curriculum vitæ of

Logan G. Wright

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Research interests

Physical computation, control, and complexity; multimode quantum and nonlinear photonics; lasers; neural networks; computer-driven experiments and engineering; quantum sensing and information processing

Education

2012 – 2018	**Ph.D.** in Applied Physics	Cornell University, Ithaca, NY, USA
2008 – 2012	**BSc. (Eng.)** in Engineering Physics (first class honors)	Queen's University, Kingston, ON, Canada

Research experience

July 2023 – present	Assistant professor of applied physics	Yale University
2022 – present	Senior research scientist	NTT Research, Inc.
2019 – 2023	Postdoctoral research scientist Advisors: Peter L. McMahon and Yoshihisa Yamamoto	Cornell University and NTT Research, Inc.
2018 – 2019	Postdoctoral research scientist Advisors: Hideo Mabuchi and Yoshihisa Yamamoto	Stanford University
2013 – 2018	Graduate research assistant Advisor: Frank W. Wise. Committee members: Alexander L. Gaeta, Clifford R. Pollock	Cornell University
Summer 2012	Undergraduate research assistant in Physics Advisor: James M. Fraser	Queen's University
Summer 2011	Undergraduate research assistant in Physics Advisor: Kevin J. Resch	Institute for Quantum Computing
Summer 2010	Undergraduate research assistant in Physics Advisor: James M. Fraser	Queen's University
Summer 2009	Undergraduate research assistant in Chemistry Advisor: Simon A.M. Hesp	Queen's University

Publications

Authors who equally contributed to a publication are marked with a †.

Preprints

1. S.-Y. Ma, T. Wang, J. Laydevant, **L.G. Wright**, and P.L. McMahon "Quantum-noise-limited optical neural networks operating at a few quanta per activation", arXiv: 2302.10360
2. M.G. Anderson, S.-Y. Ma, T. Wang, **L.G. Wright**, and P.L. McMahon "Optical Transformers", arXiv: 2302.10360
3. Y. Shen., Q. Zhan, **L.G. Wright** *et al.* "Roadmap on spatiotemporal light fields", arXiv: 2210.11273

Peer-reviewed publications (as first author)

1. **L.G. Wright**, F.O. Wu, D.N. Christodoulides, and F.W. Wise (2022) "Physics of highly multimode nonlinear optical systems", *Nature Physics* **18**, 1018-1030.
2. **L.G. Wright**, W.H. Renninger, D.N. Christodoulides, and F.W. Wise (2022) "Nonlinear multimode photonics: nonlinear optics with many degrees of freedom", *Optica* **9**, 824-841.
3. **L.G. Wright**[†], T. Onodera[†], M.M. Stein, T. Wang, D.T. Schachter, Z. Hu, and P.L. McMahon (2022) "Deep physical neural networks trained with backpropagation", *Nature* **601**, 549–555.
4. **L.G. Wright**, P. Sidorenko, H. Pourbeyram, Z.M. Ziegler, A. Isichenko, B.A. Malomed, C.R. Menyuk, D.N. Christodoulides and F.W. Wise (2020) "Mechanisms of Spatiotemporal Mode-Locking", *Nature Physics* **16**, 565–570
5. **L.G. Wright**, Z.M. Ziegler, P.M. Lushnikov, Z. Zhu, M.A. Eftekhar, D.N. Christodoulides, and F.W. Wise (2018) "Multimode Nonlinear Fiber Optics: Massively Parallel Numerical Solver, Tutorial and Outlook," *IEEE Journal of Selected Topics in Quantum Electronics* **24** (3), 1-16
6. **L.G. Wright**, D.N. Christodoulides, and F.W. Wise (2017) "Spatiotemporal mode-locking in multimode fiber lasers," *Science* **358** (6359), 94-97
7. **L.G. Wright**, Z. Liu, D.A. Nolan, M.-J. Li, D.N. Christodoulides, and F.W. Wise (2016) "Self-organized instability in graded-index multimode fibres," *Nature Photonics* **10**, 771–776.
8. **L.G. Wright**, S. Wabnitz, D.N. Christodoulides, and F.W. Wise (2015) "Ultrabroadband Dispersive Radiation by Spatiotemporal Oscillation of Multimode Waves," *Physical Review Letters* **115** (22), 223902
9. **L.G. Wright**, D.N. Christodoulides, and F.W. Wise (2015) "Controllable spatiotemporal nonlinear effects in multimode fibres," *Nature Photonics* **9** (5), 306-310
10. **L.G. Wright**, W.H. Renninger, D.N. Christodoulides, and F.W. Wise (2015) "Spatiotemporal dynamics of multimode optical solitons," *Optics Express* **23** (3), 3492-3506
11. **L.G. Wright**, A. Kanabar, E. Moult, S. Rubab and S.A.M Hesp (2011) "Chemical Aging of Asphalt Cements from a Northern Ontario Pavement Trial," *International Journal of Pavement Research and Technology* **4**, 259-268

