

## Curriculum Vitae: Alexander L. Gaeta

### Address

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### Education

B. S. (1983), M. S. (1985), and Ph. D (1991). in Optics, University of Rochester, Rochester, New York; *Doctoral Thesis Title*: Stochastic and deterministic fluctuations in stimulated Brillouin scattering; *Advisor*: Professor R. W. Boyd.

### Research Interests

Ultrafast nonlinear optics, nanophotonics, nonlinear propagation in fibers and bulk media, photonic crystal fibers, coherent interactions of laser light with matter, application of nonlinear optics to quantum information, stimulated scattering processes.

### Professional Activities and Memberships

#### *Academic*

Adjunct Professor, Department of Applied Physics and Applied Mathematics, Columbia University.

Samuel B. Eckert Professor of Engineering, School of Applied and Engineering Physics, Cornell University.

Director, School of Applied and Engineering Physics, Cornell University, 2011 - 2014.

Professor, School of Applied and Engineering Physics, Cornell University, 2004 - 2013.

Associate Director, School of Applied and Engineering Physics, Cornell University, 2006 - 2007.

Director of Graduate Studies, School of Applied and Engineering Physics, Cornell University, 1999 - 2004.

Associate Professor, School of Applied and Engineering Physics, Cornell University, 1998 - 2004.

Assistant Professor, School of Applied and Engineering Physics, Cornell University, 1992 - 1998.

#### *Commercialization*

Co-founded (w/ Michal Lipson and Alex Cable) PicoLuz, Inc., 2010.

#### *Selected Editorial Roles*

Editor-in-Chief, *Optica*, Optical Society of America.

Editorial Board, *Laser Physics Letters*, 2005 - 2009.

Editorial Board, *New Journal of Physics*, 2005 - 2008.

#### *Selected Conference Organization*

Program Chair, Nonlinear Photonics Topical Meeting, July, 2014, Barcelona.

General Chair, Nonlinear Optics Topical Meeting, August 2009, Hawaii.

General Chair, 2007 Quantum Electronics and Laser Science Conference, Baltimore.

Program Chair, Nonlinear Optics Topical Meeting, August 2007, Hawaii.

Co-Chair, CNS Symposium: Nanophotonics – From Discovery to Systems, July 2006, Ithaca, NY.

Program Chair, 2005 Quantum Electronics and Laser Science Conference, Baltimore, MD.

Chair, Frontiers in Optics 2003: Annual Meeting of the Optical Society of America, Tucson, AZ.

Chair, Nonlinear Optical Phenomena Program Committee, 2001 Conference on Lasers and Electro Optics, Baltimore, MD.

*Selected Research Administration and Service to Societies*

Member, Long-Term Publications Group, Optical Society of America, 2010-2012.

Director-at-Large, Board of Directors, Optical Society of America, 2008-2010

Director, NSF Center for Nanoscale Systems in Information Technologies, Cornell University, 2007-2012.

I. I. Rabi Prize Committee of the American Physical Society, 2007-2010.

Member, Strategic Planning Committee, Optical Society of America, 2006-2008.

Chair, Science and Engineering Council Optical Society of America, 2004-2006.

Executive Committee, Member-at-Large, Division of Laser Science, American Physical Society, 2004-2005.

Chair, Division of Quantum Electronics, Optical Society of America, term 2000-2002.

## Awards

Fellow of the American Physical Society.

Fellow of the Optical Society of America.

College of Engineering Teaching Award, 1997, 2000, 2003, and 2007.

Army Research Office Young Investigator Award, 1995.

Office of Naval Research Young Investigator Award, 1993.

## Publications [Total citations: >13,700 *h*-index: 60 (Google Scholar)]

1. D. L. Weerawarne, B. Shim, X. Gao, and A. L. Gaeta “Higher-order nonlinearities revisited and their effect on harmonic generation,” to be published in *Phys. Rev. Lett.* (2015).
2. Y. H. Wen, M. R. E. Lamont, I. M. Kloumann, S. H. Strogatz, and A. L. Gaeta, “Self-organization in soliton modelocked parametric frequency combs,” arXiv:1412.0119.
3. M. Fridman, Y. Okawachi, S. Clemmen, M. Menard, M. Lipson, and A. L. Gaeta, “Waveguide-based single-shot temporal cross-correlator,” to be published in *J. Optics* (2015).
4. A. G. Griffith, R. K. W. Lau, J. Cardenas, Y. Okawachi, A. Mohanty, R. Fain, Y. H. D. Lee, M. Yu, C. T. Phare, C. B. Poitras, A. L. Gaeta, and M. Lipson, “Silicon-chip mid-infrared frequency comb generation,” to be published in *Nat. Commun.* (2015).
5. S. Miller, K. Luke, Y. Okawachi, J. Cardenas, A. L. Gaeta, and M. Lipson, “On-chip frequency comb generation at visible wavelengths via simultaneous second- and third-order optical nonlinearities,” *Opt. Express* **22**, 26517 (2014).
6. S. Ramelow, A. Farsi, S. Clemmen, J. S. Levy, A. R. Johnson, Y. Okawachi, M. R. E. Lamont, M. Lipson, and A. L. Gaeta, “Strong polarization mode coupling in microresonators,” *Opt. Lett.* **39**, 5134 (2014).

