Peter L. McMahon

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Education

Jun 2010 – Sep 2014 **Ph.D.**, *Stanford University*, Electrical Engineering.
Minor: Physics

Sep 2008 – Jun 2010 **M.S.**, *Stanford University*, Electrical Engineering.
Concentration: Quantum Electronics

Feb 2003 – Aug 2008 **B.Sc. (Eng); M.Sc. (Eng); M.Sc.**, *University of Cape Town*, Electrical and Computer Engineering; Electrical Engineering; Computer Science.

Appointments

Jul 2019 – **Assistant Professor**, *Cornell University*, Applied and Engineering Physics.

Oct 2014 – Jun 2019 **Postdoctoral Researcher**, *Stanford University*, Applied Physics, Ginzton Laboratory.

Jun 2009 – Sep 2014 **Research Assistant**, *Stanford University*, Electrical Engineering, Ginzton Laboratory.

Sep 2008 – May 2009 **Research Assistant**, *Stanford University*, Electrical Engineering, Pervasive Parallelism Lab.

May 2007 – Apr 2008 **Visiting Research Student**, *University of California, Berkeley*, Space Sciences Laboratory and Berkeley Wireless Research Center.

Honors and Awards

- IUPAP C17 Early Career Scientist Prize for Applied Aspects on Laser Physics and Photonics (2022) *Awarded to one early career optical scientist within eight years of their Ph.D. graduation globally.*
- Office of Naval Research Young Investigator Program Award (2022 – 2025) *Awarded to 32 assistant professors—3 in physics—out of 220 applicants from universities across the US.*
- Sloan Research Fellowship (Physics) (2022 – 2024) *Awarded to 23 assistant professors in physics and astronomy from universities in the US and Canada.*
- Packard Fellowship in Science and Engineering (Physics) (2021 – 2026) *Awarded to 20 assistant professors—4 in physics—out of 100 nominees from 50 universities in the US.*
- *Light: Science & Applications* Rising Stars of Light – Second Prize (2021) *Tied second among optical scientists under the age of 40 globally.*

- Cornell Merrill Presidential Scholar selection by Hannah Doyle as *Faculty member who made the most significant contribution to her education at Cornell* (2021)
- CIFAR Azrieli Global Scholar in Quantum Information Science (2020 – 2022) *Awarded to 13 assistant professors out of 184 applicants from universities globally.*
- Google Quantum Research Award (2019) *Awarded to 18 researchers from universities globally.*
- Stanford Nano- and Quantum Science and Engineering Postdoctoral Fellowship (2015 – 2017) *Awarded to one applicant annually, across the Departments of Physics, Electrical Engineering, Applied Physics, and Materials Science and Engineering.*
- Stanford Graduate Fellowship (2008 – 2011) *Awarded to ~100 Ph.D. students annually across all science and engineering disciplines.*

Publications (including preprints)

Last-Author and Co-Last-Author Papers

- A. Senanian, L. G. Wright, P. F. Wade, H. K. Doyle and **P. L. McMahon**. "Programmable large-scale simulation of bosonic transport in optical synthetic frequency lattices." (2022). arXiv:2208.05088
- T. Wang*, M. M. Sohoni*, L. G. Wright, M. M. Stein, S.-Y. Ma, T. Onodera, M. Anderson and **P. L. McMahon**. "Image sensing with multilayer, nonlinear optical neural networks." (2022). arXiv:2207.14293
- N. Mohseni, **P. L. McMahon*** and T. Byrnes*. "Ising machines as hardware solvers of combinatorial optimization problems." *Nature Reviews Physics* **4**, 363 – 379 (2022). doi:10.1038/s42254-022-00440-8
- L. G. Wright*, T. Onodera*, M. M. Stein, T. Wang, D. T. Schachter, Z. Hu and **P. L. McMahon**. "Deep physical neural networks trained with backpropagation." *Nature* **601**, 549 – 555 (2022). doi:10.1038/s41586-021-04223-6
- E. Rosenberg, P. Ginsparg and **P. L. McMahon**. "Experimental error mitigation using linear rescaling for variational quantum eigensolving with up to 20 qubits." *Quantum Science and Technology* **7**, 015024 (2022). doi:10.1088/2058-9565/ac3b37
- T. Wang, S.-Y. Ma, L. G. Wright, T. Onodera, B. Richard and **P. L. McMahon**. "An optical neural network using less than 1 photon per multiplication." *Nature Communications* **13**, 123 (2022). doi:10.1038/s41467-021-27774-8
- T. Onodera*, E. Ng* and **P. L. McMahon**. "A quantum annealer with fully programmable all-to-all coupling via Floquet engineering." *npj Quantum Information* **6**, 48 (2020). doi:10.1038/s41534-020-0279-z
- L. G. Wright and **P. L. McMahon**. "The Capacity of Quantum Neural Networks." (2019). arXiv:1908.01364

