

Allan Peter Young
Curriculum Vitae
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Address: University of California
Santa Cruz, CA 95064

Telephone: (831) 459-4151

Professional Employment

1978–84 Lecturer in Mathematics at Imperial College.

1984–85 Reader in Mathematics at Imperial College, London

1985–2014 Professor of Physics, University of California, Santa Cruz

2014– Research Professor of Physics, University of California, Santa Cruz

Education

1967-70 Undergraduate at Oxford University. First class honors degree in Physics.

1970-73 Post-graduate student in Theoretical Physics Department, Oxford University, under the supervision of R.J. Elliott, obtained D. Phil. in September 1973. Thesis Title: Phase Transitions in Spin-phonon Systems

1973-75 Postdoctoral research assistant in Theoretical Physics Department, Oxford, working in collaboration with Metallurgy Department under the direction of R.J. Elliott and J.P. Jakubovics.

1975-77 Scientist at the Institut Laue Langevin, Grenoble

1977-78 Post-doc at Cornell University

Research Interests

Author of over 200 papers on statistical physics and theoretical condensed matter physics, especially numerical studies on the theory of phase transitions in disordered condensed matter systems such as spin glasses, and the theory of quantum phase transitions. Recent work has focussed mainly on solving optimization problems using quantum computers.

Awards

1985 Maxwell Medal and Prize (jointly with A.J. Bray)

1989 Fellow the American Physical Society.

2004 Excellence in Teaching Award at the University of California Santa Cruz.

- 2005 Outstanding Faculty Award of the Division of Physical and Biological Sciences of the University of California Santa Cruz.
- 2008 Selected as one of the inaugural group of “Outstanding Referees” by the American Physical Society.
- 2009 Aneesur Rahman Prize of the American Physical Society for Computational Physics.
- 2012 Humboldt Research Award (Humboldt Prize) from the Alexander von Humboldt Foundation.
- 2012 Elected member of the American Academy of Arts and Sciences.
- 2014 Martin Gutzwiller Fellowship from the Max Planck Institute for the Physics of Complex Systems in Dresden.
- 2017 Department of Science and Technology Centennial Professor, Indian Institute of Sciences, Bangalore, India, Jan. 4–Feb. 6, and Oct. 17–Nov. 15, 2017.
- 2018 Simons Visiting Fellow at the International Center for Theoretical Sciences, Bangalore, June 30–July 15, 2018.

Outside Professional Activities

- Referee for the following journals:
 - Physical Review B
 - Physical Review E
 - Physical Review Letters
 - Journal of Physics: Condensed Matter
 - Journal of Physics A: Mathematical and General
 - Europhysics Letters
 - Journal of Statistical Physics
 - Physics Letters A
 - International Journal of Modern Physics
- Associate Divisional Editor for Physical Review Letters, July 1992–December 1995
- Member of the Editorial Board of J. Phys. A: Mathematical and General, 1993–1999.
- Associate Editor of International Journal of Modern Physics B, 1992-94.
- Co-Editor, Europhysics Letters, May 1999–2003.
- Referee for grant proposals:
 - National Science Foundation
 - Department of Energy
 - Office of Naval Research
 - Petroleum Research Institute
 - The Wellcome Trust
 - Natural Sciences and Engineering Research Council of Canada
 - US-Israel Binational Foundation
 - Research Grants Council of Hong Kong
 - Australian Research Council
 - The Research Corporation (a Foundation for the Advancement of Science and Technology)
 - The Swiss National Science Foundation
 - Austrian Science Fund (FWF)
 - Agence Nationale de Recherche (France)
- August - December 1986. Coordinator of the program on Spin Glasses, Computation and Neural Networks at the Institute for Theoretical Physics, Santa Barbara.

