

# Maissam Barkeshli

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CITIZENSHIP USA

## DEGREES AND

## POSITIONS HELD

**University of Maryland, College Park**

College Park, Maryland, USA

- Assistant Professor, Department of Physics, 8/2016 - present
- Fellow, Joint Quantum Institute

**Microsoft Research, Station Q**

Santa Barbara, California USA

- Postdoctoral Fellow, 9/2013 - 8/2016

**Stanford University**

Stanford, California USA

- Simons Postdoctoral Fellow, Stanford Institute for Theoretical Physics, 9/2010-9/2013

**Massachusetts Institute of Technology**

Cambridge, Massachusetts USA

Ph.D. in Physics, 2005 - 2010

- Thesis Advisor: Professor Xiao-Gang Wen
- Area of Study: Theoretical Condensed Matter Physics
- Thesis Title: *Topological order in the Fractional Quantum Hall States*

**University of California, Berkeley**

Berkeley, California USA

B.S., Electrical Engineering and Computer Science, December 2004

B.A., Physics, December 2004

- Honors Thesis: *A New Model for the Microstrip DC Superconducting Quantum Interference Device Amplifier*
- Thesis Supervisor: Professor John Clarke

## AWARDS

- Alfred P. Sloan Research Fellow, 2018
- NSF CAREER Award, 2018
- Simons Postdoctoral Fellowship, Stanford University, 2010-2013
- University of California, Berkeley, Regents Scholar, 2000 - 2004

The most current publication list can be found at [http://arxiv.org/a/barkeshli\\_m\\_1](http://arxiv.org/a/barkeshli_m_1)

1. D. Bulmash, **M. Barkeshli**, *The Higgs Mechanism in Higher-Rank Symmetric  $U(1)$  Gauge Theories*, arXiv:1802.10099 (2018)
2. G. Zhu, M. Hafezi, **M. Barkeshli**, *Quantum Origami: Transversal Gates for Quantum Computation and Measurement of Topological Order*, arXiv:1711.05752 (2017)
3. **M. Barkeshli** and M. Cheng, *Time-reversal and spatial reflection symmetry localization anomalies in  $(2+1)D$  topological phases of matter*, arXiv:1706.09464, submitted to Phys. Rev. X
4. **M. Barkeshli**, P. Bonderson, M. Cheng, C.-M. Jian, K. Walker, *Reflection and time reversal symmetry enriched topological phases of matter: path integrals, non-orientable manifolds, and anomalies*, arXiv:1612.07792
5. **M. Barkeshli**, C. Nayak, Z. Papic, A. Young, M. Zaletel, *Fractionalized exciton Fermi surfaces and condensates in two-component quantized Hall states*, arXiv:1611.01171, submitted to Phys. Rev. Lett.
6. **M. Barkeshli**, *Charge  $2e/3$  superconductivity and topological degeneracies without localized zero modes in bilayer fractional quantum Hall states*, arXiv:1604.00683, Phys. Rev. Lett. 117, 096803 (2016)
7. **M. Barkeshli**, M. Freedman, *Modular transformations through sequences of topological charge projections*, arXiv:1602.01093, Phys. Rev. B 94, 165108 (2016)
8. **M. Barkeshli**, J.D. Sau, *Physical Architecture for a Universal Topological Quantum Computer based on a Network of Majorana Nanowires*, arXiv:1509.07135 (submitted)
9. M. Cheng, M. Zaletel, **M. Barkeshli**, A. Vishwanath, P. Bonderson, *Translational symmetry and microscopic constraints on symmetry-enriched topological phases: a view from the surface*, arXiv:1511.02263, Phys. Rev. X 6, 041068 (2016)
10. **M. Barkeshli**, C. Nayak, *Superconductivity Induced Topological Phase Transition at the Edge of Even Denominator Fractional Quantum Hall States*, arXiv:1507.06305 (submitted)
11. J. Cano, M. Cheng, **M. Barkeshli**, D. J. Clarke, C. Nayak, *Chirality-Protected Majorana Zero Modes at the Gapless Edge of Abelian Quantum Hall States*, arXiv:1505.07825, Phys. Rev. B 92, 195152 (2015) [Editor's Suggestion]
12. **M. Barkeshli**, M. Mulligan, M. P. A. Fisher, *Particle-Hole Symmetry and the Composite Fermi Liquid*, arXiv:1502.05404, Phys. Rev. B 92, 165125 (2015) [Editor's Suggestion]
13. M. Peterson, Y.-L. Wu, M. Cheng, **M. Barkeshli**, Z. Wang, S. Das Sarma, *Abelian and Non-Abelian States in  $\nu = 2/3$  Bilayer Fractional Quantum Hall Systems*, arXiv:1502.02671, Phys. Rev. B 92, 035103 (2015)
14. **M. Barkeshli**, P. Bonderson, M. Cheng, Z. Wang, *Symmetry, Defects, and Gauging of Topological Phases*, arXiv:1410.4540, accepted to Phys. Rev. B
15. **M. Barkeshli**, N.Y. Yao, C.R. Laumann, *Continuous Preparation of a Fractional Chern Insulator*, arXiv:1407.7034, Phys. Rev. Lett. 115, 026802 (2015)
16. **M. Barkeshli**, H.-C. Jiang, R. Thomale, X.-L. Qi, *Generalized Kitaev Models and Slave Genons*, arXiv:1405.1780, Phys. Rev. Lett. 114, 026401 (2015)