7. R. K. W. Lau, M. R. E. Lamont, A. Griffith, Y. Okawachi, M. Lipson, and A. L. Gaeta, "Octave-spanning mid-infrared supercontinuum generation in silicon nanowaveguides," *Opt. Lett.* **39**, 4518 (2014).
8. Y. Okawachi, M. R. E. Lamont, K. Luke, D. O. Carvalho, M. Yu, M. Lipson, and A. L. Gaeta, "Bandwidth shaping of microresonator-based frequency combs via dispersion engineering," *Opt. Lett.* **39**, 3535 (2014).
9. P. S. Donvankar, V. Venkataraman, S. Clemmen, K. Saha, and A. L. Gaeta, "Frequency translation via four-wave mixing Bragg scattering in Rb filled photonic bandgap fibers," *Opt. Lett.* **39**, 1557 (2014).
10. A. R. Johnson, Y. Okawachi, M. R. E. Lamont, J. S. Levy, M. Lipson, and A. L. Gaeta, "Microresonator-based comb generation without an external laser source," *Opt. Express* **22**, 1394 (2014).
11. M. Lamont, Y. Okawachi, and A. L. Gaeta, "Route to stabilized ultrabroadband microresonator-based frequency combs," *Opt. Lett.* **38**, 3478 (2013).
12. D. J. Moss, R. Morandotti, A. L. Gaeta, and M. Lipson, "New CMOS-compatible platforms based on silicon nitride and Hydex for nonlinear optics," *Nature Phot.* **7**, 597 (2013).
13. R. Salem, M. A. Foster, and A. L. Gaeta, "The application of space-time duality to ultrahigh speed optical signal processing," *Adv. Opt. Phot.* **5**, 274 (2013).
14. V. Venkataraman, K. Saha, and A. L. Gaeta, "Phase modulation at the few-photon level for weak-nonlinearity-based quantum computing," *Nature Phot.* **7**, 138 (2013).
15. K. Saha, Y. Okawachi, B. Shim, J. S. Levy, R. Salem, A. R. Johnson, M. A. Foster, M. R. E. Lamont, M. Lipson, and A. L. Gaeta, "Modelocking and femtosecond pulse generation in chip-based frequency combs," *Opt. Express* **21**, 1335 (2013).
16. Y. Okawachi, R. Salem, A. R. Johnson, K. Saha, J. S. Levy, M. Lipson, and A. L. Gaeta, "Asynchronous single-shot characterization of high-repetition-rate ultrafast waveforms using a time-lens-based temporal magnifier," *Opt. Lett.* **37**, 4892 (2012).
17. K. Saha, Y. Okawachi, J. S. Levy, K. Luke, R. K. W. Lau, M. A. Foster, M. Lipson, and A. L. Gaeta, "Broadband parametric frequency comb generation with a 1- $\mu\text{m}$  pump source," *Opt. Express* **20**, 26935 (2012).
18. S. Clemmen and A. L. Gaeta, "Applied Physics: Brighter images with no added noise," *Nature* **491**, 202 (2012).
19. J. S. Levy, K. Saha, Y. Okawachi, M. A. Foster, A. L. Gaeta, and M. Lipson, "High-performance silicon-nitride-based multiple-wavelength source," *Photon. Tech. Lett.* **24**, 1375 (2012).
20. T. Popmintchev, M.-C. Chen, D. Popmintchev, P. Arpin, S. Brown, S. Alisauskas, G. Andriukaitis, T. Balciunas, O. D. Mucke, A. Pugzlys, A. Baltuska, B. Shim, S. E. Schrauth, A. L. Gaeta, C. Hernandez-Garcia, L. Plaja, A. Becker, A. Jaron-Becker, M. M. Murnane, H. C. Kapteyn, "Bright coherent ultrahigh harmonics in the keV X-ray regime from mid-infrared femtosecond lasers," *Science* **336**, 1287 (2012).
21. Y. H. Wen, O. Kuzucu, M. Fridman, A. L. Gaeta, L.-W. Luo, and M. Lipson, "All-optical control of an individual resonance in a silicon microresonator," *Phys. Rev. Lett.* **108**, 223907 (2012).
22. R. Halir, Y. Okawachi, J. S. Levy, M. A. Foster, M. Lipson, and A. L. Gaeta, "Ultrabroadband supercontinuum generation in a CMOS-compatible platform," *Opt. Lett.* **37**, 1685 (2012).
23. Y. Okawachi and A. L. Gaeta, "Nonlinear photonics: Compressing light and sound," *Nature Phot.* **6**, 274 (2012).

