Prof. Jonathan Simon, Ph.D. March 3, 2025

Departments of Physics & Applied Physics
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Academic Appointments

Departments of Physics & Applied Physics — **Stanford University**
Professor — **2024-Present**
Associate Professor — **2022-2024**
Director, Q-FARM — **2022-Present**

Department of Physics, The James Franck Institute,
The Pritzker School of Molecular Engineering and The College — **University of Chicago**
Associate Professor — **2018-2022**
Fellow, Institute for Molecular Engineering — **2016-2020**
Neubauer Family Assistant Professor — **2012-2018**

Postdoctoral Scholar — **Harvard University**
Group of Prof. Markus Greiner — **2010-2012**

Quantum magnetism in an optical lattice, bilayer imaging, algorithmic cooling and purification of lattice gases, photon-assisted tunneling, atom-resolved studies of the superfluid to Mott insulator transition.

Education

Ph.D. in Physics, Harvard University — **March 2010**
Dissertation: *Cavity QED with Atomic Ensembles* (Advisor: Vladan Vuletić).

Single photon source, quantum bus, quantum memory, vacuum induced transparency and few photon nonlinearities.

B.S. in Physics, California Institute of Technology — **June 2004**

Honors and Awards

- Fellow of the American Physical Society — **2024-Present**
- Presidential Early Career Award in Science and Engineering (PECASE): DOE — **2013**
- Defense Advanced Research Projects Agency Young Faculty Award (DARPA YFA) — **2013**
- Department of Energy Young Investigator Award (DOE YIA) — **2013**
- Air Force Office of Scientific Research Young Investigator Program (AFOSR YIP) — **2013**
- Martin and Beate Block Award, Aspen Center for Physics — **2012**
- AAAS Newcomb Cleveland Prize — **2011**
- National Science Foundation Graduate Research Fellowship — **2007-2010**
- National Defense Science & Engineering Graduate Fellowship — **2005-2007**
- Harvard Purcell Fellowship — **2004-2005**
- Caltech Upperclass Merit Award– Carnation Fellowship — **2002-2004**
- Caltech Axline Fellowship (Full Tuition) — **2000-2004**
- Intel Science Talent Search Finalist — **2000**

Service to the Community

- QSense External Advisory Board, 2022-Present
- Chair, JILA Cooperative Agreement Independent Review Panel, 2021

- Virtual Atomic Molecular and Optical Physics (VAMOS) seminar series board member, 2020-Present
- Les Houches Summer School: Quantum Technologies with Light and Matter Lecturer, 2020
- Oklahoma State University Presidential Dream Course, Lecturer, 2020
- Les Houches Summer School: Dynamics and Disorder in Quantum Manybody Systems far from Equilibrium, Lecturer, 2019
- ITAMP Winter School: Quantum Many-Body Systems, Lecturer, 2019
- US-Japan Joint Seminar in Quantum Electronics and Laser Spectroscopy, 2021 Meeting Chair
- Gordon Research Conference in Quantum Science, 2022 Meeting Chair
- Lecturer at ETH Cavity Quantum Electrodynamics Summer School, 2017
- AMO Lecturer at Midwest Cold Atom Workshop, 2016
- Session Chair, DAMOP 2013 (Quebec City, Canada), DAMOP 2014 (Madison, Wisconsin), DAMOP 2016 (Providence, Rhode Island), DAMOP 2018 (Fort Lauderdale, Florida)
- Reviewer for Nature (& sub-journals), Science, Proceedings of the National Academy of Sciences, Physical Review Journals, New Journal of Physics

Service at the University of Chicago

- James Franck Institute Research Resumption Committee (2020-2021)
- Physics Department Faculty Excellence Committee (2020-2021)
- Physical Sciences Division Research Resumption Committee (2020)
- Chair, James Franck Institute Seminar Committee (2013-2017, 2019-2021)
- James Franck Institute Appointments Committee (2018-2021)
- Admissions Committee (2012-2013,2014-2017,2019-2021)
- Physics Recruitment Committee (2015-20)
- University of Chicago Board of Computing Activities and Services (2016-2019)
- Physical Sciences Division Recruitment Committee (2015-2016)
- Physics Department Colloquium Committee (2012-2013, 2015-2016)
- New Faculty Search Committee (2013-14, 2016-17, 2018-19)
- PhD. Thesis Defense Committee (25) (2012-Present)

Teaching Experience

- PH 216 Stanford Graduate Back of the Envelope Physics **Spring 2023, 2024**
- AP 203 Stanford Graduate Atoms & Photons **Fall 2022,2023,2024**
- Ph 471 UChicago Graduate Atomic Physics **Fall 2014, Winter 2021**
- Ph 211 UChicago Undergraduate Physics Laboratory **Winter 2014, Spring 2016, Fall 2018, Fall 2019, Spring 2020, Fall 2020**
- Ph 257 UChicago Undergraduate Introduction to Feedback and Control **Winter 2020**
- Ph 142 UChicago Undergraduate Honors Electricity & Magnetism **Winter 2018,2019**
- Ph 143 UChicago Undergraduate Honors Vibration, Waves & Heat **Spring 2017,2018**
- Ph 361 UChicago Graduate Solid State Physics **Fall 2012-2013, Fall 2016**

Advisors and Advisees

Supervisors:

- **Vladan Vuletić:** PI's graduate supervisor
- **Markus Greiner:** PI's principal postdoctoral sponsor

Current Doctoral and Post-Doctoral Researchers (***** indicates co-advised with Dave Schuster):

- **Zeyang Li:** Urbanek & Chodorow Postdoctoral Fellow, Stanford **2023-Present**
- **Marius Juergensen:** Postdoctoral Researcher, Stanford **2024-Present**
- **Guanzhong Wang:** Postdoctoral Researcher, Stanford **2024-Present**
- **Adam Shaw:** Postdoctoral Researcher, Stanford **2024-Present**

- **Lavanya Taneja:** Graduate Student, UChicago **2018-Present**
- **Lukas Palm:** Graduate Student, UChicago **2019-Present**
- **Danial Shadmany:** Graduate Student, UChicago **2021-Present**
- **Anna Soper:** Graduate Student, Stanford **2022-Present**
- **Bowen Li:** Graduate Student, Stanford **2023-Present**