First-Author and Co-First-Author Papers

- R. Hamerly*, T. Inagaki*, **P. L. McMahon***, D. Venturelli, A. Marandi, T. Onodera, E. Ng, C. Langrock, K. Inaba, T. Honjo, K. Enbutsu, T. Umeki, R. Kasahara, S. Utsunomiya, S. Kako, K. Kawarabayashi, R. L. Byer, M. M. Fejer, H. Mabuchi, D. Englund, E. Rieffel, H. Takesue and Y. Yamamoto. "Experimental investigation of performance differences between Coherent Ising Machines and a quantum annealer." *Science Advances* **5**, 5, eaau0823 (2019). doi:10.1126/sciadv.aau0823
- K. G. Lagoudakis*, **P. L. McMahon***, C. Dory*, K. A. Fischer, K. Müller, V. Borish, D. Dalacu, P. J. Poole, M. E. Reimer, V. Zwiller, Y. Yamamoto and J. Vučković "Ultrafast Coherent Manipulation of Trions in Site-Controlled Nanowire Quantum Dots." *Optica* **3**, 12, 1430 – 1435 (2016). doi:10.1364/OPTICA.3.001430
- **P. L. McMahon***, A. Marandi*, Y. Haribara, R. Hamerly, C. Langrock, S. Tamate, T. Inagaki, H. Takesue, S. Utsunomiya, K. Aihara, R. L. Byer, M. M. Fejer, H. Mabuchi and Y. Yamamoto. "A fully programmable 100-spin coherent Ising machine with all-to-all connections." *Science* **354**, No. 6312, 614 – 617 (2016). doi:10.1126/science.aah5178
- K. G. Lagoudakis*, **P. L. McMahon***, K. A. Fischer, S. Puri, K. Müller, D. Dalacu, P. J. Poole, M. E. Reimer, V. Zwiller, Y. Yamamoto and J. Vučković. "Initialization of a spin qubit in a site-controlled nanowire quantum dot." *New Journal of Physics* **18** 053024 (2016). doi:10.1088/1367-2630/18/5/053024
- **P. L. McMahon** and K. De Greve. "Towards Quantum Repeaters with Solid-State Qubits: Spin-Photon Entanglement Generation using Self-Assembled Quantum Dots." Invited chapter in *Engineering the Atom-Photon Interaction*, Springer-Verlag (2015). doi:10.1007/978-3-319-19231-4_14
- S. Puri*, **P. L. McMahon*** and Y. Yamamoto. "Single-Shot Quantum Non-Demolition Measurement of a Quantum Dot Electron Spin, using Cavity Exciton-Polaritons." *Physical Review B* **90**, 155421 (2014). doi:10.1103/PhysRevB.90.155421
- K. De Greve*, **P. L. McMahon***, L. Yu, J. S. Pelc, C. Jones, C. M. Natarajan, N. Y. Kim, E. Abe, S. Maier, C. Schneider, M. Kamp, S. Höfling, R. H. Hadfield, A. Forchel, M. M. Fejer and Y. Yamamoto. "Complete tomography of a high-fidelity solid-state entangled spin-photon qubit pair." *Nature Communications* **4**, 2228 (2013). doi:10.1038/ncomms3228

Other Papers

- R. Yanagimoto*, T. Onodera*, E. Ng, L. G. Wright, **P. L. McMahon** and H. Mabuchi. "Engineering a Kerr-based Deterministic Cubic Phase Gate via Gaussian Operations." *Physical Review Letters* **124**, 240503 (2020). doi:10.1103/PhysRevLett.124.240503
- R. M. Parrish, E. G. Hohenstein, **P. L. McMahon** and T. J. Martinez. "Quantum Computation of Electronic Transitions Using a Variational Quantum Eigensolver." *Physical Review Letters* **122**, 230401 (2019). doi:10.1103/PhysRevLett.122.230401