24. Y. Okawachi, A. L. Gaeta, and M. Lipson, "Breakthroughs in nonlinear silicon photonics 2011," *IEEE Photon. J.* **4**, 601 (2012).
25. N. Ophir, R.K. W. Lau, M. Menard, X. Zhu, K. Padmaraju, Y. Okawachi, R. Salem, M. Lipson, A. L. Gaeta, and K. Bergman, "Wavelength conversion and unicast of 10-Gb/s data spanning up to 700 nm using a silicon nanowaveguide," *Opt. Express* **20**, 6488 (2012).
26. A. R. Johnson, Y. Okawachi, J. S. Levy, J. Cardenas, K. Saha, M. Lipson, and A. L. Gaeta, "Chip-based frequency combs with sub-100-GHz repetition rates," *Opt. Lett.* **37**, 875 (2012).
27. N. Ophir, R.K. W. Lau, M. Menard, R. Salem, K. Padmaraju, Y. Okawachi, M. Lipson, A. L. Gaeta, and K. Bergman, "First demonstration of a 10-Gb/s end-to-end link at 1884 nm based on four-wave mixing of telecom-band RZ data in silicon waveguides," *Photon. Tech. Lett.* **24**, 276 (2012).
28. Y. Okawachi, O. Kuzucu, M. A. Foster, R. Salem, A. C. Turner-Foster, A. Biberman, N. Ophir, K. Bergman, M. Lipson, and A. L. Gaeta, "Characterization of nonlinear optical crosstalk in silicon nanowaveguides," *Photon. Tech. Lett.* **24**, 185 (2012).
29. B. Shim, S. E. Scharauth, A. L. Gaeta, M. Klein, and G. Fibich, "Loss of phase of collapsing beams," *Phys. Rev. Lett.* **108**, 043902 (2012).
30. M. Fridman, A. Farsi, Y. Okawachi, and A. L. Gaeta, "Demonstration of temporal cloaking," *Nature* **481**, 62 (2012).
31. V. Venkataraman, K. Saha, P. Londero, and A. L. Gaeta, "Few-photon all-optical modulation in a photonic band-gap fiber," *Phys. Rev. Lett.* **107**, 193902 (2011).
32. Y. Okawachi, K. Saha, J. S. Levy, Y. H. Wen, M. Lipson, and A. L. Gaeta, "Octave-spanning frequency comb generation in a silicon nitride chip," *Opt. Lett.* **36**, 3398 (2011).
33. M. A. Foster, J. S. Levy, O. Kuzucu, K. Saha, M. Lipson, and A. L. Gaeta, "Silicon-based monolithic optical frequency comb source," *Opt. Express* **19**, 14233 (2011).
34. L. Xu, N. Ophir, M. Menard, R. K. W. Lau, A. C. Turner-Foster, M. A. Foster, M. Lipson, A. L. Gaeta, and K. Bergman, "Simultaneous wavelength conversion of ASK and DPSK signals based on four-wave-mixing in dispersion engineered silicon waveguides," *Opt. Express* **19**, 12172 (2011).
35. J. S. Levy, M. A. Foster, A. L. Gaeta, and M. Lipson, "Harmonic generation in silicon nitride ring resonators," *Opt. Express* **19**, 11415 (2011).
36. M. A. Foster, R. Salem, and A. L. Gaeta, "Ultrahigh-speed optical processing using space-time duality," *Opt. Photon. News* **22**, 29 (2011).
37. E. Y. Morales Teraoka, T. Kita, D. H. Broaddus, A. Tsukazaki, M. Kawasaki, A. L. Gaeta, and H. Yamada, "Analysis of the nonlinear optical parameter of ZnO channel waveguides," *Jpn. J. Appl. Phys.* **50**, 04DG01 (2011).
38. P. Londero, O. Kuzucu, and A. L. Gaeta, "Spectral amplitude and phase measurement of ultrafast pulses using all-optical differential tomography," *Opt. Lett.* **36**, 1686 (2011).
39. S. E. Schrauth, B. Shim, A. D. Slepikov, L. T. Vuong, A. L. Gaeta, N. Gavish, and G. Fibich, "Pulse splitting in the anomalous group-velocity dispersion regime," *Opt. Express* **19**, 9157 (2011).
40. B. Shim, S. E. Schrauth, L. T. Vuong, Y. Okawachi, and A. L. Gaeta, "Dynamics of elliptical beams in the anomalous group-velocity dispersion regime," *Opt. Express* **19**, 9139 (2011).
41. B. Shim, S. E. Schrauth, and A. L. Gaeta, "Filamentation in air with ultrashort mid-infrared pulses," *Opt. Express* **19**, 9118 (2011).