- **Cady Feng:** Graduate Student, Stanford **2024-Present**
- **Abhishek Karve:** Graduate Student, Stanford **2024-Present**
- **Da-Yeon Koh:** Graduate Student, Stanford **2024-Present**
- **Xin Wei:** Graduate Student, Stanford **2024-Present**

Former Doctoral and Post-Doctoral Researchers:

- **Ariel Sommer:** Grainger Postdoctoral Fellow, UChicago **2013-2016**
- **Ruichao (Alex) Ma:** Kadanoff-Rice Postdoctoral Fellow*, UChicago **2015-2019**
- **Logan Clark:** Postdoctoral Researcher, UChicago **2017-2020**
- **Matt Jaffe:** Postdoctoral Researcher, UChicago **2019-2023**
- **Marius Andrei Vrajitoarea:** Postdoctoral Researcher* UChicago **2020-2023**
- **Aishwarya Kumar:** Postdoctoral Researcher*, UChicago **2019-2023**
- **Albert Ryou:** PhD, UChicago **2012-2017**
- **Ningyuan Jia:** PhD, UChicago **2013-2018**
- **Alexandros Georgakopoulos:** PhD, UChicago **2012-2018**
- **Clai Owens:** PhD, UChicago* **2013-2019**
- **Nathan Schine:** PhD, UChicago **2013-2019**
- **Aziza Suleymanzade:** PhD, UChicago* **2014-2021**
- **Mark Stone:** PhD, UChicago* **2015-2021**
- **Brendan Saxberg:** PhD, UChicago* **2016-2022**
- **Claire Baum:** PhD, UChicago **2016-2022**
- **Margaret Panetta:** PhD*, UChicago **2019-2023**
- **Gabrielle Roberts:** PhD*, UChicago **2018-2023**
- **Chuan Yin:** PhD, UChicago **2018-2023**

Current Undergraduates Researchers:

Former Undergraduate Researchers (UChicago): **Aaron Krahn** (2012-2014), **Graham Greve** (2012-2014), **Lindsay Bassman** (2012-2014), **Jeremy Seeman** (2012), **Michael Cervia** (2013-2016), **Jin Woo Sung** (2013-2014), **Jeremy Estes** (2014-5), **Sohini Upadhyay** (2014-2015), **Michelle Chalupnik** (2015-2017), **Tahoe Schrader** (2015-2016), **Jeremy Estes** (2015-2016), **Sarayu Narayan** (2016-18), **Scott Eustice** (2015-2017), **Aman LaChapelle** (2015-2017), **Yuehui (Leon) Lu** (2016-2017), **Jared Beh** (2017), **Joshua Wakefield** (2016-2018), **Evan Mata** (2016-2018), **Carl Padgett** (2017-2019), **Lin Su** (2017-2019), **Shiv Agrawal** (2018), **Jasmine Kalia** (2017-2020), **Dawit Belayneh** (2019-2021). **Tingran Wang** (2019-2023), **Vassilios Kaxiras** (2023), **Kapil Dheeriya** (2023).

Peer-Reviewed Publications

1. Lavanya Taneja, David Schuster, and Jon Simon, **Light-controlled strong coupling of optical cavity modes spaced by 200 THz**, *arXiv* 2503.00833 (2025).
2. Bowen Li, Lukas Palm, Marius Jürgensen, Yiming Cady Feng, Markus Greiner, and Jon Simon, **A Mega-FPS low light camera**, *arXiv* 2502.18716 (2025).
3. Danial Shadmany, Aishwarya Kumar, Anna Soper, Lukas Palm, Chuan Yin, Henry Ando, Bowen Li, Lavanya Taneja, Matt Jaffe, David I Schuster, and Jonathan Simon, **Cavity QED in a High NA Resonator**, *Sci. Adv.* 11, eads8171 (2025).
4. Alexander Anferov, Fanghui Wan, Shannon P. Harvey, Jonathan Simon, and David I Schuster, **A Millimeter-Wave Superconducting Qubit**, *arXiv* 2411.11170, (2024).
5. Gabrielle Roberts, Andrei Vrajitoarea, Brendan Saxberg, Margaret G. Panetta, Jonathan Simon, and David I Schuster, **Manybody Interferometry of Quantum Fluids**, *Sci. Adv.* 10, eado1069 (2024).
6. Sasha Anferov, Shanon P Harvey, Fanghui Wan, Jonathan Simon, and David I Schuster, **Superconducting Qubits Above 20 GHz Operating over 200 mK**, *arXiv* 2402.03031,

(2024).