- C. J. Layton, **P. L. McMahon** and W. J. Greenleaf. "Large-scale, quantitative protein assays on a high-throughput DNA sequencing chip." *Molecular Cell* **73**, 5 (2019). doi:10.1016/j.molcel.2019.02.019
- T. Leleu, Y. Yamamoto, **P. L. McMahon** and K. Aihara. "Destabilization of Local Minima in Analog Spin Systems by Correction of Amplitude Heterogeneity." *Physical Review Letters* **122**, 040607 (2019). doi:10.1103/PhysRevLett.122.040607
- R. She*, A. K. Chakravarty*, C. J. Layton*, L. M. Chircus, J. O. L. Andreasson, N. Damaraju, **P. L. McMahon**, J. D. Buenrostro, D. F. Jarosz and W. J. Greenleaf. "Comprehensive and quantitative mapping of RNA–protein interactions across a transcribed eukaryotic genome." *Proceedings of the National Academy of Sciences* **114**, 14, 3619 – 3624 (2017). doi:10.1073/pnas.1618370114
- S. Puri, **P. L. McMahon** and Y. Yamamoto. "Universal logic gates for quantum-dot electron-spin qubits using trapped quantum-well exciton polaritons." *Physical Review B* **95**, 125410 (2017). doi:10.1103/PhysRevB.95.125410
- K. G. Lagoudakis, K. A. Fischer, T. Sarmiento, **P. L. McMahon**, M. Radulaski, J. L. Zhang, Y. Kelaita, C. Dory, K. Müller and J. Vučković. "Observation of Mollow Triplets with Tunable Interactions in Double Lambda Systems of Individual Hole Spins." *Physical Review Letters* **118**, 013602 (2017). doi:10.1103/PhysRevLett.118.013602
- T. Inagaki, Y. Haribara, K. Igarashi, T. Sonobe, S. Tamate, T. Honjo, A. Marandi, **P. L. McMahon**, T. Umeki, K. Enbutsu, O. Tadanaga, H. Takenouchi, K. Aihara, K. Kawarabayashi, K. Inoue, S. Utsunomiya and H. Takesue. "A coherent Ising machine for 2000-node optimization problems." *Science* **354**, No. 6312, 603 – 606 (2016). doi:10.1126/science.aah4243
- K. De Greve, D. Press, **P. L. McMahon** and Y. Yamamoto. "Ultrafast optical control of individual quantum dot spin qubits." *Reports on Progress in Physics* **76**, 092501 (2013). doi:10.1088/0034-4885/76/9/092501
- K. De Greve, L. Yu*, **P. L. McMahon***, J. S. Pelc*, C. M. Natarajan, N. Y. Kim, E. Abe, S. Maier, C. Schneider, M. Kamp, S. Höfling, R. H. Hadfield, A. Forchel, M. M. Fejer and Y. Yamamoto. "Quantum-dot spin-photon entanglement via frequency downconversion to telecom wavelength." *Nature* **491**, 421 – 425 (2012). doi:10.1038/nature11577
- J. S. Pelc, L. Yu*, K. De Greve*, **P. L. McMahon***, C. M. Natarajan, V. Esfandyarpour, S. Maier, C. Schneider, M. Kamp, S. Hoefling, R. H. Hadfield, A. Forchel, Y. Yamamoto, M. M. Fejer. "Downconversion quantum interface for a single quantum dot spin and 1550-nm single-photon channel." *Optics Express* **20**, 25, 27510 – 27519 (2012). doi:10.1364/OE.20.027510
- N. C. Jones, R. Van Meter, A. G. Fowler, **P. L. McMahon**, J. Kim, T. D. Ladd and Y. Yamamoto. "Layered Architecture for Quantum Computing." *Physical Review X* **2**, 031007 (2012). doi:10.1103/PhysRevX.2.031007