- Member NSF site review panel for Materials Research Laboratory, University of Chicago, 1989.
- Member NSF review panel for Computational Approaches to Real Materials, June 24 1992.
- Member DOE review panel for projects on High Temperature Superconductivity and Ceramics, July 28-30, 1992.
- Member, Allocation Committee, San Diego Supercomputer Center, from June 1988–1990.
- Member, Allocation Committee, Cornell Supercomputer Center, September 1995–97
- Member of MetaCenter Allocation Committee, Washington DC, February 1996.
- Co-organizer of the UC Statistical Mechanics meeting, Santa Cruz, March 1996.
- Member of MetaCenter Allocation Committee, Washington DC, February 1997.
- Co-organizer, with S. Sachdev and M. Sarachik, of the program “Quantum phases with quenched disorder”, Aspen Center for Physics, July 7-August 8 1997.
- Member of NSF panel reviewing Materials Research Centers (MRSEC), Washington May 26-28 1998.
- Member of review committee for *Service de Physique Theorique*, Saclay, France, November 16-17, 2000.
- Member of review committee for *Service de Physique Theorique*, Saclay, France, December 16-17, 2002.
- Member of review committee for *Materials Design and Characterization Laboratory*, Institute for Solid State Physics, Tokyo, January 5-6, 2004.
- Member of the selection committee for the Onsager Prize of the American Physical Society, 2003, 2004.
- US editor for new book series in Mathematical and Computational Physics for Institute of Physics Publishing 2004–2005.
- Member of the committee for the selection of oral presentations at StatPhys 23, July 2007.
- Member of the a topic committee (selecting oral presentations) for STATPHYS 25, July 2013.
- Member of NSF panel reviewing proposals submitted to the Quantum Information Program, March 25-26, 2013.
- Co-organizer of the Bad Honnef Physics School on Computational Physics of Complex and Disordered Systems, 20 - 25 September, 2015, Bad Honnef, Germany.

- Asked to serve on the advisory board of the Physics Frontier Center in non-equilibrium physics at Boston University (if funded), 2016.
- Member of an NSF panel to review proposals for a program (the NSF requests me to not say which one), September 23-24, 2019, Washington DC.

Grants

- NSF Grant No. DMR-8419536, July 1985-March 1988, \$160,000 per year. Theoretical Studies of Disordered Systems; The Effects of Random Fields and Random Bonds (with M. Nauenberg)
- NSF Grant No. DMR-8510593, \$100,000. Acquisition of an Array Processor (with M. Nauenberg)
- Gift from Inmos Corporation of 16 T414 Transputers (parallel processors). Market value at the time \$16,000
- Grant from Natural Sciences Division, \$2,200 to purchase AT clone plus hard disk to drive Transputers (1987)
- Grant from the Natural Sciences Division, \$6,200. Acquisition of 12 Transputers (parallel processors) (1987)
- NSF Grant No. DMR-8721673, August 1988-July 1991, \$121,000 per year. Theoretical Studies of Disordered Systems; Cooperative Phenomena in Condensed Matter Systems (with J. Deutsch)
- Grant from IBM, August 1988-September 1989, \$45,000 (with M. Nauenberg).
- Israel-U.S. Binational Foundation, 1989-92 (with Moshe Schwartz). My share of the grant is \$2,500 per year for travel.
- NSF Grant No. DMR-9111576, August 1991 - July 1994, \$82,000 per year. Theory of Phase Transitions in Quantum and Disordered Systems.
- Grant of \$9,000 from the Natural Sciences Division as matching funds for the NSF proposal. Used to buy computer equipment (1994).
- NSF Grant No. DMR-9411964, July 1994 - June 1997, \$86,000 per year. Theory of Phase Transitions in Quantum and Disordered Systems.
- NSF Grant No. DMR-9713977, November 1997 - October 2000, \$95,000 per year. Theory of Phase Transitions in Quantum and Disordered Systems.
- NSF Grant No. DMR-0086287, November 2000 - October 2003, \$100,000 per year. Numerical Studies of Phase Transitions in Disordered Systems.
- NSF Grant No. DMR-0337049, December 2003 - November 2007, \$100,000 per year. Theoretical Studies of Frustrated Systems.
- Special Research grant from the Committee on Research (actually funded by the Vice Chancellor for Research), \$11,000; “Computer cluster for simulation of quantum computers”. Used to purchase 4 Mac Pro computers.