7. Sasha Anferov, Shanon P Harvey, Wendy Wan, Kan-Heng Lee, Jonathan Simon, and David I Schuster, **Low-loss millimeter-wave resonators with an improved coupling structure**, *arXiv* 2311.01670, (2023).
8. Alexander Anferov, Kan-Heng Lee, Fang Zhao, Jonathan Simon and David I Schuster, **Improved Coherence in Optically-Defined Niobium Trilayer Junction Qubits**, *arXiv* 2306.05883 (2023).
9. Aishwarya Kumar, Aziza Suleymanzade, Mark Stone, Lavanya Taneja, Alexander Anferov, David I. Schuster, and Jonathan Simon, **Quantum-enabled millimetre wave to optical transduction using neutral atoms**, *Nature* 615, 614–619 (2023).
10. Chuan Yin, Henry Ando, Mark Stone, Danial Shadmany, Anna Soper, Matt Jaffe, Aishwarya Kumar and Jonathan Simon **A Cavity Load Lock Apparatus for Next-Generation Quantum Optics Experiments**, arXiv: 2301.12323 (2023).
11. Claire Baum, Matt Jaffe, Lukas Palm, Aishwarya Kumar and Jonathan Simon, **Optical mode conversion via spatiotemporally modulated atomic susceptibility**, *Opt. Express* 31, 528-535 (2023).
12. Brendan Saxberg, Andrei Vrajitoarea, Gabrielle Roberts, Meg Panetta, Jonathan Simon and David Schuster, **Disorder-Assisted Assembly of Strongly Correlated Fluids of Light**, *Nature* 612, 435–441 (2022).
13. Matt Jaffe, Lukas Palm, Claire Baum, Lavanya Taneja, Aishwarya Kumar, and Jonathan Simon, **Understanding and suppressing backscatter in optical resonators**, *Optica* 8, 878 (2022).
14. Clai Owens, Margaret G. Panetta, Brendan Saxberg, Gabrielle Roberts, Srivatsan Chakram, Ruichao Ma, Andrei Vrajitoarea, Jonathan Simon, and David Schuster, **Chiral Cavity Quantum Electrodynamics**, *Nature Physics* 18, 1048–1052 (2022).
15. R. O. Umucalılar, Jonathan Simon, and Iacopo Carusotto, **Autonomous stabilization of photonic Laughlin states through angular momentum potentials**, *Phys. Rev. A* 104, 023704 (2021).
16. Matt Jaffe, Lukas Palm, Claire Baum, Lavanya Taneja, and Jonathan Simon, **Aberrated optical cavities**, *Phys. Rev. A* 104, 013524 (2021).
17. Mark Stone, Aziza Suleymanzade, Lavanya Taneja, David Schuster, and Jonathan Simon, **Optical mode conversion in coupled Fabry-Pérot resonators**, *Optics Letters* 46, 21-24 (2021).
18. Iacopo Carusotto, Andrew Houck, Alicia J. Kollár, Pedram Roushan, David Schuster, and Jonathan Simon, **Photonic materials in circuit quantum electrodynamics.** *Nature Physics* 16, 268–279 (2020).
19. Aziza Suleymanzade, Alexander Anferov, Mark Stone, Ravi K. Naik, Jonathan Simon, and David Schuster, **A tunable High-Q millimeter wave cavity for hybrid circuit and cavity QED experiments.** *Appl. Phys. Lett.* 116, 104001 (2020).
20. Alexander Anferov, Aziza Suleymanzade, Andrew Oriani, Jonathan Simon and David Schuster, **Millimeter-Wave Four-Wave Mixing via Kinetic Inductance for Quantum Devices.** *Phys. Rev. Applied* 13, 024056 (2020).
21. Logan W Clark, Nathan Schine, Claire Baum, Ningyuan Jia and Jonathan Simon, **Observation of Laughlin states made of light.** *Nature* 582, 41-45 (2020). [Featured in a Nature "News and Views"].
22. Logan Clark, Ningyuan Jia, Nathan Schine, Claire Baum, Alexandros Georgakopoulos, Jonathan Simon, **Interacting Floquet Polaritons.** *Nature* 571, 532–536 (2019).

23. Tomoki Ozawa, Hannah M. Price, Alberto Amo, Nathan Goldman, Mohammad Hafezi, Ling Lu, Mikael Rechtsman, David Schuster, Jonathan Simon, Oded Zilberberg, Iacopo Carusotto, **Topological Photonics.** *Rev. Mod. Phys.* 91, 015006 (2019).

24. Ruichao Ma, Brendan Saxberg, Clai Owens, Nelson Leung and Yao Lu, Jonathan Simon and David Schuster, **A Dissipatively Stabilized Mott Insulator of Photons.** *Nature* 566, 51-57 (2019) [Featured in a Nature "News and Views"].

25. Leon Lu, Ningyuan Jia, Lin Su, Clai Owens, Gediminas Juzeliunas, David Schuster, Jonathan Simon, **Probing the Berry Curvature and Fermi Arcs of a Weyl Circuit.** *Phys. Rev. B* 99, 020302 (2019) [Featured as an Editor's Suggestion on the PRB Frontpage].

26. Nathan Schine, Michelle Chalupnik, Tankut Can, Andrey Gromov, Jonathan Simon, **Measuring Electromagnetic and Gravitational Responses of Photonic Landau Levels.** *Nature* 565, 173-179 (2019).

27. Alexandros Georgakopoulos, Ariel Sommer, Jonathan Simon, **Theory of Interacting Cavity Rydberg Polaritons.** *Quantum Science and Technology*, 4, 1 (2018).

28. Ningyuan Jia, Nathan Schine, Alexandros Georgakopoulos, Albert Ryou, Ariel Sommer, Jonathan Simon, **A Strongly Interacting Polaritonic Quantum Dot.** *Nature Physics* 14, 550 (2018).

29. Peter A. Ivanov, Fabian Letscher, Jonathan Simon, Michael Fleischhauer, **Adiabatic flux insertion and growing of Laughlin states of cavity Rydberg polaritons.** *Phys. Rev. A* 98, 013847 (2018).

30. Jia Ningyuan, Nathan Schine, Alexandros Georgakopoulos, Albert Ryou, Ariel Sommer, Jonathan Simon, **Photons and polaritons in a broken-time-reversal non-planar resonator.** *Phys. Rev. A* 97, 013802 (2018). [Selected for an APS "Physics Focus" and Nature Photonics "Highlight"]

31. Clai Owens, Aman LaChapelle, Brendan Saxberg, Brandon Anderson, Ruichao Ma, Jonathan Simon, David I, Schuster, **Quarter-Flux Hofstadter Lattice in Qubit-Compatible Microwave Cavity Array.** *Phys. Rev. A* 97, 013818 (2018).

32. Ruichao Ma, Clai Owens, Andrew Houck, David I. Schuster, Jonathan Simon, **An Autonomous Stabilizer for Incompressible Photon Fluids and Solids.** *Phys. Rev. A* 95, 043811 (2017).

33. Ruichao Ma, Clai Owens, Aman LaChapelle, David I. Schuster, Jonathan Simon, **Hamiltonian Tomography of Photonic Lattices.** *Phys. Rev. A* 95, 062120 (2017).

34. Albert Ryou, Jonathan Simon, **Active Cancellation of Acoustical Resonances with an FPGA FIR Filter.** *Rev. Sci. Inst.* 88, 013101 (2017).