42. Y. H. Wen, O. Kuzucu, T. Hou, M. Lipson, and A. L. Gaeta, "All-optical switching of a single resonance in silicon ring resonators," *Opt. Lett.* **36**, 1413 (2011).
43. K. Saha, V. Venkataraman, P. Londero, and A. L. Gaeta, "Enhanced two-photon absorption in a hollow-core photonic-band-gap fiber," *Phys. Rev. A* **83**, 033833 (2011).
44. R. K. W. Lau, M. Ménard, Y. Okawachi, M. A. Foster, A. C. Turner-Foster, R. Salem, M. Lipson, and A. L. Gaeta, "Continuous-wave mid-infrared frequency conversion in silicon nanowaveguides," *Opt. Lett.* **36**, 1262 (2011).
45. N. Ophir, J. Chan, K. Padmaraju, A. Biberman, A. C. Foster, M. A. Foster, M. Lipson, A. L. Gaeta, and K. Bergman, "Continuous wavelength conversion of 40-Gb/s data over 100 nm using a dispersion-engineered silicon waveguide," *Photon. Tech. Lett.* **23**, 73 (2011).
46. J. Cardenas, M. A. Foster, N. Sherwood-Droz, C. B. Poitras, H. L. R. Lira, B. Zhang, A. L. Gaeta, J. B. Khurgin, P. Morton, and M. Lipson, "Wide-bandwidth continuously tunable optical delay line using silicon microring resonators," *Opt. Express* **18**, 26525 (2010).
47. Y. Zhu, E. Cabrera-Granado, O. G. Calderon, S. Melle, Y. Okawachi, A. L. Gaeta, and D. J. Gauthier, "Competition between the modulation instability and stimulated Brillouin scattering in a broadband slow light device," *J. Opt.* **12**, 104019 (2010).
48. E. Y. Morales-Teraoka, D. H. Broaddus, T. Kita, A. Tsukazaki, M. Kawasaki, A. L. Gaeta, and H. Yamada, "Self-phase modulation at visible wavelengths in nonlinear ZnO channel waveguides," *Appl. Phys. Lett.* **97**, 071105 (2010).
49. A. Biberman, B. G. Lee, A. C. Turner-Foster, M. A. Foster, M. Lipson, A. L. Gaeta, and K. Bergman, "Wavelength multicasting in silicon photonic nanowires," *Opt. Express* **17**, 18047 (2010).
50. V. Venkataraman, P. Londero, A.R. Bhagwat, A. D. Slepko, and A. L. Gaeta, "All-optical modulation of four wave mixing in Rb-filled photonic band-gap fiber," *Opt. Lett.* **35**, 2287 (2010).
51. B. Shim, S. E. Schrauth, C. J. Hensley, L. T. Vuong, P. Hui, A. A. Ishaaya, and A. L. Gaeta, "Controlled interactions of femtosecond light filaments in air," *Phys. Rev. A* **81**, 061803(R) (2010).
52. D. H. Broaddus, M. A. Foster, O. Kuzucu, A. C. Turner-Foster, K. W. Koch, M. Lipson, and A. L. Gaeta, "Temporal-imaging system with simple external-clock triggering," *Opt. Express* **18**, 14262 (2010).
53. A. D. Slepko, A. R. Bhagwat, V. Venkataraman, P. Londero, and A. L. Gaeta, "Spectroscopy of Rb atoms in hollow-core fibers," *Phys. Rev. A* **81**, 053825 (2010).
54. A. C. Turner-Foster, M. A. Foster, J. S. Levy, C. B. Poitras, R. Salem, A. L. Gaeta, and M. Lipson, "Ultrashort free-carrier lifetime in low-loss silicon nanowaveguides," *Opt. Express* **18**, 3582 (2010).
55. A. C. Turner-Foster, M. A. Foster, R. Salem, A. L. Gaeta, and M. Lipson, "Frequency conversion over two-thirds of an octave in silicon nanowaveguides," *Opt. Express* **18**, 1904-1908 (2010).
56. Y. Dai, Y. Okawachi, A. C. Turner-Foster, M. Lipson, A. L. Gaeta, and C. Xu, "Ultralong continuously tunable parametric delays via a cascading discrete stage," *Opt. Express* **18**, 333 (2010).
57. J. S. Levy, A. Gondarenko, M. A. Foster, A. C. Turner-Foster, A. L. Gaeta, and M. Lipson, "CMOS-compatible multiple-wavelength oscillator for on-chip optical interconnects," *Nature Photonics* **4**, 37 (2009).