- ARO Grant No. 56290-PH-QC, July 2009 - June 2012, \$150,000 per year; “Determining the complexity of the quantum adiabatic algorithm using Monte Carlo simulations” (to be confirmed).
- NSF Grant No. DMR-0906366, September - 2009 August 2012, \$100,000 per year. “Numerical Simulations of Quantum Computers and Disordered Systems”.
- NSF Grant No. DMR-0906366, September - 2012 August 2015, \$110,000 per year. “Numerical Simulations of Quantum Computers and Disordered Systems”.
- University Affiliated Research Center (NASA Ames), 2013 Calendar Year, \$34,580. “Proposal to investigate two problems relevant for NASA’s quantum computing activities”.
- Consultant for proposal “FluQS: flux-based quantum speedup” to IARPA-BAA-15-13 (Quantum Enhanced Optimization), lead organization is USC. My participation is \$24K per year, August 2017–July 2019.

INVITED TALKS

1. APS Annual Condensed Matter Physics Conference, Baltimore, March 1985.
2. Aspen Center for Physics, August 1985.
3. International Conference on Magnetism, San Francisco, August 1985.
4. Workshop on Scientific Applications and Algorithm Design for High Speed Computing, Urbana, April 1986.
5. Nonlinearity in Condensed Matter, Los Alamos, May 1986.
6. Competing Interactions and Microstructures: Statics and Dynamics, Los Alamos, May 1987.
7. American Mathematical Society Meeting on Disordered Systems, Bowdoin College, Bangor, Maine, June 1988.
8. Invited talk on “Simulations of Quantum Spin Systems” at the annual APS condensed matter physics conference, St. Louis, March 1989.
9. Invited talk on “Simulations of Quantum Spin Systems” at the first meeting of the Computation Physics Group of the APS, Boston, June 1989.
10. Invited talk on “Spin Glasses” at the “Sir Roger Elliott 60th Birthday Symposium”, Oxford, July 1989.
11. Invited talk on “Antiferromagnetism and Binding of Holes in 2-d Quantum Systems” at the meeting of the magnetism group of the Institute of Physics, Oxford, July 1989.
12. I was invited to present papers at the StatPhys conference in Rio de Janeiro, August 1989 and a Satellite Conference on Magnetism in Recife but was unable to attend because of other commitments and shortage of funding for travel.
13. Series of 4 lectures on “Strongly correlated electron and spin systems,” Saclay, January 1991.
14. Invited talk on “The universal conductance at the superconductor-insulator transition in two-dimensional thin films,” MECO conference, Duisburg, Germany, March 12 - 14, 1991.
15. Invited lectures on “Numerical Methods for Quantum Spin Systems,” at the Les Houches summer school on “Strongly Correlated Electron Systems,” August 1991.
16. Invited talk at the conference on Computational Physics for Condensed Matter Phenomena, Osaka, Japan, October 21 - 23, 1991.
17. Invited talk on “Spin Glasses: Results from Numerical Simulations” at the Nishinomiya Yukawa Symposium, Nishinomiya, Japan, October 24 - 25, 1991.

18. Invited participant at the Workshop on Quantum Phase Transitions, Institute for Theoretical Physics, Santa Barbara, February - March 1992.
19. Invited talk on “The Vortex Glass” at the March meeting of the APS, March 1992.
20. Invited to talk at the Symposium on “Frontiers in Low Dimensional Condensed Matter Systems”, Beijing, China, June 1 - 12, 1992, but was unable to attend because of other commitments.
21. Invited talk on “The Vortex Glass” at the conference on “Superconductors in a Magnetic Field” Argonne National Laboratory, August 24-28, 1992.
22. Invited to give lectures on “Vortex Glass and Spin Glass” at the Nato Advanced Study Institute on “Phase Transitions and Relaxation and Systems with Competing Energy Scales”, Geilo Norway, April 1993, but was unable to attend.
23. Invited Talk on “Vortex Glass” at the Raymond L. Orbach Inauguration Symposium, Riverside, March 1993.
24. Invited Lectures on “Bosons in a random potential” at the International Summer School on Fundamental Problems in Statistical Physics VIII, Altenberg, July 1993.
25. Invited Lectures on “Two Dimensional Superfluids”, at the Nato Advanced Study Institute on Vortices in Superfluids, Cargese, Corsica, July 1993.
26. Invited to speak at the conference on “Metal-Insulator Transitions, Localization and Mesoscopic Systems”, Eugene, Oregon August 1993, but was unable to attend.
27. August 25 - September 9, 1993, 12 talks in Japan. (Kyoto University, several Institutes in Tokyo and Tsukuba University) My visit was sponsored by the Japanese Society for the Promotion of Science.
28. Invited to give a series of lectures at the NATO Advanced Study Institute on “Statistical Mechanics of Complex Systems”, International Center for Theoretical Physics, Trieste, March 21 - April 3, 1994.
29. Invited to meeting on “Quantum Phases”, at the International Center for Theoretical Physics, Trieste, April 1994, but unable to attend.
30. Invited Lecture at the Workshop on “Submicron Quantum Dynamics”, International Center for Theoretical Physics, Trieste, June 14 - June 30 1994.
31. Invited Lectures at the Workshop on “Strong Correlations and Quantum Critical Phenomena” at the International Center for Theoretical Physics, Trieste, July 4 - 22 1994.
32. Invited to 18th Brazilian Meeting of Condensed Matter Physics, Caxambu, May 1995 (declined).
33. Invited talk on “Quantum Spin Glasses” at “Recent advances in the theory of disordered systems: spin glasses, random fields, random polymers”, Saclay, France July 1995.