35. Brandon M. Anderson, Ruichao Ma, Clai Owens, David I. Schuster, Jonathan Simon, **Engineering Topological Many-Body Materials in Microwave Cavity Arrays.** *Phys. Rev. X* 6, 041043 (2016).

36. Nathan Schine, Albert Ryou, Andrey Gromov, Ariel Sommer, Jonathan Simon, **Synthetic Landau Levels for Photons.** *Nature* 534, 671-5 (2016).

37. Jia Ningyuan, Alexandros Georgakopoulos, Albert Ryou, Nathan Schine, Ariel Sommer, Jonathan Simon, **Observation and characterization of cavity Rydberg polaritons.** *Phys. Rev. A.* 93, 041802(R) (2016).

38. Ariel Sommer, Jonathan Simon, **Engineering Photonic Floquet Hamiltonians through Fabry Pérot Resonators.** *New Journal of Physics* 18, 035008 (2015).

39. Ariel Sommer, Hanspeter Buchler, and Jonathan Simon, **Quantum Crystals and Laughlin Droplets of Cavity Rydberg Polaritons.** *arXiv:* 1506.00341 (2015).

40. Ningyuan Jia, Ariel Sommer, David Schuster, and Jonathan Simon, **Time- and Site-Resolved Dynamics in a Topological Circuit.** *Phys. Rev. X* 5, 021031 (2015). [Highlighted in the "Condensed Matter Journal Club"]
41. Philipp M. Preiss, Ruichao Ma, M. Eric Tai, Jonathan Simon, Markus Greiner, **Quantum gas microscopy with spin, atom-number, and multilayer readout**. *Phys. Rev. A* 91, 041602(R) (2015).
42. Andrew Daley, Jonathan Simon **Effective three-body interactions via photon-assisted tunneling in an optical lattice.** *Phys. Rev. A* 89, 053619 (2014).
43. Hannes Pichler, Johannes Schachenmayer, Jonathan Simon, Peter Zoller, Andrew J. Daley, **Dressed, noise- or disorder- resistant optical lattices.** *Phys. Rev. A* 86, 051605(R) (2012).
44. Waseem S. Bakr, Philipp M. Preiss, M. Eric Tai, Ruichao Ma, Jonathan Simon, Markus Greiner, **Orbital excitation blockade and algorithmic cooling in quantum gases.** *Nature* 480, 500-503 (2011) [Selected for a Nature "News and Views"]
45. Haruka Tanji-Suzuki, Wenlan Chen, Renate Landig, Jonathan Simon, Vladan Vuletić, **Vacuum Induced Transparency.** *Science* 333, 1266-1269 (2011). [Selected for a Science "Perspective" and a Nature Photonics "News and Views"]
46. Ruichao Ma, M. Eric Tai, Philipp M. Preiss, Waseem S. Bakr, Jonathan Simon, Markus Greiner, **Photon-Assisted Tunneling in a Biased, Strongly Correlated Bose Gas.** *Phys. Rev. Lett.* 107, 095301 (2011).
47. Jonathan Simon, Waseem S. Bakr, Ruichao Ma, M. Eric Tai, Philipp M. Preiss, Markus Greiner, **Quantum Simulation of Antiferromagnetic Spin Chains in an Optical Lattice.** *Nature* 472, 307-312 (2011). [Selected for a Nature "News and Views"]
48. Waseem S. Bakr, Amy Peng, M. Eric Tai, Ruichao Ma, Jonathan Simon, Jonathon Gillen, Simon Fölling, Lode Pollet, Markus Greiner, **Probing the Superfluid-to-Mott-Insulator Transition at the Single-Atom Level.** *Science* 329, 547-550 (2010). [Selected for a Science "Perspective"]
49. Haruka Tanji, Saikat Ghosh, Jonathan Simon, Benjamin Bloom, and Vladan Vuletić, **Heralded Single-Magnon Quantum Memory for Photon Polarization States.** *Phys. Rev. Lett.* 103, 043601 (2009). [Selected for a PRL "Viewpoint"]
50. Jonathan Simon, Haruka Tanji, Saikat Ghosh, Vladan Vuletić, **Single-photon bus connecting spin-wave quantum memories.** *Nat. Phys.* 3, 765 (2007).
51. Vladan Vuletić, James Thompson, Adam T. Black, and Jonathan Simon, **External-feedback laser cooling of molecular gases.** *Phys. Rev. A* 75, 051405(R) (2007).
52. Jonathan Simon, Haruka Tanji, James K. Thompson, and Vladan Vuletić, **Interfacing Collective Atomic Excitations and Single Photons.** *Phys. Rev. Lett.* 98, 183601 (2007).
53. Huanqian Loh, Yu-Ju Lin, Igor Teper, Marko Cetina, Jonathan Simon, James K. Thompson, Vladan Vuletić, **Influence of grating parameters on the linewidths of external-cavity diode lasers.** *Appl. Opt.*, Vol. 45, Issue 36, 9191–9197 (2006).
54. James K. Thompson, Jonathan Simon, Huanqian Loh, Vladan Vuletić, **A High-Brightness Source of Narrowband, Identical-Photon Pairs.** *Science* 313, 74–77 (2006).

Other Publications

- Jonathan Simon, **Magnetic Fields without magnetic fields.** *Nature News and Views* 515 (2014).
- Jonathan Simon, Markus Greiner, **A Duo of Graphene Mimics.** *Nature News and Views* 483 (2012).
- Haruka Tanji-Suzuki, Ian D. Leroux, Monika H. Schleier-Smith, Marko Cetina, Andrew Grier, Jonathan Simon, Vladan Vuletić, **Interaction between Atomic Ensembles and Optical Resonators: Classical Description.** *Adv. At. Mol. Opt. Phys* 60, 201-237 (2011).

- Haruka Tanji, Jonathan Simon, Saikat Ghosh, Benjamin Bloom, Vladan Vuletić, **Heralded atomic-ensemble quantum memory for photon polarization states.** *Phys. Scr. T* 135, 014010 (2009).