17. A. Vaezi, **M. Barkeshli**, *Fibonacci Anyons From Abelian Bilayer Quantum Hall States*, arXiv:1403.3383, Phys. Rev. Lett. **113**, 236804 (2014)
18. **M. Barkeshli**, Erez Berg, Steven Kivelson, *Coherent Transmutation of Electrons into Fractionalized Anyons*, arXiv:1402.6321, Science, 346 6210 (2014)
19. **M. Barkeshli**, Yuval Oreg, X.-L. Qi, *Experimental Proposal to Detect Topological Ground State Degeneracy*, arXiv:1401.3750, submitted
20. **M. Barkeshli**, *Transitions Between Chiral Spin Liquids and Z<sub>2</sub> Spin Liquids*, arXiv:1307.8194, submitted
21. **M. Barkeshli**, C.M. Jian, and X.-L. Qi, *Theory of defects in Abelian topological states*, arXiv:1305.7203, Phys. Rev. B **88**, 235103 (2013)
22. **M. Barkeshli**, C.M. Jian, and X.-L. Qi, *Classification of Topological Defects in Abelian Topological States*, arXiv:1304.7579, Phys. Rev. B **88**, 241103(R) (2013)
23. Raghu Mahajan, **M. Barkeshli** and Sean Hartnoll, *Non-Fermi liquids and the Wiedemann-Franz law*, arXiv:1304.4249, Phys. Rev. B **88**, 125107 (2013)
24. **M. Barkeshli** and X.-L. Qi, *Synthetic Topological Qubits in Conventional Bilayer Quantum Hall Systems*, arXiv:1302.2673, Phys. Rev. X **4**, 041035 (2014)
25. **M. Barkeshli**, C.M. Jian, and X.-L. Qi, *Twist defects and projective non-abelian statistics*, arXiv:1208.4834, Phys. Rev. B **87**, 045130 (2013) [Editor's Suggestion]
26. **M. Barkeshli**, Hong Yao, and Steven A. Kivelson, *Gapless Spin Liquids: Stability and Possible Experimental Relevance*, arXiv:1208.3869, Phys. Rev. B **87**, 140402(R) (2013)
27. **M. Barkeshli** and John McGreevy, *Continuous transitions between composite Fermi liquid and Landau Fermi liquid: a route to fractionalized Mott insulators*, arXiv:1206.6530, Phys. Rev. B **86**, 075136 (2012) [Editors' Suggestion]
28. A.C. Potter, **M. Barkeshli**, J. McGreevy, and T. Senthil, *Quantum spin liquids and the metal-insulator transition in doped semiconductors*, arXiv:1204.1342, Phys. Rev. Lett. **109**, 077205 (2012)
29. **M. Barkeshli** and John McGreevy, *Continuous transition between fractional quantum Hall and superfluid states*, arXiv:1201.4393, Phys. Rev. B **89**, 235116 (2014)
30. **M. Barkeshli** and Xiao-Liang Qi, *Topological Nematic States and Non-Abelian Lattice Dislocations*, arXiv:1112.3311, Phys. Rev. X **2**, 031013 (2012)
31. **M. Barkeshli**, S.B. Chung, and X.-L. Qi, *Dissipationless phonon Hall viscosity*, Phys. Rev. B **85**, 245107 (2012)
32. **M. Barkeshli** and Xiao-Liang Qi, *Topological Response Theory of Doped Topological Insulators*, Phys. Rev. Lett. **107**, 206602 (2011)
33. **M. Barkeshli** and X.-G. Wen, *Phase transitions in Z<sub>N</sub> gauge theory and twisted Z<sub>N</sub> topological phases*, Phys. Rev. B **86**, 085114 (2012)
34. **M. Barkeshli** and X.-G. Wen, *Bilayer quantum Hall phase transitions and the orbifold non-Abelian fractional quantum Hall states*, Phys. Rev. B **84**, 115121 (2011)