34. Invited lectures on “Phase Transitions in Random Systems”, at the Summer School, Como, Italy, July 1995.
35. Invited talk on “Quantum Spin glasses” at the meeting on Quantum Phase Transitions, Telluride, August 1995.
36. Invited talk at the Satellite meeting of Statphys in Calcutta, August 1995 (Declined).
37. Invited talk on “Numerical Simulations of Quantum Phase Transitions”, at StatPhys XV, Xiamen, China, August 1995.
38. Invited talk on “Recent Developments in Ising Spin Glasses”, at the US-Japan Bilateral Symposium on Computational Physics, Maui, August 1995.
39. Invited talk on “Quantum phase transition in one-dimensional disordered Ising magnets”, at the Miniworkshop on Strong Electron Correlations, Trieste, Italy, July 1996.
40. Invited talk on “Griffiths Singularities in Disordered Quantum Magnets”, conference organized by the Institute of Physics, September 1996, Oxford, England.
41. Invited talk at Physics Computing 96, Krakow, Poland, September 1996 (declined).
42. Invited talk on “The vortex glass; is there really a phase transition?” at conference on Aging Phenomena in Complex Systems, Lake Arrowhead, November 4-7, 1996.
43. Invited talk on “Numerical Study of the Random Ising Chain in a Transverse Field” at the Workshop on Quantum Magnets, Osaka, December 1996.
44. Invited talk on “Numerical Study of the Random Transverse-Field Ising Chain”, March meeting of the APS, March 17-21, 1997. Kansas City.
45. Invited talk on “Simulations of the 3-d Ising Spin Glass”, March meeting of the APS, March 17-21, 1997. Kansas City (declined because one can only give one invited talk).
46. Invited talk on “Future directions of statistical mechanics” at the Symposium in memory of Prof. Choh, Seoul, June 1997 (declined because of another commitment).
47. Invited plenary talk at the International Conference on Magnetism, Cairns, Australia, July 27 to August 1, 1997 (declined because of pressure of schedule.)
48. Invited lectures on “Quantum Phase Transitions in Random Systems” at the Summer College in Condensed Matter on “Statistical Physics of Frustrated Systems”, International Centre for Theoretical Physics, Trieste, 28 July to 15 August, 1997.
49. Invited talk on “Slow dynamics in the Griffiths-McCoy phase of the random transverse-field Ising chain” at the Workshop on “Aging Phenomena in Complex Systems. II”, Kyoto, October 26-29, 1997.
50. Invited talk “Tutorial on Disordered Systems” at the conference “Algorithmic Techniques in Physics”, Schloss Dagstuhl, Germany, December 15-19, 1997.