Research Talks

1. **Invited Lecturer**, SIF International School of Physics "Enrico Fermi", Varenna, Como Lake, Italy, July 2024; *A Brief Introduction to Superconducting Circuits: Quantum Simulation & Computing.*
2. **Invited Lecturer**, Cal-Bay Quantum School, TUM Institute for Advanced Study, Garching, Germany, June 2024; *Racing to the Bottom: Low Finesse, Small Waist Cavity QED.*
3. **Invited Lecturer**, Siegman International School on Lasers, Stanford University, Stanford CA, June 2024; *Quantum Computing.*
4. **Invited Speaker**, MIT Physics Colloquium, Cambridge Massachusetts, March 2024 *Probing Quantum Matter with Cats.*
5. **Invited Speaker**, Topological phases and strong correlations in many-body systems and light-matter hybrids, Harvard ITAMP, Cambridge, Massachusetts, November 2023 *Probing Quantum Matter with Cats.*
6. **Invited Speaker**, International Conference on quantum simulation, Ecole Polytechnique/The Internet, November 2023 *Quantum Matter in Cavity QED.*
7. **Invited Speaker**, University of Victoria Colloquium, The Internet, October 2023 *Probing Quantum Matter with Cats & Atomic Quantum Transduction.*
8. **Invited Speaker**, BEC 2023, Sant Feliu de Guixols, Spain, September 2023 *Probing Quantum Matter with Cats.*
9. **Invited Speaker**, Munich Center for Quantum Science and Technology Annual Retreat, Santhofen, Germany, June 2023; *Cavity QED from Many-body Physics to Transduction.*
10. **Invited Speaker**, CLEO Tutorial, San Jose California, May 2023; *New Regimes of Cavity QED Transduction to Manybody Physics.*
11. **Invited Speaker**, Stanford University Photonics Retreat, Asilomar Conference Grounds, April 2023; *Cavity QED from Many-body Physics to Transduction.*
12. **Invited Speaker**, Many-body Physics with Synthetic Quantum Systems, Princeton Center for Theoretical Physics, Princeton, NJ, April 2023; *Making & Probing Photon Fluids and Solids.*
13. **Invited Speaker**, CUBit Seminar, JILA/University of Colorado, Boulder, April 2023; *Cavity QED from Many-body Physics to Transduction.*
14. **Invited Speaker**, Quantum Control of Light, Physikzentrum Bad Honnef, March 2023; *Quantum Matter in Circuit QED.*
15. **Invited Speaker**, MIT iQUISE Seminar, February 2023; *Cavity QED from Manybody Physics to Transduction.*
16. **Invited Speaker**, JQI Seminar, College Park, Maryland, November 2022; *Making Fluids and Solids from (Microwave) Photons.*
17. **Invited Speaker**, ICFO Colloquium, Barcelona, Spain November 2022; *Making Fluids and Solids from (Microwave) Photons.*
18. **Invited Speaker**, SLAC Colloquium, Stanford, California October 2022; *Making Fluids and Solids from (Microwave) Photons.*
19. **Invited Speaker**, Purdue Physics Colloquium, Urbana, Illinois, October 2022; *Making Fluids and Solids from (Microwave) Photons.*
20. **Invited Speaker**, UIUC Physics Colloquium, Urbana, Illinois, October 2022; *Making Fluids and Solids from (Microwave) Photons.*

21. **Invited Speaker**, Q-FARM Seminar, Stanford, California, October 2022; *Cavity QED Many-body Physics to Transduction.*
22. **Invited Speaker**, The 27th International Conference on Atomic Physics, Toronto, Canada, July 2022; *Multimode Cavity QED: Few-body Physics to Transduction.*
23. **Invited Speaker**, University of California, Berkeley Physics Colloquium, Berkeley, California, April 2022; *Making Quantum Matter from Light: Laughlin Puddles, Mott Insulators, and Strongly Interacting Fluids.*
24. **Invited Speaker**, University of Toronto Physics Colloquium, Toronto, Canada, March 2022; *Making Quantum Matter from Light: Laughlin Puddles, Mott Insulators, and Strongly Interacting Fluids.*
25. **Invited Speaker**, March Meeting, Chicago, Illinois, March 2022; *Quantum Simulation with Photons: Laughlin Puddles, Mott Insulators, and Strongly Interacting Fluids.*
26. **Invited Speaker**, Simons Collaboration on Ultra-Quantum Matter, Flatiron Institute, New York, New York, January 2022; *Making Quantum Matter from Light: Laughlin Puddles, Mott Insulators, and Strongly Interacting Fluids.*
27. **Invited Speaker**, Benasque Conference: Topology meets Quantum Optics, June 2021; *Topological Cavity QED: Laughlin Molecules and Chern Circuits.*
28. **Invited Speaker**, Heidelberg Physics Colloquium, May 2021; *When Photons Self-Organize: Making Matter from Light.*
29. **Invited Speaker**, Virtual Science Forum Long Range Colloquium, May 2021; *When Photons Self-Organize: Making Matter from Light.*
30. **Invited Speaker**, Pittsburgh Quantum Institute 2021, Pittsburgh, Pennsylvania, March 2021; *When Photons Self-Organize: Making Matter from Light.*
31. **Invited Speaker**, University of Stuttgart Physics Colloquium, Stuttgart, Germany, December 2020; *When Photons Self-Organize: Laughlin Molecules and Mott Insulators.*
32. **Invited Speaker**, New York University Physics Colloquium, New York, New York, October 2020; *When Photons Self-Organize: Laughlin Molecules and Mott Insulators.*
33. **Invited Speaker**, University of Chicago Physics Colloquium, Chicago, Illinois, October 2020; *When Photons Self-Organize: Laughlin Molecules and Mott Insulators.*
34. **Invited Speaker**, City College of New York Physics Colloquium, Manhattan, New York, September 2020; *Making Matter from Light.*
35. **Invited Speaker**, Columbia Pro-QM Zeminar, Manhattan, New York, July 2020; *Making Matter from Light.*
36. **Invited Speaker**, REU Seminar, The University of Chicago, June 2020; *Making Matter from Light.*
37. **Invited Speaker**, Virtual DAMOP 2020, Portland, Oregon, June 2020; *Making Quantum Matter from Light.*
38. **Invited Speaker**, Virtual Atomic Molecular and Optical Physics Seminar (VAMOS), The Internet, Earth, May 2020; *Making Quantum Matter from Light.*
39. **Invited Speaker**, University of Cambridge Physics Colloquium, Cambridge, UK, April 2020; *Making Quantum Matter from Light: Photon Crystals & Laughlin Molecules.*
40. **Invited Speaker**, Perimeter Institute Physics Seminar, Waterloo, Canada, April 2020; *Making Quantum Matter from Light: Photon Crystals & Laughlin Molecules.*
41. **Invited Speaker**, Weizmann Institute AMO Seminar, Rehovot, Israel, February 2020; *Making Quantum Matter from Light: Photon Crystals & Laughlin Molecules.*
42. **Invited Speaker**, Minerva-Gentner Symposium: Quantum Simulations Using Photons, Atoms, and Molecules; Tze'elim, Israel, February 2020; *Making Matter From Light.*

