051878.9, CAN/3104518, and HK/62021040630.7**

**OCR7596**

S. Mundhada, N. Frattini, S. Puri, S. Shankar, S. Girvin, M. Devoret

*Josephson non-linear circuit for Kerr and cross-Kerr modulation*

**Prosecution pending in**

**US/17/423,631, EP/20741852.6, and CAN/3125986**

**OCR7649**

C. Hann, C. Zou, Y. Chu, Y. Zhang, R. Schoelkopf, S. Girvin and L. Jiang

*Techniques for Quantum Memory addressing and related systems and methods*

**Prosecution pending in**

**US/17/435,167, EP/20765915.2, SG/11202109186V, ROK/10-2021-7031032, JP/2021-551553, CN/202080017978.2, HK/62022055703.2, and CAN/3132155**

**OCR7677**

K. Noh, S. Girvin, L. Jiang

*Error correcting while maintaining bosonic nature of the system*

**Prosecution pending in**

**US/17/598,148, EP/20776963.9, and CAN/3134827**

**OCR8301**

James Teoh, Neel Thakur, Ben Chapman, Stijn de Graaf, Steven Girvin, Shruti Puri, Robert J. Schoelkopf

*Measurement-based Fault tolerant architecture for 4-legged cat code*  
**Provisional filing 63/293,034 dated 12/22/2021**

**OCR8493**

Robert J. Schoelkopf, Steven Girvin, Shruti Puri, James Teoh, Stijn de Graaf, Sophia Xue, Ben Chapman, John Garmon, Aniket Maiti, Yao Lu, William Kalfus, Neel Thakur, Takahiro Tsunoda, Patrick Winkel

*Dual-rail qubits based on superconducting resonant cavities and their application for quantum error correction*

**Provisional filing pending**

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