51. Invited talk on “The Random Transverse Field Ising Ferromagnet: the Simplest Disordered Model with a Quantum Phase Transition” in “Computer Simulation Studies in Condensed Matter Physics, XI”, Athens Georgia, February 23-27, 1998.
52. Invited talk on “Superconductor–Insulator Transition”, at the meeting on “Bad Metals”, UCLA, March 21-22, 1998.
53. Invited talk on “Quantum Phase Transitions in Disordered Ising Magnets” at the APCTP-ICTP meeting on “Highlights in Condensed Matter Physics”, June 12-16 1998, Seoul, Korea.
54. Invited talk at “Statistical Physics of Glassy Dynamics and Quantum Fluctuations” at Fondation Royaumont, France, October 25-28, 1998.
55. Invited talk on “Quantum Phase Transitions” at Aspen Winter School, January 3-9, 1999.
56. Invited talk on “The Random Ising Ferromagnet in a Transverse Field: the Simplest Disordered Model with a Quantum Phase Transition”, in conference on “Monte Carlo and Structure Optimization Methods for Biology, Chemistry and Physics”, Florida State University, Tallahassee, March 30 1999.
57. Invited talk on “The Random Transverse Field Ising Ferromagnet: the Simplest Disordered Model with a Quantum Phase Transition”, Centennial meeting of the American Physical Society, March 20-26, 1999.
58. Discussion leader on “Vortex Matter in Type-II Superconductors”, Gordon Conference on Condensed Matter Physics, New London, Connecticut College, Connecticut, June 12-17, 1999.
59. Invited talk on “Slow Dynamics at Quantum Phase Transitions”, US-Japan Bi-lateral Seminar on “Understanding and Conquering Long Time Scales in Computer Simulations”, Maui July 27-30, 1999.
60. Invited talk on “Quantum Phase Transitions”, at meeting on “Advances in Statistical Physics”. Copenhagen, September 22, 1999.
61. Invited talk on “Sensitivity of Spin Glass Ground States to Changes in Boundary Conditions”, at meeting on “Frontiers in Magnetism”. Kyoto, October 4-7, 1999.
62. Invited talk on “Critical Behavior and Griffiths-McCoy Singularities in Random Quantum Magnets”, at the workshop “Computational Quantum Many-Body Physics”, Cambridge, England, February 18-21, 2000.
63. Invited talk on “Critical Behavior and Griffiths-McCoy Singularities in the Two-Dimensional Random Transverse Field Ising Model”, March meeting of the APS, Minneapolis, March 20-24, 2000.
64. Invited talk on “Quantum Phase Transitions in Random Magnets” at ICM2000, International Conference on Magnetism, August 6-11, 2000, Recife, Brazil.

65. Invited talk on “Computer Science in Physics” at the conference “Informatics - 10 Years Back, 10 Years Ahead” Dagstuhl Anniversary Conference, August 26-31, 2000 Saarbrücken, Germany.
66. Invited talk on “Spin Glasses: A Computational Challenge for the 21st Century”, Statphys Satellite Conference on “Challenges in Computational Statistical Physics in the 21st Century”, Athens, Georgia, July 23-25, 2001.
67. Invited talk in “Numerical Studies of Spin Glass Problems in Magnetism and Superconductivity”, Second Regional Conference on Magnetic and Superconducting Materials, Irbid, Jordan, September 9-13, 2001.
68. Invited talk on “Numerical studies of finite dimensional spin glasses at low temperatures” at the meeting on “Quantum disordered systems, glassy low-temperature physics and physics at the glass transition”, Heidelberg, Feb. 26–Mar. 1, 2002.
69. Invited talk on “Short range spin glasses” at the Middle European Cooperation in Statistical Physics (MECO), Sopron Hungary, March 7-9, 2002.
70. Invited talk on “Numerical methods in the spin-glass problem” at conference on “Unconventional Critical Behaviour and Phase Transitions”, Prague, Sept. 18-21, 2002.
71. Invited talk on “Griffiths singularities and critical phenomena at quantum phase transitions” at the “288-WE-Heraeus-Seminar on Quantum Magnetism: Microscopic Techniques For Novel States Of Matter”, Bad Honnef, Germany, November, 4-6, 2002.
72. Invited talk on “A single spin- and chiral-glass transition in vector spin glasses” at the symposium on “Current Topics in Physics”, Mexico City, June 17-19, 2003.
73. Invited talk on “Griffiths singularities and unusual critical phenomena in the disordered quantum Ising model at $T = 0$ ” at a workshop on “Quantum Phase Transitions” at the Max Planck Institute for Complex Systems, Dresden, July 10-12, 2003.
74. Invited talk on “Recent Developments in the Theory of Spin Glasses” at BIFI 2004, an international conference on “Biology after the genome: a physical view”, Zaragoza, Spain, February 11-13, 2004.
75. Invited talk on “Some recent developments in Spin Glasses” at Statphys 22, Bangalore, India, July 4-9, 2004.
76. Invited talk on “Recent developments in Spin Glasses” at “Statistical Physics of Disordered Systems and Its Applications”, Hayama, Japan, July 12-15, 2004.
77. Invited talk on “Recent numerical results on Spin Glasses” at “CCP2004, Conference on Computational Physics 2004, Genoa, Italy, September 1-4, 2004.
78. Invited talk on “Numerical studies of spin glasses: methods and some recent results” at “Computer Simulations in Condensed Matter”, Erice, Sicily Italy, July 20–August 1, 2005.