43. **Invited Speaker**, University of Texas at Austin Physics Colloquium; Austin, TX, October 2019; *Making Matter From Light: Photon Crystals & Topological Molecules.*
44. **Invited Speaker**, KITP Conference on Topological Quantum Matter: From Fantasy to Reality, Santa Barbara, CA, October 2019; *Making Topological Matter from Light.*
45. **Session Chair**, 2019 Israeli-American Kavli Frontiers of Science Symposium; Jerusalem, Israel, September 2019 *What is the "Quantum World" What has it got to do with "Ultracold Atoms"?.*
46. **Tutorial Speaker**, Dynamics and Disorder in Quantum Manybody Systems far from Equilibrium; Ecole des Houches, France, August 2019 *Design Principles for Photonic Quantum Matter: Platforms, Probes, and Prospects.*
47. **Invited Speaker**, Designing Artificial Quantum Matter 2019; San Sebastian, Spain, July 2019 *Making Quantum Matter from Light: Photon Crystals & Laughlin Molecules.*
48. **Invited Speaker**, KITP Conference on Exploring Open Quantum Systems in Quantum Simulators, Santa Barbara, CA, April 2019; *Routes to Photonic Quantum Matter: Photon Crystals & Laughlin Molecules.*
49. **Invited Speaker**, Stanford Physics/Applied Physics Colloquium; Stanford, CA, April 2019; *Making Matter From Light: Photon Crystals & Topological Molecules.*
50. **Invited Speaker**, Kavli Nanoscience Institute Distinguished Seminar Series; Pasadena, CA, April 2019; *Making Matter From Light: Photon Crystals & Topological Molecules.*
51. **Invited Speaker**, ITAMP Winter School 2019: Quantum Many-body Systems; Biosphere 2, AZ, March 2019; *Creating Materials from Light.*
52. **Invited Speaker**, Solvay Conference in Quantum Simulation; Brussels, Belgium, February 2019; *First Light on Photonic Materials.*
53. **Invited Speaker**, Workshop on Precision Manybody Physics; Amherst, Massachusetts, October 2018; *First Light on Photonic Materials.*
54. **Invited Speaker**, US-Japan QELS-13: Quantum simulation, metrology, and computing in atomic and optical systems; Kanazawa, Japan, September 2018; *First Light on Strongly Correlated Photonic Materials.*
55. **Invited Speaker**, Gordon Research Conference: Non-Equilibrium Quantum Matter and Scalable Quantum Computing; Stonehill College, MA, July 2018; *Exploring Matter Made of Light.*
56. **Invited Speaker**, SU^2P/SPRC Workshop: Dynamics and Dissipation in Quantum Simulation; Stanford, CA, July 2018; *Making Materials from Light.*
57. **Invited Speaker**, Quantum Fluids of Light and Matter; Les Houches, France, June 2018; *Photon Mott Insulators, etc....*
58. **Invited Speaker**, FOR 2247: Long-Range Workshop 2018; Hanover, Germany, June 2018; *Introduction to Experiments with Strongly Interacting Polaritons (and Floquet Polaritons).*
59. **Invited Speaker**, Center for Ultracold Atoms Seminar; Harvard/MIT CUA, Cambridge, MA, April 2018; *Exploring Matter Made of Light.*
60. **Invited Lecturer**, Novel Paradigms in Many-Body Physics from Open Quantum Systems; Max Planck Institute for the Physics of Complex Systems, Dresden Germany, March 2018; *Making Materials from Light.*
61. **Invited Speaker**, Condensates of Light; Wilhelm und Else Heraeus-Stiftung, January 2018; *Topological and Strongly Correlated Photons.*
62. **Invited Speaker**, POTUS- Quantum: AI, Fundamentals, & Technologies; Caltech & SpaceX, January 2018; *Exploring Materials Made of Light.*
63. **Invited Speaker**, Croucher Conference on Frontiers of Cold Atom Physics; Hong Kong University, Hong Kong, December 2017; *Building Quantum Matter from Light.*