Peer-reviewed publications (as secondary author)

12. A. Senanian, **L.G. Wright**, P.F. Wade, H.K. Doyle, and P.L. McMahon (2023) "Programmable large-scale simulation of bosonic transport in optical synthetic frequency lattices", *Nature Physics*.
13. T. Wang[†], M.M. Sohoni[†], **L.G. Wright**, M.M. Stein, S.-Y. Ma, T. Onodera, M.G. Anderson, P.L. McMahon (2023) "Image sensing with multilayer, nonlinear optical neural networks", *Nature Photonics* **17**, 408–415.
14. H. Pourbeyram[†], P. Sidorenko[†], F.O. Wu[†], N. Bender, **L.G. Wright**, D.N. Christodoulides, and F.W. Wise (2022) "Direct observations of thermalization to a Rayleigh–Jeans distribution in multimode optical fibres", *Nature Physics* **18**, 695-690.
15. R. Yanagimoto[†], E. Ng[†], A. Yamamura, T. Onodera, **L.G. Wright**, M. Jankowski, M. M. Fejer, P.L. McMahon, H. Mabuchi (2022) "Onset of non-Gaussian quantum physics in pulsed squeezing with mesoscopic fields", *Optica* **9** (4), 379-390.

16. T. Wang, S. Ma, **L.G. Wright**, T. Onodera, B. Richards, and P. L. McMahon (2022) "A photonic neural network using less than 1 photon per weight multiplication," *Nature Communications* **13**, 123.

17. R. Yanagimoto, E. Ng, **L.G. Wright**, T. Onodera, and H. Mabuchi (2021) "Efficient simulation of ultrafast quantum nonlinear optics with matrix product states,", *Optica* **8**, 1306-1315

18. R. Yanagimoto[†], T. Onodera[†], E. Ng, **L.G. Wright**, P.L. McMahon, and H. Mabuchi (2020) "Engineering a Kerr-based Deterministic Cubic Phase Gate via Gaussian Operations", *Physical Review Letters* **124**, 240503

19. P. Sidorenko, W. Fu, **L.G. Wright**, M. Olivier, and F.W. Wise (2018) "Self-seeded, multi-megawatt, Mamyshev oscillator," *Optics Letters* **43** (11), 2672-2675

20. W. Fu, **L.G. Wright**, P. Sidorenko, S. Backus, and F.W. Wise (2018) "Several new directions for ultrafast fiber lasers," *Optics Express* **26** (8), 9432-9463

21. W. Fu, **L.G. Wright**, and F.W. Wise (2017) "High-power femtosecond pulses without a modelocked laser," *Optica* **4** (7), 831-834

22. Z. Liu, Z. Ziegler, **L.G. Wright**, and F.W. Wise (2017) "Megawatt peak power from a Mamyshev oscillator," *Optica* **4** (6), 649-654

23. M. A. Eftekhar, **L.G. Wright**, M. S. Mills, M. Kolesik, R. Amezcua Correa, F. W. Wise, and D. N. Christodoulides (2017) "Versatile supercontinuum generation in parabolic multimode optical fibers," *Optics Express* **25**, 9078-9087

24. Y. Tang, **L.G. Wright**, K. Charan, T. Wang, C. Xu, and F.W. Wise (2016) "Generation of intense 100 fs solitons tunable from 2 to 4.3 μm in fluoride fiber," *Optica* **3** (9), 948-951

25. Z. Zhu, **L.G. Wright**, D.N. Christodoulides, and F.W. Wise (2016) "Observation of multimode solitons in few-mode fiber," *Optics Letters* **41** (20), 4819-4822

26. A. Fusaro, J. Garnier, C. Michel, G. Xu, J. Fatome, **L.G. Wright**, F.W. Wise, and A. Picozzi (2016) "Decoupled polarization dynamics of incoherent waves and bimodal spectral incoherent solitons," *Optics Letters* **41** (17), 3992-3995

27. Z. Liu, **L.G. Wright**, D.N. Christodoulides, and F.W. Wise (2016) "Kerr self-cleaning of femtosecond-pulsed beams in graded-index multimode fiber," *Optics Letters* **41** (16), 3675-3678

28. G. Lopez-Galmiche, Z.S. Eznaveh, M.A. Eftekhar, J.A. Lopez, **L.G. Wright**, F.W. Wise, D.N. Christodoulides, and R. Amezcua Correa (2016) "Visible supercontinuum generation in a graded index multimode fiber pumped at 1064 nm," *Optics Letters* **41** (11), 2553-2556