58. M. A. Foster, R. Salem, D. F. Geraghty, A. C. Turner-Foster, M. Lipson, and A. L. Gaeta, "Ultrafast measurements using a silicon-chip-based temporal lens," *Optics in 2009* in *Optics and Photonics News*, **20**, 40 (2009).
59. O. Kuzucu, Y. Okawachi, R. Salem, M. A. Foster, A. C. Turner-Foster, M. Lipson, and A. L. Gaeta, "Spectral phase conjugation via temporal imaging," *Opt. Express* **17**, 20605 (2009).
60. A. A. Ishaaya, C. J. Hensley, B. Shim, S. Schrauth, K. W. Koch, and A. L. Gaeta, "Highly-efficient coupling of linearly- and radially-polarized femtosecond pulses in hollow-core photonic band-gap fibers," *Opt. Express* **17**, 18630 (2009).
61. M. A. Foster, R. Salem, Y. Okawachi, A. C. Turner-Foster, M. Lipson, and A. L. Gaeta, "Ultrafast waveform compression using a time-domain telescope," *Nature Photonics* **3**, 581 (2009).
62. I. H. Agha, Y. Okawachi, and A. L. Gaeta, "Theoretical and experimental investigation of broadband cascaded four-wave mixing in high-Q microspheres," *Opt. Express* **17**, 16209 (2009).
63. Y. Dai, X. Chen, Y. Okawachi, A. C. Turner-Foster, M. A. Foster, M. Lipson, A. L. Gaeta, and C. Xu, "1  $\mu$ s tunable delay using parametric mixing and optical phase conjugation in Si waveguides: reply," *Opt. Express* **17**, 16029 (2009).
64. P. Londero, V. Venkataraman, A.R. Bhagwat, A. D. Slepko, and A. L. Gaeta, "Ultralow-power four-wave mixing with Rb in a hollow-core photonic band-gap fiber," *Phys. Rev. Lett.* **103**, 043602 (2009).
65. A.R. Bhagwat, A. D. Slepko, V. Venkataraman, P. Londero, and A. L. Gaeta, "On-demand all-optical generation of controlled Rb-vapor densities in photonic-band-gap fibers," *Phys. Rev. A* **79**, 063809 (2009).
66. Y. Dai, X. Chen, Y. Okawachi, A. C. Turner-Foster, M. A. Foster, M. Lipson, A. L. Gaeta, and C. Xu, "1  $\mu$ s tunable delay using parametric mixing and optical phase conjugation in Si waveguides," *Opt. Express* **17**, 7004 (2009).
67. D. H. Broaddus, M. A. Foster, I. H. Agha, J. T. Robinson, M. Lipson, and A. L. Gaeta, "Silicon-waveguide-coupled high-Q chalcogenide microspheres," *Opt. Express* **17**, 5998 (2009).
68. Y. Okawachi, R. Salem, M. A. Foster, A. C. Turner-Foster, M. Lipson, and A. L. Gaeta, "High-resolution spectroscopy using a frequency magnifier," *Opt. Express* **17**, 5691 (2009).
69. R. Salem, M. A. Foster, A. C. Turner-Foster, D. F. Geraghty, M. Lipson, and A. L. Gaeta, "High-speed optical sampling using a silicon-chip temporal magnifier," *Opt. Express* **17**, 4324 (2009).
70. B. G. Lee, A. Biberman, A. C. Turner-Foster, M. A. Foster, M. Lipson, A. L. Gaeta, and K. Bergman, "Demonstration of broadband wavelength conversion at 40 Gb/s in silicon waveguides," *Photon. Technol. Lett.* **21**, 182 (2009).
71. J. D. Marconi, A. Cergueira S. Jr., J. T. Robinson, N. Sherwood-Droz, Y. Okawachi, H. E. Hernandez-Figueroa, M. Lipson, A. L. Gaeta and H. L. Fragnito, "Performance investigation of microphotonic-silicon devices in a field-trial all-optical network," *Opt. Comm.* **282**, 849 (2009).
72. G. M. Gehring, R. W. Boyd, A. L. Gaeta, D. J. Gauthier, and A. E. Willner, "Fiber-based slow-light technologies," *J. Lightwave Technol.* **26**, 3752 (2008).
73. M. A. Foster, R. Salem, D. F. Geraghty, A. C. Turner-Foster, M. Lipson, and A. L. Gaeta, "Silicon-chip-based ultrafast optical oscilloscope," *Nature* **456**, 81 (2008).
74. N. Gavish, G. Fibich, L. T. Vuong, and A. L. Gaeta, "Predicting the filamentation of high-power beams and pulses without numerical integration: A nonlinear geometrical optics method," *Phys. Rev. A* **78** (2008).

75. J. E. Sharping, J. R. Sanborn, M. A. Foster, D. Broaddus, and A. L. Gaeta, "Generation of sub-100-fs-pulses from a microstructure-fiber-based optical parametric oscillator," *Opt. Express* **16**, 18050 (2008).
76. A.C. Turner, M. A. Foster, A. L. Gaeta, and M. Lipson, "Ultra-low power parametric frequency conversion in a silicon microring resonator," *Opt. Express* **16**, 4881 (2008).
77. Y. Okawachi, M. A. Foster, X. P. Chen, A. C. Turner-Foster, R. Salem, M. Lipson, C. Xu, and A. L. Gaeta, "Large tunable delays using parametric mixing and phase conjugation in Si nanowaveguides," *Opt. Express* **16**, 10349 (2008).
78. A.D. Slepko, A. R. Bhagwat, V. Venkataraman, P. Londero, and A. L. Gaeta, "Generation of large alkali vapor densities inside bare hollow-core photonic band-gap fibers," *Opt. Express* **16**, 18976 (2008).
79. A.R. Bhagwat and A. L. Gaeta, "Nonlinear optics in hollow-core photonic bandgap fibers," (invited paper in the Focus Serial in Nonlinear Optics) *Opt. Express* **16**, 5035 (2008).
80. R. Salem, M. A. Foster, A. C. Turner, D. F. Geraghty, M. Lipson, and A. L. Gaeta, "Optical time lens based on four-wave mixing on a silicon chip," *Opt. Lett.* **33**, 1047 (2008).
81. D. F. Geraghty, R. Salem, M. A. Foster, and A. L. Gaeta, "A simplified optical correlator and its application to packet-header recognition," *Photon. Tech. Lett.* **20**, 487 (2008).
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84. L. T. Vuong, R. B. Lopez-Martens, C. P. Hauri, and A. L. Gaeta, "Spectral reshaping and pulse compression via sequential filamentation in gases," *Opt. Express* **16**, 390 (2008).
85. A.A. Ishaaya, L. T. Vuong, T. D. Grow, and A. L. Gaeta, "Self-focusing dynamics of polarization vortices in Kerr media," *Opt. Lett.* **33**, 13 (2008).
86. R. Salem, M. A. Foster, A. C. Turner, D. F. Geraghty, M. Lipson, and A. L. Gaeta, "Signal regeneration using low-power four-wave mixing on silicon chip," *Nature Photonics* **2**, 35 (2008).
87. M. A. Foster, A. C. Turner, R. Salem, D. F. Geraghty, M. Lipson, and A. L. Gaeta, "Broad-band continuous-wave parametric wavelength conversion silicon nanowaveguides," *Opt. Express* **15**, 12949 (2007).
88. Y. Okawachi, R. Salem, and A. L. Gaeta, "Continuous tunable delays at 10 Gbits/s data rates via self-phase modulation and dispersion," *J. Lightwave Tech.* **25**, 3710 (2007).
89. Y. Okawachi, A. D. Slepko, I. H. Agha, D. F. Geraghty, and A. L. Gaeta, "Absorption of ultrashort pulses in water," *J. Opt. Soc. Am. A* **24**, 3343 (2007).
90. I. H. Agha, Y. Okawachi, M. A. Foster, and A. L. Gaeta, "Four-wave mixing parametric oscillation in dispersion-compensated high-Q silica microspheres," *Phys. Rev. A* **76**, 043837 (2007).
91. Y. Wang, C. Y. Yu, L. S. Yan, A. E. Willner, R. Roussev, C. Langrock, M. M. Fejer, J. E. Sharping, and A. L. Gaeta, "44-ns continuously tunable dispersionless optical delay element using a PPLN waveguide with two-pump configuration, DCF, and a dispersion compensator," *IEEE Phot. Tech. Lett.* **19**, 861 (2007).
92. A.L. Gaeta, "Slow light – putting the brakes on images," *Nature Phot.* **1**, 140 (2007).