64. **Invited Speaker**, Stony Brook Physics Colloquium; Stony Brook, NY, October 2017; *Building Correlated and Topological Matter from Light.*
65. **Invited Speaker**, Stony Brook AMO Seminar; Stony Brook, NY, October 2017; *An Introduction to Topological Photonics.*
66. **Invited Speaker**, Many Body Cavity QED; Cambridge, MA, October 2017; *Building Topological Quantum Matter from Photons and Polaritons.*
67. **Invited Speaker**, JQI Seminar, College Park, MD, September 2017; *Building Correlated and Topological Quantum Matter from Light.*
68. **Invited Speaker**, Cavity QED Summer School; Lausanne, Switzerland, September 2017; *Building Quantum Materials from Light: Topological and Strongly Correlated Photons.*
69. **Invited Speaker**, BEC 2017; Sant Feliu, Spain, September 2017; *Building Topological Quantum Matter from Photons and Polaritons.*
70. **Invited Speaker**, NYU Frontiers in Emergent Quantum Phenomena; Manhattan NY, June 2017; *Building Quantum Materials from Light: Polariton Blockade to Landau Levels in Curved Space.*
71. **Invited Speaker**, DAMOP 2017; Sacramento, California, June 2017;*Photonic Landau Levels in Curved Space.*
72. **Invited Speaker**, QFLM at Institute of Scientific Studies of Cargèse: Quantum Fluids of Light and Matter, Corsica, France, May 2017; *Topological Photonic Quantum Materials: Landau Levels to Polariton Blockade.*
73. **Invited Speaker**, University of Chicago Computations in Science, Chicago, Illinois, April 2017; *Building Strongly Correlated Matter from Light.*
74. **Invited Speaker**, UMass Amherst Physics Colloquium, Amherst, MA, April 2017; *Topological Cavity QED: Photonics Landau Levels in Curved Space.*
75. **Invited Speaker**, Emerging Optical Materials Workshop @ MIT Lincoln Labs, Lexington, MA, April 2017; *Topological Cavity QED: Photonics Landau Levels in Curved Space.*
76. **Invited Speaker**, ETH Physics Colloquium, Zurich, Switzerland, March 2017; *Topological Physics in Curved Space: Twisted Cavities to Polariton Blockade.*
77. **Invited Speaker**, Princeton Physics Colloquium, Princeton, New Jersey, March 2017; *Topological Physics in Curved Space: Twisted Cavities to Polariton Blockade.*
78. **Invited Speaker**, UC Berkeley AMO Seminar, Berkeley, California, February 2017; *Building Quantum Matter from Light: from Topological Photonics to Polariton Blockade.*
79. **Invited Speaker**, University of Kaiserslautern Physics Colloquium, Kaiserslautern, Germany, February 2017; *Building Quantum Matter from Light: from Topological Photonics to Polariton Blockade.*
80. **Invited Speaker**, Aspen Center for Physics: Topological Meta-Materials, Aspen, CO, January 2017; *Building Quantum Matter from Light: from Topological Photonics to Polariton Blockade.*
81. **Invited Speaker**, KITP Conference on Universality in Few-Body Systems, Santa Barbara, CA, December 2016; *Building Quantum Materials from Light.*
82. **Invited Speaker**, Frontiers in Optics/Laser Science Conference (FiO/LS), Rochester, NY, October 2016; *Topological Cavity QED: Landau Levels in Curved Space to Microwave Chern Insulators.*
83. **Invited Speaker**, KITP Conference on Topological Quantum Matter, Santa Barbara, CA, October 2016; *Landau Levels in Curved Space.*
84. **Invited Speaker**, SPRC Symposium: Session on Collective Phenomena in Quantum Systems; Stanford, CA, September 2016; *Topological Photonics Landau Levels in Curved Space*

85. **Invited Speaker**, MURI Workshop on Synthetic Quantum Materials, and Quantum Dynamics of Atomic Gases, UChicago Eckhardt Center, September 2016; *Topological Cavity QED: Landau Levels in Curved Space.*
86. **Invited Speaker**, KITPC Workshop: Synthetic Topological Materials, Chinese Academy of Sciences, Beijing, China, August 2016; *Topological Cavity QED: Landau Levels in Curved Space.*
87. **Invited Speaker**, Harvard ITAMP: Connecting Few-body and Many-body Pictures of Fractional Quantum Hall Physics, Cambridge, MA, July 2016; *Topological Cavity QED: Landau Levels in Curved Space to Microwave Chern Insulators.*
88. **Invited Speaker**, Lorentz Center: Topological Physics at $\hbar = 0$: Photonic, Acoustic, and Mechanical Analogues of Electronic Topological Insulators, Leiden, Netherlands, May 2016; *Landau Levels in Curved Space, (Topological Circuits & Microwave Chern Insulators).*
89. **Invited Speaker**, Simons Center for Geometry and Topology Conference: Geometry of Quantum States in Condensed Matter, Stony Brook, NY, April 2016; *Landau Levels in Curved Space: Topological Photonics in Twisted Resonators.*
90. **Invited Speaker**, University of Illinois, Urbana-Champagne, April 2016; *Topological Photonics with Twisted Resonators and Braided Circuits.*
91. **Invited Speaker**, MPQ Colloquium, Garching, Germany, February 2016; *Topological Photonics with Twisted Resonators and Braided Circuits.*
92. **Invited Speaker**, CoQuS Colloquium, Vienna, Austria, November 2015; *Topological Photonics with Twisted Resonators and Braided Circuits.*
93. **Invited Speaker**, UC/PKU Workshop on quantum condensed matter physics, Beijing, China, CA, October 2015; *Topological Photonics with Twisted Resonators and Braided Circuits.*
94. **Invited Speaker**, James Franck Institute Seminar, Chicago, IL, October 2015; *Topological Photonics with Twisted Resonators and Braided Circuits.*
95. **Invited Speaker**, KITP Conference on Non-equilibrium dynamics of strongly interacting photons, Santa Barbara, CA, October 2015; *Topological Photonics with Twisted Resonators and Braided Circuits.*
96. **Invited Speaker**, 12th US-Japan Seminar on many body quantum systems, Madison, Wisconsin, September 2015; *Topological Photonics with Twisted Resonators and Braided Circuits.*
97. **Invited Speaker**, Quantum Systems and Technology, Monte Verita, Switzerland, June 2015; *Topological Photonics with Twisted Resonators and Braided Circuits.*
98. **Invited Speaker**, Aspen Center for Physics: Nonequilibrium Quantum Matter, Aspen, Colorado, March 2015; *Progress Towards Topological Cavity Quantum Electrodynamics.*
99. **Invited Speaker**, Strongly correlated fluids of light and matter, Trento Italy, January 2015; *Topological Photonics: Braided Microwave Circuits and Twisted Resonators.*
100. **Invited Speaker**, OSA Incubator on Topological Order of Photons, Washington DC, April 2014; *Weaving (Quantum) Materials from Light.*
101. **Invited Speaker**, Quantum Optics Obergurgl 2014, Obergurgl Austria, February 2014; *Weaving Quantum Materials from Light: Towards Few-Body Physics in Multimode Rydberg Cavity QED.*
102. **Invited Speaker**, Physics of Quantum Information, Snowbird Utah, January 2014; *Weaving Quantum Materials from Light: Cold Atoms, Topological Circuits, Photons and Beyond.*
103. **Condensed Matter Seminar**, Northwestern University, December 2013; *Engineering Photonic Topological & Quantum Materials.*
104. **AMO Seminar**, University of St. Andrews, October 2013; *Weaving Quantum Materials from Light: Cold Atoms, Topological Circuits, Photons and Beyond.*