35. B. Swingle, **M. Barkeshli** , J. McGreevy, and T. Senthil, *Correlated Topological Insulators and the Fractional Magnetoelectric Effect*, Phys. Rev. B **83**, 195139 (2011)
36. **M. Barkeshli** and X.-G. Wen, *Anyon Condensation and Topological Phase Transitions in Non-Abelian States*, Phys. Rev. Lett. **105** 216804 (2010)
37. **M. Barkeshli** and X.-G. Wen, *Effective Field theory and Projective Construction for the  $Z_k$  Parafermion Fractional Quantum Hall States*, Physical Review B **81** 155302 (2010)
38. **M. Barkeshli** and X.-G. Wen,  *$U(1) \times U(1) \rtimes Z_2$  Chern-Simons Theory and  $Z_4$  Parafermion Fractional Quantum Hall States*, Physical Review B **81** 045323 (2010)
39. **M. Barkeshli** and X.-G. Wen, *Non-Abelian Two-component Fractional Quantum Hall States*, Phys. Rev. B **82** 233301 (2010)
40. **M. Barkeshli** and X.-G. Wen, *Classification of Abelian and Non-Abelian Multilayer Fractional Quantum Hall States Through the Pattern of Zeros*, Phys. Rev. B **82**, 245301 (2010)
41. **M. Barkeshli** and X.-G. Wen, *Structure of Quasiparticles and Their Fusion Algebra in Fractional Quantum Hall States*, Physical Review B **79** 195132 (2009)
42. **M. Barkeshli** , *Dissipationless Information Erasure and Landauer's Principle* (2005), arXiv:0504323

SEMINARS/TALKS  
GIVEN

1. *New Schemes for measuring and manipulating topologically ordered states*, MPS Conference on Ultra Quantum Matter, Simons Foundation, NYC, February 2018
2. *Quantum Origami: Applying Transversal Logic Gates and Measuring Topological Order*, Invited Talk, CMTC Symposium, UMD College Park, November 2017
3. *Space-time reflection symmetry in 2+1 dimensional topological phases*, Invited Talk, Workshop on Chaos, Duality, and Topology, UIUC, November 2017
4. *Space-time reflection symmetry enriched topological phases of matter*, Invited Talk, Simons Center for Geometry and Physics, SUNY, October 20, 2017
5. *Time-reversal and reflection symmetry in 2+1 dimensional topological phases*, Invited Talk, Topological Phases and Quantum Computation Workshop, Gump Station, Moorea, 2017
6. *Time-reversal and reflection symmetry in 2+1 dimensional topological phases*, Invited Talk, APS Physics Next Conference, From Quantum Fields to Condensed Matter," Long Island, NY, August 2017
7. *Time reversal and reflection symmetry in 2+1 dimensional topological phases of matter*, Invited Talk, Conference on Strongly Correlated Topological Phases of Matter, Simons Center, Stony Brook University, June 2017
8. *Reflection / time-reversal symmetry in 2+1 dimensional topological phases* , Invited Talk, Simons Conference on Quantum Entanglement, Schloss Elmau, Germany, May 2017