93. R. Salem, M. A. Foster, D. F. Geraghty, A. L. Gaeta, A. C. Turner, and M. Lipson, "All-optical regeneration on a Silicon chip," *Opt. Express* **15**, 7802 (2007).
94. C. J. Hensley, D. H. Broaddus, A. L. Gaeta, and C. B. Schaffer, "Photonic band-gap fiber gas cell fabricated using femtosecond micromachining," *Opt. Express* **15**, 6690 (2007).
95. T. D. Grow, A. A. Ishaaya, L. T. Vuong, and A. L. Gaeta, "Collapse and stability of necklace beams in Kerr media," *Phys. Rev. Lett.* **99**, 133902 (2007).
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## Book Chapters

- A. L. Gaeta, "Spatial and Temporal Dynamics of Collapsing Ultrashort Laser Pulses," *Self-Focusing: Past and Present*, ed. R.W. Boyd, S.G. Lukishova, Y.-R. Shen (Springer, New York, 2007).
- A. L. Gaeta and R. S. Windeler, "Microstructure Fiber and White Light Generation," in *Femtosecond Optical Frequency Comb: Principle, Operation, and Applications* ed. J. Ye and S. Cundiff (Kluwer, Norwell, 2005).
- A. L. Gaeta and R. W. Boyd, "Nonlinear Optics Basics: Ultrafast and Intense-Field Nonlinear Optics," in *Encyclopedia of Modern Optics* ed. M. Ruck (Elsevier, Oxford, 2005).
- J. K. Ranka and A. L. Gaeta, "Optical Properties of Microstructure Optical Fibers," in *Photonic Crystal Fibers*, ed. R. Slusher (2003).
- A. L. Gaeta and R. W. Boyd, "Nonlinear Optics," in *Atomic, Molecular, and Optical Physics Handbook*, ed. G. W. Drake (AIP, Woodbury, 1996).

## Invited, Keynote, Plenary, and Tutorial Lectures

- A. L. Gaeta, "Microresonator-Based Frequency Combs," delivered at the Physics of Quantum Electronics Conference in Snowbird, UT, in January 2015.
- A. L. Gaeta, "Microresonator-Based Frequency Combs," delivered at the OSA Incubator on Quantitative Modeling of Frequency-Comb Sources in Washington, DC, in November 2014.
- A. L. Gaeta, "Temporal Magnification, Compression, and Cloaking of Light," delivered at the Department of Physics Seminar, University of Toronto, Toronto, Canada in November 2014.
- A. L. Gaeta, "Modelocking and Femtosecond Pulse Generation in Chip-Based Frequency Combs," delivered at the Frontier in Optics Annual Meeting of the Optical Society, Tucson, AZ, in October 2014.
- A. L. Gaeta (Plenary), "Silicon-Chip-Based Frequency Combs," delivered at the Instituto Nazionale di Ottica Annual Symposium in Brescia, Italy, in October 2014.
- A. L. Gaeta, "Temporal Magnification, Compression, and Cloaking of Light," delivered at the European Laboratory for Nonlinear Spectroscopy, University of Florence, Florence, Italy in October 2014.
- A. L. Gaeta, "Silicon-Chip-Based Frequency Combs," delivered at the Monte Verita Workshop 2014 on Microresonator-Based Optical Frequency Combs," in Ascona, Switzerland, in August 2014.
- A. L. Gaeta, "Chip-Based Nonlinear Photonics," delivered at the Siegmann International Summer School on Lasers at Stanford University, in August 2014.
- A. L. Gaeta, "Chip-Based Frequency Combs," delivered at the Nonlinear Photonics Meeting in Barcelona, Spain, in June 2014.
- A. L. Gaeta, "Chip-Based Frequency Combs," delivered at the OECC/ACOFT 2014 Conference in Melbourne, Australia, in June 2014.
- A. L. Gaeta, "Nonlinear Photonics in Chip-Based Structures," delivered at the Enrico Fermi Workshop on the Frontiers in Modern Optics in Varenna, Italy, in June 2014.
- A. L. Gaeta, "Silicon-Based Nonlinear Photonics," delivered at the Nonlinear Optics Workshop at the Laboratory for Physical Sciences, College Park, MD, in June 2014.
- A. L. Gaeta, "Modelocking and Femtosecond Pulse Generation in Chip-Based Frequency Combs," delivered at the Nonlinear Meeting, Edinburgh, Scotland, in May 2014.