79. Invited talk on “Do Spin Glasses Have a Phase Transition in a Magnetic Field?” at the 94th Statistical Mechanics Conference, Rutgers University, December 18–20, 2005.
80. Invited talk on “Do spin glasses have phase transitions ” at Conference on Quantum Computing and Many Body Systems, Key West, January 31–February 3, 2006.
81. Invited talk on “Is there a spin glass transition (AT-line) in a magnetic field?” at meeting on Quantum Disordered Systems, Glassy Low-Temperature Physics and Physics at the Glass Transition, at the Max Planck Institute for the Physics of Complex Systems, Dresden, March 13 - 24, 2006.
82. Invited talk on “Phase Transitions in Spin Glasses” at the U.S.-Japan bilateral seminar, Maui, July 17-20, 2006.
83. Invited talk on “Phase Transitions in Spin Glasses” at StatPhys-Taiwan 2006, Taipei, Taiwan, June 21-16, 2006.
84. Invited talk on “Existence and/or nonexistence of phase transitions in spin glasses” at ICM 2006 (International Conference on Magnetism), Kyoto, August 20-25, 2006.
85. Invited talk on “Are there phase transitions in spin glasses?” at the Inaugural Theory Workshop on “Theories of Advanced Materials for Nanoscience” at the California Nanosciences Insitute, UC Santa Barbara, October 6–8, 2006.
86. Invited talk on “Is the Sherrington-Kirkpatrick model relevant for real spin glasses?”, at the meeting “Viewing the World Through Spin Glasses” in honor of David Sherrington, Oxford, England, Aug. 31–Sept. 1, 2007.
87. Invited talk on “Some recent results concerning phase transitions in spin glasses” at the International Workshop on Statistical Mechanics-Informatics 2007, Kyoto, Sept. 16–19, 2007.
88. Invited talk on “Phase Transitions in spin glasses” at the International Congress on “Large Scale Simulations of Complex Systems, Condensed matter and Fusion Plasma”, Zaragoza, Spain, February 6–8, 2008.
89. Invited talk on “Outstanding theoretical problems in Spin Glasses and their possible impact on a theory of Glasses” at “New Horizons in Condensed Matter Physics”, Aspen Feb. 3–9, 2008. (Had to decline because of clash with the Zaragoza meeting which I had already accepted.)
90. Invited talk on “Is there an Almeida-Thouless line in Spin Glasses?” at the APS March meeting, New Orleans, March 11, 2009.
91. Invited to present a talk at the Spring School in Leipzig on ”Monte Carlo Simulations of Disordered Systems”, March 30 to April 4, 2008, but declined because of teaching commitments.