9. *Exciton metals and other exotic states at even-denominator fillings*, Invited Talk, Quantum Hall Effect: Past, Present, and Future, Princeton Center for Theoretical Sciences, March 2017
10. *Time-Reversal and Reflection Symmetry in 2+1 Dimensional SETs*, Invited Talk, Many-body Entanglement and Topological Quantum Phenomena Workshop, Tsinghua Sanya International Mathematics Forum, Sanya, China, December 2016
11. *Charge  $2e/3$  superconductivity and topological degeneracies without localized zero modes in bilayer FQH states*, Invited Talk, Frontiers in Topological Superconductivity, Hapuna Beach, Hawaii, December 2016
12. *Splitting the electron: New windows into electron fractionalization in quantum matter*, Department of Physics Colloquium, University of California, Santa Barbara
13. *Time-reversal and reflection symmetry in 2+1 dimensional SETs*, KITP invited talk for Conference on Topological Quantum Matter, Fall 2016
14. *Characterizing symmetry-enriched topological states in 2+1 dimensions*, KITP invited talk for Fall Program on Symmetry, Topology, and Quantum Phases of Matter
15. *New paths to creating and manipulating topologically protected degeneracies in quantum many-body states*, KITP invited talk for Fall Program on Synthetic Matter, September 2016
16. *New paths to creating and manipulating topologically protected degeneracies in quantum many-body states*, JQI Seminar, Joint Quantum Institute, University of Maryland, September 2016
17. *Realizing Modular Transformations in Physical Systems*, Invited talk, Geometrical Degrees of Freedom in Topological Phases, Banff International Research Station, Banff, Canada, August 2016
18. *Symmetry Enriched Topological Phases of Matter and G-crossed Braided Tensor Categories*, Invited (Beach) talk, Summer workshop on Mathematics and Physics, Simons Center for Geometry and Physics, Stony Brook, July 2016
19. *Symmetry Enriched Topological Phases of Matter and G-crossed Braided Tensor Categories*, Invited talk, SIAM, Boston, MA, July 2016
20. *New paths to realizing and manipulating topological degeneracies*, Invited talk, Quantum Matter 2, Benasque, Spain, July 2016
21. *Quantum phase transitions between bosonic fractional quantum Hall states, superfluids, and Mott insulators*, Invited conference talk, Conformal Field Theories and Renormalization Group Flows in Dimensions  $d > 2$ , Galileo Galilei Institute, Florence, Italy, June 2016
22. *Modular Transformations Through Sequences of Topological Charge Projections*, Invited Talk, Station Q retreat, April 2016
23. *Modular Transformations Through Sequences of Topological Charge Projections*, Invited Conference Talk, Geometry of Quantum States in Condensed Matter Systems, Simons Center for Geometry and Physics, Stony Brook University, April 2016
24. *Physical Architecture for a Universal Topological Quantum Computer from a network of Majorana nanowires*, Invited Speaker, CMTC Symposium, University of Maryland, March 2016

25. *Physical Architecture for a Universal Topological Quantum Computer from a network of Majorana nanowires*, Invited Condensed Matter Seminar, Caltech, February 2016
26. *Superconductivity Induced Topological Phase Transition at the Edge of Even Denominator FQH states*, Invited Talk, Emergent Phenomena in Quantum Hall Systems, Tata Institute for Fundamental Research, Mumbai, January 2016
27. *Particle-Hole Symmetry and the Composite Fermi Liquid*, Invited talk, Strongly Interacting Topological Phases Conference, Banff International Research Station, September 2015
28. *Boundaries, defects, and exotic zero modes in topological phases of matter* Summer School on Emergent Phenomena in Quantum Materials, Cornell University, August 2015
29. *Genons, Parafermions and Fibonacci in Bilayer Fractional Quantum Hall Systems*, Invited Talk, Parafermion workshop, Army Research Office, August 2015
30. *Extrinsic Defects and Possible New Experimental Probes of Topological Order*, Invited Special Joint Quantum Institute Seminar, University of Maryland, College Park, May 2015
31. *Particle-Hole Symmetry and the Composite Fermi Liquid*, Invited Kadanoff Seminar, University of Chicago, May 2015
32. *Extrinsic Defects and Possible New Experimental Probes of Topological Order*, Invited Condensed Matter Theory Group Seminar, University of Colorado, Boulder, May 2015
33. *Particle-Hole Symmetry and the Composite Fermi Liquid*, Invited Condensed Matter Seminar, Stanford University, April 2015
34. *Particle-Hole Symmetry and the Composite Fermi Liquid*, Invited LASSP-LEP joint seminar, Cornell University, April 2015
35. *Coherent Transmutation of Electrons into Fractionalized Anyons*, APS Contributed Talk, March 2015
36. *Extrinsic Defects and Possible New Experimental Probes of Topological Order*, Invited LASSP Seminar, Cornell University, February 2015
37. *Extrinsic Defects and Possible New Experimental Probes of Topological Order*, Invited Condensed Matter Seminar, Johns Hopkins University, February 2015
38. *Extrinsic Defects and Possible New Experimental Probes of Topological Order*, Invited Condensed Matter Seminar, Purdue University, February 2015
39. *Symmetry, Defects, and Gauging of Topological Phases*, Invited talk, Progress and Applications of Modern Quantum Field theory, Aspen Center for Physics Winter Program, February 2015
40. *Symmetry, Defects, and Gauging of Topological Phases*, 45 minute Invited talk, Joint Mathematics Meeting of American Mathematical Society and Mathematical Association of America, San Antonio, January 2015
41. *Extrinsic Defects and Possible New Experimental Probes of Topological Order*, Invited Condensed Matter Seminar, UC San Diego, December 2014