A. L. Gaeta, "Self-Focusing and Filamentation in Optical Waveguides," delivered at Workshop on Mathematical Models in Laser Filamentation, University of Montreal, Montreal, Canada, in March 2014.

A. L. Gaeta, "Extreme Nonlinear Photonics on Chip," delivered at the Atomic and Laser Physics Seminar at the University of Oxford, Oxford, UK, in February 2014.

A. L. Gaeta, "Collapsing Light Really Shines," delivered at the Symposium on 45 Years of Supercontinuum Generation at the SPIE Photonics West Conference in San Francisco, CA in February 2014.

A. L. Gaeta, "Si-Based Nonlinear Optical Devices for Quantum Information," delivered at the Workshop on Scalable Information Processing with Quantum Nanophotonics at BBN Technologies, Cambridge, MA in January 2014.

A. L. Gaeta, "Nonlinear Optics at the Few-Photon Level," delivered at the Physics Colloquium at the University of Illinois at Urbana-Champaign, Urbana, IL, in October 2013.

A. L. Gaeta, "Modelocking and femtosecond pulse generation in chip-based frequency combs," delivered at the Advanced Solid-State Lasers Conference, Paris, France, in October 2013.

A. L. Gaeta, "Modelocking and femtosecond pulse generation in chip-based frequency combs," delivered at the International Symposium on Ultrafast Photonics Technologies, in Rochester, NY, in October 2013.

A. L. Gaeta, "Control of Multiple Filamentation," delivered at the International Symposium on Ultrafast Intense Laser Science 12, Salamanca, Spain, in October 2013.

K. Saha and A. L. Gaeta, "Ultralow-Power Nonlinear Optics in Photonic Band-Gap Fibers," delivered at the Frontier in Optics Annual Meeting, Orlando, FL, in October 2013.

A. L. Gaeta, "Nonlinear Optics at the Few-Photon Level," delivered at the Applied Nanophotonics Seminar at the University of Twente, Twente, Netherlands, in September 2013.

A. L. Gaeta, "Nonlinear Optics at the Few-Photon Level," delivered at the Progress in Electromagnetics Research Symposium, Stockholm, Sweden, in August 2013.

A. L. Gaeta, "Self-Focusing in Optical Fibers," delivered at the Progress in Electromagnetics Research Symposium, Stockholm, Sweden, in August 2013.

A. L. Gaeta, (Keynote) "Nonlinear Optics at the Few-Photon Level in Photonic Band-Gap Fibers," delivered at the Workshop on Photonics Crystal Fibers, Gößweinstein, Germany in June 2013.

A. L. Gaeta, (Tutorial) "Nonlinear Optics at the Few-Photon Level," delivered at the Coherence and Quantum Optics X and Quantum Information and Measurement Conferences, Rochester, NY in June 2013.

A. L. Gaeta, "Extreme Nonlinear Photonics on Chip," delivered at the Physics Seminar, Duke University, Durham, NC in May 2013.

A. L. Gaeta, "Silicon-Based Nonlinear Photonics," delivered at the Materials Research Society Spring Meeting, San Francisco, CA in April 2013.

A. L. Gaeta, "Temporal Magnification, Compression, and Cloaking of Light," delivered at the Physics Colloquium, Colorado School of Mines, Golden, CO in April 2013.

A. L. Gaeta, "Frequency Comb Generation in Silicon-Based Devices," delivered at the University of Trento, Trento, Italy on March 2013.

A. L. Gaeta, "Nonlinear Photonics in Silicon-Based Microresonators," delivered at the 7th Optoelectronics & Photonics Winter School: Physics and Applications of Microresonators, Levico Terme, Italy, March 2013.