- N. C. Jones, J. D. Whitfield, **P. L. McMahon**, M.-H. Yung, R. Van Meter, A. Aspuru-Guzik and Y. Yamamoto. "Faster quantum chemistry simulation on fault-tolerant quantum computers." *New Journal of Physics* **14**, 115023 (2012). doi:10.1088/1367-2630/14/11/115023
- A. P. V. Siemion, G. C. Bower, G. Foster, **P. L. McMahon**, M. I. Wagner, D. Werthimer, D. Backer, J. Cordes and J. van Leeuwen. "The Allen Telescope Array Fly's Eye Survey for Fast Radio Transients." *Astrophysical Journal*, **744**, 109 (2012). doi:10.1088/0004-637X/744/2/109
- K. De Greve, **P. L. McMahon**, D. Press, T. D. Ladd, D. Bisping, C. Schneider, M. Kamp, L. Worschech, S. Höfling, A. Forchel and Y. Yamamoto. "Coherent control and suppressed nuclear feedback of a single quantum dot hole qubit." *Nature Physics* **7**, 872 – 878 (2011). doi:10.1038/nphys2078
- H.-H. Kuo, J.-H. Chu, S. C. Riggs, L. Yu, **P. L. McMahon**, K. De Greve, Y. Yamamoto, J. G. Analytis, and I. R. Fisher. "Possible origin of the nonmonotonic doping dependence of the in-plane resistivity anisotropy of $Ba(Fe_{1-x}T_x)_2As_2$ (T=Co, Ni and Cu)." *Physical Review B*, **84**, 054540 (2011). doi:10.1103/PhysRevB.84.054540
- T. D. Ladd, D. Press, K. De Greve, **P. L. McMahon**, B. Frieß, C. Schneider, M. Kamp, S. Höfling, A. Forchel and Y. Yamamoto. "Pulsed Nuclear Pumping and Spin Diffusion in a Single Charged Quantum Dot." *Physical Review Letters*, **105**, 107401 (2010). doi:10.1103/PhysRevLett.105.107401
- J.-H. Chu, J. G. Analytis, K. De Greve, **P. L. McMahon**, Z. Islam, Y. Yamamoto and I. R. Fisher. "In-Plane Resistivity Anisotropy in an Underdoped Iron Arsenide Superconductor." *Science*, **329**, No. 5993, 824 – 826 (2010). doi:10.1126/science.1190482
- D. Press, K. De Greve, **P. L. McMahon**, T. D. Ladd, B. Frieß, C. Schneider, M. Kamp, S. Höfling, A. Forchel and Y. Yamamoto. "Ultrafast optical spin echo in a single quantum dot." *Nature Photonics*, **4**, 367 – 370 (2010). doi:10.1038/nphoton.2010.83
- M. J. Keith, A. Jameson, W. Van Straten, M. Bailes, S. Johnston, M. Kramer, A. Possenti, S. D. Bates, N. D. R. Bhat, M. Burgay, S. Burke-Spolaor, N. D'Amico, L. Levin, **P. L. McMahon**, S. Milia and B. W. Stappers. "The High Time Resolution Universe Pulsar Survey – I. System configuration and initial discoveries." *Monthly Notices of the Royal Astronomical Society*, **409**, 2, 619 – 627 (2010). doi:10.1111/j.1365-2966.2010.17325.x
- A. Siemion, J. Von Korff, **P. McMahon**, E. Korpela, D. Werthimer, D. Anderson, G. Bower, J. Cobb, G. Foster, M. Lebofsky, J. van Leeuwen, W. Mallard and M. Wagner. "New SETI Sky Surveys for Radio Pulses." *Acta Astronautica*, **67**, 11 – 12 (2010). doi:10.1016/j.actaastro.2010.01.016
- K. Stevens, H. Chen, T. Filiba, **P. McMahon** and Y. S. Song. "SeqHive: A Reconfigurable Computer Cluster for Genome Re-sequencing." *Proceedings of the IEEE Conference on Field Programmable Logic and Applications (FPL)*, 31 August – 2 September 2010. doi:10.1109/FPL.2010.121