42. *Synthetic Topological Qubits in Conventional Bilayer Quantum Hall Systems*, Workshop for Innovative Nanoscale Devices (WINDS), Kapuna Coast, HI, December 2014
43. *Coherent Transmutation of Electrons into Fractionalized Anyons*, Invited Talk, CMTS Symposium, University of Maryland, College Park, November 2014
44. *Extrinsic Defects and Possible New Experimental Probes of Topological Order*, Invited Condensed Matter Seminar, University of Toronto, October 2014
45. *Defects: A New Window into Topological Quantum Matter*, Invited Seminar, Institute of Condensed Matter Theory, UIUC, October 2014
46. *Defects: A New Window into Topological Quantum Matter*, Invited Colloquium, Perimeter Institute, October 2014
47. *Extrinsic Defects and Possible New Experimental Probes of Topological Order*, Invited Talk, Topological Phases of Quantum Matter, Erwin Schrodinger Institute for Mathematical Physics, Vienna, August 2014
48. *Coherent Transmutation of Electrons into Fractionalized Anyons*, Invited talk, Topology and Entanglement in Correlated Quantum Systems, Max Planck Institute, Dresden, July 2014
49. *Defects: A New Window Into Topological Order*, Invited Condensed Matter Seminar, University of Washington, Seattle May 2014
50. *Defects: A New Window Into Topological Order*, Invited Condensed Matter Seminar, CUNY March 2014
51. *Defects: A New Window into Topological Order*, Invited Condensed Matter Seminar, University of Maryland, College Park, March 2014
52. *Experimental Proposal to Detect Topological Ground State Degeneracy*, Contributed Talk, APS March Meeting, Denver, March 2014
53. *Defects: A New Window Into Topological Order*, Invited Condensed Matter Seminar, Harvard University, February 2014
54. *Universal Experimental Signatures of Topological Order in Quantum Spin Liquids*, Aspen Winter Conference on Unconventional Order in Strongly Correlated Electron Systems, January 2013
55. *Topological Line Junctions and Defects in Topological States*, Invited Condensed Matter Seminar, Weizmann Institute, October 2013
56. *Defects in Topologically Ordered Quantum Matter*, Invited Strongly Correlated Informal Theory Seminar, Cornell University, October 2013
57. *Defects in Topologically Ordered Quantum Matter*, Invited talk, Simons Center program on Topological States of Matter, Stony Brook SUNY, June 2013
58. *Defects in Topologically Ordered Quantum Matter*, Invited talk, Entanglement and Emergence II Conference, Perimeter Institute, May 2013
59. *Defects in Topologically Ordered Quantum Matter*, Invited Joint Condensed Matter / High Energy Theory seminar, Boston University, May 2013