92. Invited talk on “Complexity of the Quantum Adiabatic Algorithm”, at a meeting on “Quantum Critical Phenomena”, Toronto September 25–27, 2008.
93. Invited talk on “Phase Transitions in Spin Glasses” at CompPhys08 Workshop, Leipzig, November 27-29, 2008.
94. Invited talk on “Simulations of Spin Glasses and Related Systems” for receipt of the Rahman Prize, at the APS March meeting, Pittsburgh, March16–20, 2009.
95. Invited talk on “Numerical results on phase transitions in spin glasses” at a meeting on “Disordered Systems, Spin Glasses”, Montreal, June 8–13, 2009.
96. Invited talk at 2009 Quantum Computing (QC) & Quantum Algorithms (QA) Program Review review, Minneapolis, August 17–21, 2009.
97. Colloquium on “Complexity of the Quantum Adiabatic Algorithm”, Princeton, September 24, 2009.
98. Invited talk on “Complexity of the Quantum Adiabatic Algorithm” at CCP2009, Kaoshing, Taiwan, December 15–19, 2009.
99. Invited lecture on “Complexity of the Quantum Adiabatic Algorithm” at Winter School on Quantum Information Science at Natl. Cheng Kung Univ., Tainin, Taiwan, December 19–22, 2009
100. Talk on “First order phase transitions in the Quantum Adiabatic Algorithm”, at the March meeting of the APS, March 15–19, 2010.
101. Invited talk on “First order phase transition in the Quantum Adiabatic Algorithm”, at the Conference on Quantum Statistical Mechanics, Computation, and Information, ICTP, Trieste, June 14-18, 2010
102. Talk on “First order phase transition in the Quantum Adiabatic Algorithm”, at Statphys24, Cairns, Australia, July 19-23.
103. Invited talk on at conference on ”Phase Transitions in Spin Glasses” ”Monte Carlo Algorithms in Statistical Physics”, University of Melbourne, Melbourne, July 26–28, 2010.
104. Invited talk at 2010 Quantum Computing (QC) & Quantum Algorithms (QA) Program Review review, Cincinnati, August 16–20, 2010.
105. Invited talk on ”Efficiency of the Quantum Adiabatic Algorithm” at the third international workshop on dynamics and manipulation of quantum systems (DMQS2010), Tokyo, February 14–16, 2011.
106. Invited talk on ”Quantum Adiabatic Algorithms” at Summer School on ”Quantum Information meets Statistical Mechanics” at El Escorial, Spain, July 11–15, 2011.

107. Invited talk on "Quantum adiabatic algorithms" at the International Workshop on Simulation and Manipulation of Quantum Systems for Information Processing (SMQS-IP2011), Jülich Supercomputing Centre, Germany, October 17–19, 2011.
108. Invited talk on "‘Mind the Gap’, Solving optimization problems with a quantum computer" at NASA Quantum Technologies Conference, January 17–20, 2012.
109. Colloquium on "Mind the gap, solving optimization problems with a quantum computer", University of California Santa Cruz, February 23, 2012.
110. Lecture on "Advanced Data Analysis" at the summer school on "Efficient Algorithms in Computational Physics", Bad Honef, September 10-14, 2012.
111. Invited talk on "‘Mind the Gap’, Solving optimization problems with a quantum computer" at the Tony and Pat Houghton Memorial Lecture series, Brown University, October 8, 2012.
112. Talk on "Invited talk on "‘Mind the Gap’, Solving optimization problems with a quantum computer" at London Centre for Nanotechnology, October 17, 2012.
113. Invited talk on "Numerical Studies of Adiabatic Quantum Computation applied to Optimization and Graph Isomorphism" at the Second International Workshop on Adiabatic Quantum Computing (AQC2013), London, March 6-8, 2013.
114. Invited talk on "Is there a de Almeida-Thouless line in finite-dimensional spin glasses?" at the APS March meeting, Baltimore, March 18–22, 2013.
115. Invited talk on "‘Mind the Gap’–Could a quantum computer solve optimization problems efficiently?" at the workshop on "Statistical Physics of Quantum Matter, Taipei, Taiwan, July 28–31, 2013.
116. Invited talk on "Numerical Studies of Adiabatic Quantum Computation applied to Optimization and Graph Isomorphism" at the Sudip Fest, Stanford December 7, 2013.
117. Invited talk on "Numerical Studies of the Quantum Adiabatic Algorithm" at CCP2014 (Conference on Computational Physics 2014), in Boston, August 11–14, 2014.
118. Invited talk on "Spin glasses in a magnetic field" at workshop on "Critical Phenomena in Random and Complex Systems" in Capri, Italy, September 8–12, 2014.
119. Colloquium on "Mind the gap: solving optimization problems on a quantum computer", part of the Guzwiller Award Ceremony, at the Max Planck Institute for the Physics of Complex Systems, June 8, 2015.
120. Invited talk on "Spin glasses and Adiabatic Quantum Computing" at the "Workshop on Theory and Practice of Adiabatic Quantum Computers and Quantum Simulation" at the International Center for Theoretical Physics, Trieste, Italy, August 22-26, 2016.
121. Colloquium on "Can a quantum computer solve optimization problems more efficiently than a classical computer?" at Carl von Ossietzky University, Oldenburg, October 24, 2016.