- S. K. Kim, **P. L. McMahon** and K. Olukotun. "A Large-scale Architecture for Restricted Boltzmann Machines." *Proceedings of the IEEE Symposium on Field-Programmable Custom Computing Machines (FCCM)*, 2 – 4 May 2010. [Acceptance rate: 18%] doi:10.1109/FCCM.2010.38
- S. K. Kim, L. McAfee, **P. L. McMahon** and K. Olukotun. "A Highly Scalable Restricted Boltzmann Machine FPGA Implementation." *Proceedings of the IEEE Conference on Field Programmable Logic and Applications (FPL)*, 31 August – 2 September 2009. [Acceptance rate: 25%] doi:10.1109/FPL.2009.5272262
- A. Parsons, D. Backer, H. Chen, P. Droz, T. Filiba, D. MacMahon, J. Manley, **P. McMahon**, A. Parsa, A. Siemion, D. Werthimer and M. Wright. "A Scalable Correlator Architecture Based on Modular FPGA Hardware, Reuseable Gateware, and Data Packetization." *The Publications of the Astronomical Society of the Pacific*, **120**, 873, 1207 – 1221 (2008). doi:10.1086/593053

Invited Talks

- "Computing with Physical Systems." *Physics Colloquium, Syracuse University*, Syracuse, NY, 13 October, 2022.
- "Computing with Physical Systems." *EECS Solid-State Seminar, University of California*, Berkeley, CA, 2 September, 2022.
- "Computing with Light: Photonic Neural Networks using Linear and Nonlinear Optics" *Lake Como Machine Learning Photonics School*, Lake Como, Italy, 29 August, 2022. (Held online due to COVID-19.)
- "Computing with Physical Systems." *Computer Systems Colloquium, Stanford University*, Stanford, CA, 1 June, 2022. (Held online due to COVID-19.)
- "Photonic neural networks using linear and nonlinear optics." *Photonics North*, Niagara Falls, Canada, 26 May, 2022. (Held online due to COVID-19.)
- "Physical Neural Networks: Harnessing complex dynamics to perform machine learning." *IBM Quantum Qiskit Seminar*, 6 May, 2022. (Held online due to COVID-19.)
- "Ising solving using an optical matrix-vector multiplier." *NSF-FET Workshop on Ising Machines*, 8 April, 2022. (Held online due to COVID-19.)
- "Computing with Physical Systems." *Department of Electrical and Computer Engineering Seminar, University of Delaware*, Newark, DE, 25 March, 2022. (Held online due to COVID-19.)
- "Physical Neural Networks: Harnessing complex dynamics to perform machine learning." *Yale Quantum Institute Colloquium, Yale University*, New Haven, CT, 18 February, 2022. (Held online due to COVID-19.)
- "Neural networks with linear and nonlinear photonics." *SPIE Photonics West – AI and Optical Data Sciences Conference*, San Francisco, CA, 22 – 27 January, 2022. (Held online due to COVID-19.)
- "Computing with Physical Systems." *51st Winter Colloquium on the Physics of Quantum Electronics (PQE)*, Snowbird, UT, 10 – 14 January, 2022. (Held online due to COVID-19.)

- "Fully programmable quantum machines with all-to-all connectivity via Floquet engineering." *Many-body Cavity QED 2022, Aspen Center for Physics*, Aspen, CO, 5 – 10 December, 2021. (Held online due to COVID-19.)
- "Computing with Physical Systems." *CUNY-Princeton Workshop on Computation with Physical Systems*, New York, NY, 15 October, 2021. (Held online due to COVID-19.)
- "Photonic Neural Networks Using Linear and Nonlinear Optics" *OSA Photonics in Switching and Computing (PSC)*, 27 – 29 September, 2021. (Held online due to COVID-19.)
- "Computing with Physical Systems." *Hewlett Packard Enterprise Labs*, Palo Alto, CA, 24 September, 2021. (Held online due to COVID-19.)
- "Computing with Physical Systems." *NTT Research Upgrade Summit*, Sunnyvale, CA, 20 – 21 September, 2021. (Held online due to COVID-19.)
- "Computing with Physical Systems." *Joby Aviation*, Santa Cruz, CA, 17 September, 2021. (Held online due to COVID-19.)
- "Computing with Physical Systems." *Corning*, Corning, NY, 30 August, 2021. (Held online due to COVID-19.)
- "Computing with Physical Systems." *Microsoft Research*, Cambridge, England, 24 August, 2021. (Held online due to COVID-19.)
- "Quantum Engineering: Photonics in quantum computing and quantum networking." *IEEE Quantum Computing Education Series*, 28 July, 2021. (Held online due to COVID-19.)
- "Quantum machines with fully programmable all-to-all coupling via Floquet engineering." *IBM Quantum Qiskit Seminar*, 23 July, 2021. (Held online due to COVID-19.)
- "Computing with Physical Systems." *Departments of Electrical Engineering and Physics, University of Washington*, Seattle, WA, 25 June, 2021. (Held online due to COVID-19.)
- "Photonics in quantum computing and quantum networking." *Hamamatsu Quantum Webinar Series*, 22 May, 2021. (Held online due to COVID-19.)
- "Computing with Physical Systems." *Unite Mixte de Physique CNRS/Thales*, Palaiseau, France, 3 May, 2021. (Held online due to COVID-19.)
- "Coherent Ising Machines: non-von Neumann computing using networks of optical parametric oscillators." *47-779 Quantum Integer Programming, Carnegie Mellon University*, Pittsburgh, PA, 6 October, 2020. (Held online due to COVID-19.)
- "A quantum annealer with fully programmable all-to-all coupling via Floquet engineering." *Conference on Quantum Annealing/Adiabatic Quantum Computation 2020*, Trieste, Italy, 5 – 6 October, 2020. (Held online due to COVID-19.)
- "Fully programmable quantum machines with all-to-all connectivity via Floquet engineering." *Advanced Quantum Testbed Colloquium, Lawrence Berkeley National Laboratory*, Berkeley, CA, 24 September, 2020. (Held online due to COVID-19.)