60. *Genons, twist defects, and projective non-Abelian braiding statistics*, Invited talk, APS March Meeting, Baltimore 2013
61. *Synthetic non-Abelian anyons in conventional bilayer quantum Hall systems*, Aspen Winter Conference on Topological States of Matter, January 2013
62. *Synthetic topological qubits in conventional bilayer quantum Hall systems*, Microsoft Station Q, November 2012
63. *Genons, twist defects, and projective non-Abelian braiding statistics*, International Workshop on Topological Order and Quantum Computation, Moorea 2012
64. *Bandwidth-tuned continuous transitions in quantum Hall states*, Condensed Matter Seminar, Tsinghua University, Beijing, July 2012
65. *Twisted Topological Order*, Condensed Matter Seminar, International Center for Quantum Materials Summer School, Peking University, Beijing, June 2012
66. *Bandwidth-tuned continuous transitions in quantum Hall states*, Simons Fellows Meeting, SUNY Stony Brook, April 2012
67. *Topological Nematic States and Non-Abelian Lattice Dislocations*, Condensed Matter Seminar, University of Maryland, College Park, March 2012
68. *Topological Nematic States and Non-Abelian Lattice Dislocations*, Contributed Talk, APS March Meeting, Boston 2012
69. *Topological Nematic States and Non-Abelian Lattice Dislocations*, Condensed Matter Seminar, MIT, February 2012
70. *Topological Nematic States and Non-Abelian Lattice Dislocations*, Condensed Matter Seminar, UC Berkeley, February 2012
71. *Dissipationless Phonon Hall Viscosity*, KITP workshop on Topological Insulators and Superconductors, October 2011
72. *Dissipationless Phonon Hall Viscosity*, Aspen Center for Physics, August 2011
73. *Topological Response Theory of Doped Topological Insulators*, Contributed Talk, APS March Meeting, Dallas 2011
74. *Bilayer quantum Hall phase transitions and non-Abelian fractional quantum Hall states*, Condensed Matter Seminar, Princeton University, February 2011
75. *Bulk Effective Field Theories for Non-Abelian Fractional Quantum Hall States*, Weizmann Institute, January 2011
76. *Topologically Ordered Quantum States of Matter*, Physics Colloquium, University of Oslo, August 2010
77. *Bilayer quantum Hall phase transitions and non-Abelian fractional quantum Hall states*, Condensed Matter Seminar, University of Oslo, August 2010
78. *Bilayer quantum Hall phase transitions and non-Abelian fractional quantum Hall states*, Tsinghua University, Beijing, July 2010
79. *Continuous Topological Phase Transitions in Fractional Quantum Hall States*, Stanford University, February 2010



80. *Continuous Topological Phase Transitions in Fractional Quantum Hall States*, Microsoft Station Q, December 2009
81. *Continuous Topological Phase Transitions in Fractional Quantum Hall States*, MIT Informal Condensed Matter Seminar, November 2009
82. *Towards a theory of topological phases in quantum Hall systems: the pattern of zeros approach*, MIT Informal Condensed Matter Seminar, April 2009

WORKSHOPS/CONFERENCES/SUMMER

SCHOOLS

ATTENDED

1. Invited Speaker, Perspectives in Topological phases: From Condensed Matter to High-Energy Physics, International Center for Interdisciplinary Science and Education, Quy Nhon Vietnam, July 2018
2. Invited Speaker, String Math 2018, Tohoku University, Sendai, Japan, June 2018
3. Invited Speaker, MPS Conference on Ultra Quantum Matter, Simons Foundation, NYC, February 2018
4. Invited Speaker, Workshop on Chaos, Duality, and Topology, UIUC, November 2017
5. Invited Speaker, Topological Phases and Quantum Computation Workshop, Gump Station, Moorea, August 2017
6. Invited Speaker, APS Physics Next Conference, From Quantum Fields to Condensed Matter,” Long Island, NY, August 2017
7. Member of Working Group on “Spatial symmetries in topological phases of matter,” Aspen Center for Physics, July 16 - August 4, 2017
8. Invited Speaker, Conference on Strongly Correlated Topological Phases of Matter, Simons Center, Stony Brook University, June 2017
9. Invited Speaker, Simons Conference on Quantum Entanglement, Schloss Elmau, Germany, May 2017
10. Visitor, Institute for Advanced Study, Princeton University, April 24 - April 26, 2017
11. Invited Speaker, Quantum Hall Effect: Past, Present, and Future, Princeton Center for Theoretical Sciences, March 2017
12. Invited Speaker, Many-body Entanglement and Topological Quantum Phenomena Workshop, Tsinghua Sanya International Mathematics Forum, Sanya, China, December 2016
13. Invited Speaker, Frontiers in Topological Superconductivity Workshop, Hapuna Beach, Hawaii, 2016
14. Participant, Synthetic Quantum Matter, KITP Fall Program, 2016
15. Participant, Symmetry, Topology, and Quantum Phases of Matter: From Tensor Networks to Physical Realizations, KITP Fall Program, 2016
16. Invited Speaker, Topological Quantum Matter Conference, KITP, October 2016