105. **AMO Seminar**, University of Strathclyde, October 2013; *Weaving Quantum Materials from Light: Cold Atoms, Topological Circuits, Photons and Beyond.*

106. **REU Seminar**, University of Chicago, July 2013; *Engineering Quantum- and Topological-Materials Cold Atoms, Quantum Circuits and Beyond.*

107. **AMO Seminar**, University of Wisconsin. Madison, Wisconsin, February 2013; *Engineering Synthetic Quantum Materials from Cold Atoms: Mott Insulators to Emergent Polariton Crystals.*

108. **AMO Seminar**, University of Waterloo. Waterloo Ontario, Canada, January 2013; *Engineering Quantum Materials from Cold Atoms: Mott Insulators to Emergent Crystals.*

109. **Physics Colloquium**, University of Chicago. Chicago, Illinois, December 2012; *Engineering Synthetic Quantum Materials from Cold Atoms: Mott Insulators to Emergent Polariton Crystals.*

110. **AMO Seminar**, Northwestern University. Evanston, Illinois, November 2012; *Engineering Synthetic Quantum Materials from Cold Atoms: Mott Insulators to Emergent Polariton Crystals.*

111. **Invited Speaker**, Midwest Cold Atom Workshop. Champaign, Illinois, November 2012; *Engineering Synthetic Quantum Materials from Cold Atoms: Mott Insulators to Emergent Polariton Crystals.*

112. **Invited Speaker**, New Laser Scientist Conference. Rochester, New York, October 2012; *Engineering Synthetic Quantum Materials from Cold Atoms: Mott Insulators to Emergent Polariton Crystals.*

113. **Invited Speaker**, Quantum Walks, Quantum Simulators and Quantum Networks, Bonn, Germany, July 2012; *Building Synthetic Materials From Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

114. **Invited Speaker**, Quantum Systems and Technology Workshop. Monte Verita, Ascona Switzerland, June 2012; *Building Synthetic Materials from Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

115. **Physics Seminar**, Boston University, Cambridge, Massachusetts, May 2012; *Building Synthetic Materials from Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

116. **Atomic Physics Seminar**, Stanford University, Stanford California, March 2012; *Building Synthetic Materials from Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

117. **Atomic Physics Seminar**, University of Illinois at Urbana-Champagne, February 2012; *Building Synthetic Materials from Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

118. **Colloquium**, UMass Amherst, February 2012; *Building Synthetic Materials from Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

119. **AMO Seminar**, University of Michigan, February 2012; *Synthetic Materials from Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

120. **Colloquium**, Institute for Quantum Computing, Waterloo Ontario, Canada, February 2012; *Building Synthetic Materials from Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

121. **AMO Seminar**, University of California Los Angeles, Los Angeles California, February 2012; *Building Synthetic Materials from Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

122. **Colloquium**, Duke University, Durham, North Carolina, February 2012; *Building Synthetic Materials from Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

123. **Colloquium**, Caltech, Pasadena CA, January 2012; *Building Synthetic Materials from Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

124. **AMO Seminar**, Yale University, New Haven, Connecticut, January 2012; *Building Synthetic Materials from Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

125. **LAASP Seminar**, Cornell University, Ithaca, New York, January 2012; *Building Synthetic Materials from Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

126. **AMO Seminar**, Princeton University, Princeton, New Jersey, January 2012; *Building Synthetic Materials from Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

127. **Institute Seminar**, James Franck Institute, University of Chicago, Chicago Illinois, January 2012; *Building Synthetic Materials from Ultracold Atoms: Quantum Magnetism in an Optical Lattice.*

128. **Invited Speaker**, Aspen Center for Physics: New Directions in Ultracold Atomic Systems, January 2012, Aspen, Colorado; *Atom-Resolved Many-Body Quantum Physics.*

129. **Invited Speaker**, CifAR Quantum Materials Program Meet, Montreal Quebec Canada, October 2011; *Engineering Synthetic Materials with Cold Atoms: Quantum Magnetism in an Optical Lattice.*

130. **AMO Seminar**, Institute for Quantum Optics and Quantum Information, Innsbruck, Austria, September 2011; *Quantum Magnetism in an Optical Lattice.*

131. **Invited Speaker**, Strongly Correlated Electron Systems 2011, Cambridge, UK, September 2011; *Mott Insulators to Quantum Magnets: Atom-By-Atom Imaging and Manipulation of Designer Condensed Matter.*

132. **Keynote Speaker**, Photonics Ireland, Dublin Ireland, September 2011; *Quantum Magnetism with Ultracold Atoms: A Microscopic View of Artificial Quantum Matter*

133. **Invited Speaker**, Quantum phenomena in graphene, other low-dimensional materials, and optical lattices, Erice, Italy, August 2011; *Quantum Magnetism in an Optical Lattice.*

134. **Invited Speaker**, Minerva-Weizmann workshop on Entanglement in Atomic systems, Rohovot, Israel, November 2010; *Probing the Superfluid to Mott Insulator Transition at the Single Site Level.*

135. **Colloquium**, University of Connecticut Atomic Physics Seminar, Storrs, Connecticut, November 2010; *Quantum Gas Microscope: Exploring the Superfluid to Mott Insulator Transition at the Single Atom Level.*

136. **Invited Speaker**, CNLS Conference on Complexity and Disorder at Ultra-low Temperatures, Santa Fe, New Mexico, June 2010; *Single-Site Probing of the Superfluid-Mott Insulator Transition with a Quantum Gas Microscope.*

137. **Invited Talk**, Princeton-TAMU Symposium on Quantum Coherence and Laser Spectroscopy, Princeton, New Jersey, Mark 2007; *Single Photons and Quantum Memories: Climbing the Dicke Ladder One Rung at a Time.*