- "A quantum annealer with fully programmable all-to-all coupling via Floquet engineering." *Adiabatic Quantum Computing Conference 2020*, Albuquerque, NM, 22 – 25 June, 2020. (Cancelled due to COVID-19.)
- "The return of optical computing: photonic processing for optimization and machine learning." *Computational Physics Seminar, ExxonMobil Research*, Annandale, NJ, 24 February, 2020.
- "Explorations in Computation using Classical and Quantum Photonics." *Department of Physics Colloquium, Cornell University*, Ithaca, NY, 27 January, 2020.
- "Fully programmable quantum machines with all-to-all connectivity via Floquet engineering." *Department of Electrical Engineering Colloquium, Princeton University*, Princeton, NJ, 25 October, 2019.
- "A quantum annealer with fully programmable all-to-all coupling via Floquet engineering." (Plenary) *Quantum Innovators in Science and Engineering Workshop*, Institute for Quantum Computing, Waterloo, Canada, 30 September – 3 October, 2019.
- "Combinatorial optimization using networks of optical parametric oscillators with measurement feedback." *49th Winter Colloquium on the Physics of Quantum Electronics (PQE)*, Snowbird, UT, 7 – 11 January, 2019.
- "Non-von Neumann computing using networks of optical parametric oscillators." *Center in Quantum Information and Quantum Physics, University of Science and Technology of China*, Shanghai, China, 24 May, 2018.
- "Non-von Neumann computing using networks of optical parametric oscillators." *School of Electrical and Computer Engineering, Cornell University*, Ithaca, NY, 1 March, 2018.
- "Non-von Neumann computing using networks of optical parametric oscillators." *School of Applied and Engineering Physics, Cornell University*, Ithaca, NY, 27 February, 2018.
- "Non-von Neumann computing using networks of optical parametric oscillators." *Department of Electrical and Computer Engineering & Joint Quantum Institute Special Seminar, University of Maryland*, College Park, MD, 20 February, 2018.
- "Combinatorial optimization with Coherent Ising Machines based on Degenerate Optical Parametric Oscillators." *Physical Chemistry Seminar, Purdue University*, West Lafayette, IN, 22 March, 2017.
- "Computing using networks of optical parametric oscillators." *RLE/EECS Optics and Quantum Electronics Seminar, Massachusetts Institute of Technology*, Cambridge, MA, 29 November, 2017.
- "Computing using networks of optical parametric oscillators." *10th IEEE/ACM Workshop on Variability, Modeling, and Characterization (VMC)*, Irvine, CA, 16 November, 2017.
- "Combinatorial optimization using networks of optical parametric oscillators." *Workshop on Non-conventional Approaches to Hard Optimization*, Irvine, CA, 16 November, 2017.