122. Sommerfeld Theory Colloquium on “Can a quantum computer solve optimization problems more efficiently than a classical computer?” at Ludwig Maximilian University, Munich, October 26, 2016.
123. Seminar on “Can a quantum computer solve optimization problems more efficiently than a classical computer?” at the Indian Institute of Science, Bangalore, India, January 19, 2017.
124. Special Colloquium on “Can a quantum computer solve optimization problems more efficiently than a classical computer?” at International Center for Theoretical Sciences, Bangalore, India, January 25, 2017.
125. Seminar on “Can a quantum computer solve optimization problems more efficiently than a classical computer?” at the Complutense University, Madrid, Spain, April 24, 2017.
126. Seminar on “Critical Phenomena and Griffiths-McCoy Singularities in Quantum Spin Glasses” at the University of Southern California, Sept. 15, 2017.
127. Seminar on “Critical Phenomena and Griffiths-McCoy Singularities in Quantum Spin Glasses” at the Indian Institute of Science, Bangalore, India, Oct. 24, 2017.
128. Seminar on “Can a Quantum Computer Solve Optimization Problems More Efficiently than a Classical Computer?” Tata Institute for Fundamental Research, Hyderabad, India, Nov. 1, 2017.
129. Seminar on “Critical Phenomena and Griffiths-McCoy Singularities in Quantum Spin Glasses” at the International Center for Theoretical Sciences, Bangalore, India, Nov. 7, 2017.
130. Invited talk on “Critical and Griffiths-McCoy singularities in quantum Ising spin-glasses on d-dimensional hypercubic lattices: A series expansion study” at “The 2nd International Workshop on Critical Behavior in Lattice Models”, Anqing, China, April 5–7, 2018.
131. Five 90-minute blackboard lectures on “Quantum Computing”, at the “Bangalore School on Statistical Physics - IX”, at the International Center for Theoretical Sciences, Bangalore, India, June 27–July 13.
132. Shri Rajendralal Mitra Endowment Lecture on “Critical Phenomena and Griffiths-McCoy Singularities in Quantum Spin Glasses” at the Indian Association for the Cultivation of Science, Calcutta, July 9, 2018.
133. Lectures on “Data Analysis” at the Sixth International Summer School on Modern Computational Science, Oldenburg, Germany, Sept. 3-14, 2018.
134. Colloquium on “Can a Quantum Computer Solve Optimization Problems More Efficiently than a Classical Computer?” at the University of Cologne, May 3, 2019.
135. Colloquium on “Can a Quantum Computer Solve Optimization Problems More Efficiently than a Classical Computer?” at the Georg-August-Universität Göttingen, May 13, 2019.

136. Invited talk on “States, Metastates, and Replica Symmetry Breaking” at the international conference, RSB40 “40 years of Replica Symmetry Breaking”, Sept. 10-13, 2019, Sapienza University of Rome.

Publications

1. Acoustic Anomalies in Jahn-Teller Coupled Systems (with R.J. Elliott and S.R.P. Smith), *J. Phys. C*, **4**, L317 (1971).
2. Brillouin Scattering, Ultrasonic and Theoretical Studies of Acoustic Anomalies in Crystals Showing Jahn-Teller Phase Transitions (with J.R. Sandercock et al.), *J. Phys. C*, **5**, 3126 (1972).
3. A theory for the Elastic Properties of Dysprosium Antimonide (with D.K. Ray), *J. Phys. C*, **6**, 3353 (1973).
4. The Pseudo-spin Model and its Application to KDP-type Materials (with R.J. Elliott), *Ferroelectrics*, **7**, 23 (1974).
5. Low Frequency Response of KDP-like Crystals in the Spin-phonon Model (with R.J. Elliott), *J. Phys. C*, **7**, 2721 (1974).
6. Excitations in Jahn-Teller Coupled System, Proceedings of 3rd International Conference on Light Scattering in Solids, M. Balkanski, ed., Flammarion, p. 817 (1975).
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