17. Invited Speaker, Geometrical Degrees of Freedom in Topological Phases Conference, Banff International Research Station, Banff, Canada, August 2016
18. Invited Speaker, Summer workshop on Mathematics and Physics, Simons Center for Geometry and Physics, Stony Brook, July 2016
19. Invited Speaker, Minisymposium on Mathematical Models for Topological Phases of Matter, SIAM Annual Meeting, Boston, July 2016
20. Invited Speaker, Quantum Matter II Conference, Centro de Ciencias, Benasque, Spain, July 2016
21. Invited Speaker, Conformal Field Theories and Renormalization Group Flows in Dimensions  $d > 2$ , Galileo Galilei Institute, Florence, Italy, June 2016
22. Invited Speaker, Geometry of Quantum States in Condensed Matter Systems Conference, Simons Center for Geometry and Physics, Stony Brook University, April 2016
23. Invited Speaker, Emergent Phenomena in Quantum Hall Systems, Tata Institute for Fundamental Research, Mumbai, January 2016
24. Microsoft Station Q, Fall Meeting, December 2015
25. Invited Speaker, Strongly Interacting Topological Phases Conference, Banff International Research Station, September 2015
26. Invited Speaker, Summer School on Emergent Phenomena in Quantum Materials, Cornell University, August 2015
27. Microsoft Station Q Summer Meeting, June 2015
28. Invited Speaker, Progress and Applications of Modern Quantum Field theory, Aspen Center for Physics Winter Program, February 2015
29. Invited Speaker, Joint Mathematics Meeting of American Mathematical Society and Mathematical Association of America, San Antonio, January 2015
30. Microsoft Station Q, Fall Meeting, December 2014
31. Invited Speaker Workshop for Innovative Nanoscale Devices (WINDS), Kohala Coast, Hawaii, December 2014
32. Invited Speaker, Condensed Matter Theory Center Symposium, University of Maryland, November 2014
33. Invited Speaker, Topological Phases of Quantum Matter, Erwin Schrodinger Institute for Mathematical Physics, Vienna, August 2014
34. Invited Speaker, Topology and Entanglement in Correlated Quantum Systems, Max Planck Institute, Dresden, July 2014
35. Microsoft Station Q, Summer Meeting, June 2014
36. KivelsonFest, Stanford University, June 2014
37. Non-Fermi Liquids Workshop, Stanford University, April 2014
38. Symmetry Protected Topological Phases Workshop, Princeton University, March 2014

39. APS March Meeting, Denver, March 2014
40. New Perspectives on Thermalization, Aspen Center for Physics Winter Program, March 2014
41. Invited Speaker, Unconventional Order in Strongly Correlated Electron Systems, Aspen Center for Physics Winter Program, January 2014
42. Microsoft Station Q, Fall Meeting, December 2013
43. Invited Speaker, Topological States of Matter, Simons Center, Stony Brook SUNY, June 2013
44. Invited Speaker, Emergence and Entanglement II, Perimeter Institute, May 2013
45. Invited Speaker, APS March Meeting, Baltimore, March 2013
46. Invited Speaker, Aspen Center for Physics Winter Conference on Topological States of Matter, January 2013
47. Microsoft Station Q, Fall Meeting, December 2012
48. Invited Speaker, Microsoft Station Q International Workshop on Topological Order and Quantum Computation, Moorea 2012
49. Invited speaker, International Center for Quantum Materials Summer School, Peking University, Beijing, June 2012
50. Invited Lecturer for CIFAR Quantum Materials Summer School, May 2012
51. Simons Fellows Meeting, SUNY Stony Brook, April 2012
52. APS March Meeting, Boston 2012
53. KITP Workshop on Topological Insulators and Superconductors, September-October 2011
54. Aspen Center for Physics, Summer Program on Topological States of Matter, 8/7/11 - 8/21/11
55. Workshop and School on Topological Aspects of Condensed Matter Physics, ICTP Trieste, Italy, June-July 2011
56. APS March Meeting, Dallas 2011
57. Winter School in Theoretical Physics, "Topological states in condensed matter physics," Institute for Advanced Study, Hebrew University, Jerusalem, Dec. 2010 - Jan. 2011.
58. Princeton Condensed Matter Physics Summer School, August 2010
59. Boulder School for Condensed Matter and Materials Physics, "Computational and Conceptual Approaches to Quantum Many-Body Systems," July 2010
60. Microsoft Station Q Fall Meeting, December 2009
61. Microsoft Station Q Summer Meeting, June 2009
62. Microsoft Station Q Fall Meeting, December 2008
63. Emergent Gravity Conference, MIT, August 2008
64. Princeton Condensed Matter Physics Summer School, August 2007
65. Caltech Computing Beyond Silicon Summer School (invited), June-July 2004