- "Computing using networks of optical parametric oscillators." *Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology*, Cambridge, MA, 27 February, 2017.
- "Computing using networks of optical parametric oscillators." *Los Alamos National Laboratory*, Los Alamos, NM, 9 February, 2017.
- "Computing using networks of optical parametric oscillators." *Institute for Molecular Engineering, University of Chicago*, Chicago, IL, 24 January, 2017.
- "Combinatorial optimization using networks of optical parametric oscillators: present (bulk) and future (on-chip)." *47th Winter Colloquium on the Physics of Quantum Electronics (PQE)*, Snowbird, UT, 8 – 13 January, 2017.
- "Physical computing using networks of optical parametric oscillators: solving Ising problems using optical-electronic machines." *SystemX Alliance Fall Conference*, Stanford, CA, 15 – 17 November, 2016.
- "Combinatorial Optimization with Coherent Ising Machines based on Degenerate Optical Parametric Oscillators." *Frontiers in Optics / Laser Science (FiO/LS)*, Rochester, NY, 17 – 21 October, 2016.
- "Explorations with a New Qubit System: Hybrid Quantum Dot and Quantum Well Exciton-Polariton Devices." *American Physical Society March Meeting*, San Antonio, TX, 5 March, 2015.
- "Tomography of a high-fidelity entangled spin-photon qubit pair." *MSS-16: 16th International Conference on Modulated Semiconductor Structures*, Wrocław, Poland, 1 – 5 July, 2013.

Selected Other Conference Presentations and Talks

- "Fully programmable quantum machines with all-to-all connectivity via Floquet engineering, and quantum neural networks." *Electrical Engineering Seminar, California Institute of Technology*, Pasadena, CA, 10 July, 2019.
- "Non-von Neumann computing using networks of optical parametric oscillators." *EECS Solid-State Devices Seminar, University of California*, Berkeley, CA, 24 August, 2017.
- "Combinatorial optimization using networks of optical parametric oscillators." *Nonlinear Optics 2017*, Waikoloa, HI, 17 – 21 July, 2017.
- "A fully-programmable measurement-feedback OPO Ising machine with all-to-all connectivity." *AQC 5: Adiabatic Quantum Computing*, Venice, CA, 27 – 30 June, 2016.
- "Coherent optical Ising machines based on networks of optical parametric oscillators." *AQC 4: Adiabatic Quantum Computing*, Zurich, Switzerland, 29 June – 2 July, 2015.
- "Coupling Quantum Dots to Quantum-Well Exciton-Polaritons: A Path Towards Scalable Two-Qubit Interactions." *Department of Physics Seminar, Harvard University*, Cambridge, MA, 17 April, 2015.

- "Towards Quantum Repeaters using Quantum Dot Spin Qubits." *Research Laboratory of Electronics Seminar, Massachusetts Institute of Technology*, Cambridge, MA, 16 April, 2015.
- "Exchange Interaction between a Quantum Dot Electron Spin Qubit and an Exciton-Polariton Gas." *QD 2014: 8th International Conference on Quantum Dots*, Pisa, Italy, 11 – 16 May, 2014.
- "Experimental Progress in Quantum Information Processing using Spins in Self-Assembled Quantum Dots." *Institut für Festkörperphysik Seminar, Technische Universität Berlin*, Berlin, Germany, 8 May, 2014.
- "Experimental Progress in Quantum Information Processing using Spins in Self-Assembled Quantum Dots." *Schottky Seminar, Walter Schottky Institut, Technische Universität München*, Munich, Germany, 6 May, 2014.
- "Experimental Progress in Quantum Information Processing using Spins in Self-Assembled Quantum Dots." *Technische Physik Seminar, Universität Würzburg*, Würzburg, Germany, 5 May, 2014.
- "Experimental Progress in Quantum Information Processing using Spins in Self-Assembled Quantum Dots." *Fachbereich Physik Sonderseminar, Universität Konstanz*, Konstanz, Germany, 28 April, 2014.
- "Tomography of a high-fidelity spin-photon entangled state." *American Physical Society March Meeting*, Baltimore, MD, 18 March, 2013.
- "Entanglement between an electron's spin and a photon: technology for quantum repeaters and long-distance quantum cryptography." *School of Natural Sciences Seminar, University of California*, Merced, CA, 14 December, 2012.
- "Entanglement between a quantum dot spin and a single photon." *NOEKS 11: 11th International Workshop on Nonlinear Optics and Excitation Kinetics in Semiconductors*, Stuttgart, Germany, 23 – 27 September, 2012.
- "Quantum Dot Quantum Information Processing: A Summary of Recent Results." *Technische Physik Seminar, Universität Würzburg*, Würzburg, Germany, 19 September, 2012.
- "Spin-photon entanglement using ultrafast downconversion." *Department of Physics, ETH-Zürich*, Switzerland, 17 September, 2012.
- "QND Measurement, Hole Spins and Entanglement Experiments." *Technische Physik Seminar, Universität Würzburg*, Würzburg, Germany, 1 July, 2011.
- "Quantum Computing: Theory and Experiment." *CASPER Seminar, Berkeley Wireless Research Center*, Univeristy of California, Berkeley, CA, 6 May, 2011.
- "Quantum Nondemolition Measurement of Single Spin Quantum Dot Qubits." *Technische Physik Seminar, Universität Würzburg*, Würzburg, Germany, 6 September, 2010.
- "Pulsar and Transient Instrumentation using CASPER Technology." *3rd Marie Curie SKADS Training School: Towards the SKA*, Observatoire de Paris, Paris, France, August 24 – 28, 2009.