29. A. Chong, **L.G. Wright**, and F.W. Wise (2015) "Ultrafast fiber lasers based on self-similar pulse evolution: a review of current progress," *Reports on Progress in Physics* **78** (11), 113901

30. E.S. Lamb, **L.G. Wright**, and F.W. Wise (2014) "Divided-pulse lasers," *Optics Letters* **39** (9), 2775-2777

31. P.J.L. Webster, **L.G. Wright**, Y. Ji, C.M. Galbraith, A.W. Kinross, C. Van Vlack, and J.M. Fraser (2014) "Automatic laser welding and milling with in situ inline coherent imaging," *Optics Letters* **39** (21), 6217-6220

32. K.X.Z. Yu, **L.G. Wright**, P.J.L. Webster, and J.M. Fraser (2013) "Deep nonlinear ablation of silicon with a quasi-continuous wave fiber laser at 1070 nm," *Optics Letters* **38** (11), 1799-1801

33. J. Lavoie, J.M. Donohue, **L.G. Wright**, A. Fedrizzi, and K.J. Resch (2013) "Spectral compression of single photons," *Nature Photonics* **7** (5), 363-366

34. S. Rubab, K. Burke, **L.G. Wright**, S.A.M. Hesp (2011) "Effects of Engine Oil Residues on Asphalt Cement Quality," *Proceedings of the 56th Annual Conference of the Canadian Technical Asphalt Association*, 01368658

35. P.J.L. Webster, **L.G. Wright**, K.D. Mortimer, B.Y.C. Leung, J.X.Z. Yu and J.M. Fraser (2011) "Automatic real-time guidance of laser machining with inline coherent imaging," *Journal of Laser Applications* **23**, 022001

Other publications

1. **L.G. Wright** and F.W .Wise (2020) "Exotic waves in multimode hollow-core fibres," *Nature Photonics* **14** (12), 713-714
2. **L.G. Wright** and P.L. McMahon "The Capacity of Quantum Neural Networks", arXiv: 1908.01364
3. **L.G. Wright**, W.H Renninger, and F.W. Wise (2014) "Universal Three-Dimensional Optical Logic," arXiv:1407.4947
4. 1001 Inventions that Changed the World, 2009 Cassell Illustrated, ISBN-10: 0764161369
5. Defining Moments in Science: Over a Century of the Greatest Discoveries, Experiments, Inventions, People, Publications, and Events that Rocked the World, 2008 Cassell Illustrated, ISBN-10:1844035891

Honors

2018 and 2019	Senior Mong Fellowships	Cornell Neurotech
2018	William Nichols Findley Award	Cornell Applied Physics
	for "most exceptional research paper in 2017-2018", for "Spatiotemporal mode-locking in multimode fiber lasers".	
2018	Tingye Li Innovation Prize	Optical Society (OSA)
	for innovative research, for "Spatiotemporal Mode-Locking". 1 award to an author under the age 39 submitting a paper to CLEO (1000-1500 papers).	
2017	Outstanding Reviewer Recognition	Optical Society (OSA)
	given to the top ∼15 reviewers for OSA journals based on editor recommendations.	
2017	DJ Lovell Scholarship	SPIE
	"The largest and most prestigious scholarship of SPIE", 1 award.	
2015	William Nichols Findley Award	Cornell Applied Physics
	for "most exceptional research paper in 2014-2015", for "Controllable spatiotemporal nonlinear effects in multimode fibres".	
2013 – 2016	Sage Postgraduate Fellowship	Cornell University
2012 – 2016	Postgraduate Fellowship	NSERC
2012	Olin Postgraduate Fellowship	Cornell University
2012	University Medal in Engineering Physics	Queen's University
	for top-ranked student.	
2012	Engineering Physics Design Award	Queen's University
	for top-ranked undergraduate thesis.	
2011	Harold Arthur Cohen Prize	Queen's University
	for "student with most promise for inventiveness and discovery".	
2010	1st place in poster competition	ICALEO
	for "Automatic real-time guidance of laser machining with inline coherent imaging".	
2010, 2011, 2012	Undergraduate research awards in physics	NSERC
2009	Undergraduate research award in chemistry	NSERC
2008	Highest Honors	Canada-wide Virtual Science Fair

Service To The Scientific Community

2023 – 2024	IEEE Summer Topicals Meeting	Program subcommittee
2023 – 2024	CLEO	Program subcommittee

2023 – 2024	IEEE Photonics Conference	Program subcommittee
2022 – 2023	CLEO	Program subcommittee
2022 – 2023	IEEE Photonics Conference	Program subcommittee
2021 – 2022	Nonlinear Photonics Conference	Program subcommittee
2021 – 2022	CLEO	Program subcommittee
2020 – 2021	CLEO	Program subcommittee
2019 – 2020	Nonlinear Photonics Conference	Program subcommittee
2019 – 2020	CLEO Pacific Rim	Program subcommittee