- "Pulsar and Transient Instrumentation using CASPER Technology." *CASPER-JPL Workshop, NASA Jet Propulsion Laboratory, Pasadena*, CA, June 11 – 12, 2009.
- "Pulsar Spectrometer Development using CASPER Technology." *Center for Astronomy Signal Processing and Electronics Research Workshop*, University of California, Berkeley, CA, August 2 – 5, 2008.

Service

- Journal reviewer for *Optics Express* (2015, 2017, 2020); *Nature Communications* (2016, 2020, 2022); *Physical Review Letters* (2016, 2020); *Physical Review A* (2016); *Electronics Letters* (2016); *Physical Review B* (2017); *Quantum Information Processing* (2017, 2019, 2020); *ACS Photonics* (2018); *Science Advances* (2018, 2020, 2021); *Scientific Reports* (2019); *Nanophotonics* (2020); *New Journal of Physics* (2020); *Communications Physics* (2020, 2022); *Transactions on Computers* (2020); *Frontiers in Physics* (2020); *Nature Photonics* (2020); *Nature Computational Science* (2020); *Physical Review Applied* (2022); *Nature Physics* (2022); *Communications Engineering* (2022), *Science Robotics* (2022), *Laser & Photonics Reviews* (2022), *Physical Review X* (2022), *Matter* (Cell Press) (2022)
- Reviewer, IEEE Conference on Design of Circuits and Integrated Systems (DCIS) (2022)
- Advisory Council, SheQuantum (2021–)
- Program Committee, SPIE Photonics West: AI and Optical Data Sciences Conference (2023)
- Co-Chair, CIFAR Workshop on Quantum Machine Learning (2022)
- Co-Chair, CIFAR Workshop on Quantum Information Science (2023)
- Program Committee (Quantum Optics section), 15th Pacific Rim Conference on Lasers and Electro-Optics (CLEO Pacific Rim) (2022)
- Program Committee (Quantum Algorithms and Applications track), IEEE International Conference on Quantum Computing & Engineering (QCE) (2021)
- Program Committee, 21st Asian Quantum Information Science Conference (2021)
- Funding/proposal reviewer for *UK Research and Innovation* (2020); *Israel Science Foundation* (2022); *U.S. Department of Energy, Office of Science, Advanced Scientific Computing Research* (2022)
- Program Committee, Photonics for Quantum Workshop (2020)
- Program Committee, 19th Asian Quantum Information Science Conference (2019)
- Briefed the DoD Defense Science Board Task Force on Applications of Quantum Technologies (2019)
- Program Committee, Coherent Network Computing (2019, 2022)
- Invited Abstract Reviewer, Cognitive Computing (2018)

Thesis Committee Member or External Examiner (other universities)

- Fabian Böhm, Vrije Universiteit Brussel, Department of Applied Physics and Photonics (2022)
- Kirill Kalinin, University of Cambridge, Department of Applied Mathematics and Theoretical Physics (2021)
- Connor Hann, Yale University, Department of Physics (2021)