- A. L. Gaeta, "Extreme Nonlinear Photonics on Chip," delivered at the Laser Seminar, ETH, Zurich, Switzerland in March 2013.
- A. L. Gaeta, "Modelocking and Femtosecond Pulse Generation in Chip-Based Frequency Combs," delivered at the Ultrafast Optics Meeting, Davos, Switzerland in March 2013.
- A. L. Gaeta, "Extreme Nonlinear Optics in Photonics Nanostructures," delivered at the Electrical Engineering Seminar, Ben Gurion University, Beer Sheva, Israel in February 2013.
- A. L. Gaeta, "Extreme Nonlinear Optics in Photonics Nanostructures," delivered at the Physics Colloquium, Weizmann Institute, Tel Aviv, Israel in February 2013.
- A. L. Gaeta, "Nonlinear Optics at the Few-Photon Level in Photonic Band-Gap Fibers," delivered at the Symposium on Integrated Optoelectronic Devices at the SPIE Photonics West Conference in San Francisco, CA in February 2013.
- A. L. Gaeta, "Mid-Infrared Devices on Silicon," delivered at the NRS Workshop on Photonic/Electronic Convergence: Will silicon be the material of the third millenium?, Paris, France in January 2013.
- A. L. Gaeta, "Temporal Magnification, Compression, and Cloaking of Light," delivered at the Physics Colloquium, Oklahoma State University, Stillwater, OK in October 2012.
- A. L. Gaeta, "Spiral and Phase Filamentation Dynamics," delivered at the 4th International Symposium on Filamentation, Tucson, AZ in October 2012.
- A. L. Gaeta, "Silicon-Based Frequency Combs," delivered at the Photonics in Switching Meeting, Ajaccio, Corsica in August 2012.
- A. L. Gaeta, "Nonlinear Photonics in Guided-Wave Nanostructures," delivered at the Quantum and Nonlinear Optics Summer School, Sandbjerg, Denmark, August 2012.
- A. L. Gaeta, "Silicon Nitride Waveguides for Nonlinear Optics and Frequency Comb Generation," 17<sup>th</sup> OptoElectronics and Communications Conference, Busan, South Korea in July 2012.
- A. L. Gaeta, "Application of Time-Space Duality to Temporal Cloaking," delivered at the Integrated Photonics Research, Silicon and Nano Photonics Meeting, Colorado Springs, CO in June 2012.
- A. L. Gaeta, "Silicon-Based Frequency Combs," delivered at the Society of Industrial and Applied Math Nonlinear Waves Meeting, Seattle, WA in June 2012.
- A. L. Gaeta, "Silicon-Based Frequency Combs," delivered at the Conference on Lasers and Electro-Optics, San Jose, CA in May 2012.
- A. L. Gaeta, "Integrated Nonlinear Photonics in Silicon," delivered at the European Conference on Integrated Optics, Barcelona, Spain in April 2012.
- A. L. Gaeta, "Silicon-Chip-Based Nonlinear Photonics," delivered at the Ghent University, Ghent, Belgium on April 17, 2012.
- A. L. Gaeta, "Nonlinear Silicon Photonics," delivered at the SPIE Europe, Brussels, Belgium in April 2012.
- A. L. Gaeta, "Novel Nonlinear Optical Devices," delivered at the CREOL 25<sup>th</sup> Anniversary Symposium, University of Central Florida, Orlando, FL on March 16, 2012.
- A. L. Gaeta, "Silicon-Chip-Based Nonlinear Photonics with Milliwatt Powers," delivered at the Optics and Quantum Electronics Seminar, Massachusetts Institute of Technology, Cambridge, MA on March 21, 2012.
- A. L. Gaeta, "Temporal Magnification, Compression, and Cloaking of Light," delivered at the Optics Seminar, University of Rochester, Rochester, NY, in March 5, 2012.

- A. L. Gaeta, "Nonlinear Optical Signal Processing Based on Time-Space Duality," delivered at the Optical Fiber Conference, Los Angeles, CA in March 2012.
- A. L. Gaeta, "Temporal Magnification, Compression, and Cloaking of Light," delivered at the Physics Colloquium, Cornell University, Ithaca, NY, in February 20, 2012.
- A. L. Gaeta, "Novel Silicon-Based Nonlinear Devices," delivered at the Optics and Quantum Electronics Seminar, Columbia University, New York, NY on February 13, 2012.
- A. L. Gaeta, "Silicon-Based Nonlinear Photonics," delivered at the Symposium on Integrated Optoelectronic Devices at the SPIE Photonics West Conference in San Jose, CA in January 2012.
- Y. Okawachi and A. L. Gaeta, "Silicon-Based Optical Frequency Combs," delivered at the Symposium on Integrated Optoelectronic Devices at the SPIE Photonics West Conference in San Jose, CA in January 2012.
- V. Venkataraman and A. L. Gaeta, "Nonlinear Optics at the Few-Photon Level in Photonic Crystal Fibers," delivered at the Symposium on Integrated Optoelectronic Devices at the SPIE Photonics West Conference in San Jose, CA in January 2012.
- A. L. Gaeta, "Novel Optical Devices Based on Four-Wave Mixing," 5th 'Rio de la Plata' Workshop on Lasers Dynamics and Nonlinear Photonics, Colonia del Sacramento, Uruguay in December 2011.
- A. L. Gaeta, "Extreme Nonlinear Optics at Ultralow Powers," Nonlinear Optics at 50 Symposium, Ann Arbor, MI on October 26, 2011.
- A. L. Gaeta, "Silicon-Chip-Based Frequency Combs," Frontiers in Optics Annual Meeting, Rochester, NY in October 2011.
- A. L. Gaeta, "Nonlinear Interactions in Gas-Filled Photonic Band-Gap Fibers," Clemson University on September 30, 2011.
- B. Shim and A. L. Gaeta, "Loss-of-phase with high-power collapsing beams," Ultrafast Optics 2011, Monterey, CA in September 2011.
- A. L. Gaeta, "Extreme Nonlinear Optics at Milliwatt Powers," Nonlinear Optics: East-West Reunion, Suzdal, Russia in September 2011.
- A. L. Gaeta, "Novel CMOS-compatible sources based on nonlinear optics," Pacific Rim CLEO, Sydney, Australia in August 2011.
- R. K. Lau and A. L. Gaeta, "Mid-Infrared Nonlinear Optics in Silicon Nanostructures," Nonlinear Optics and Waveguides Session at the XXX URSI General Assembly and Scientific Symposium, Istanbul, Turkey in July 2011.
- B. Shim and A. L. Gaeta, "Loss-of-phase with high-power collapsing beams," International Laser Physics Workshop, Sarajevo, Bosnia and Herzegovina, July 2011.
- A. L. Gaeta, "Silicon-Based Sources from the Visible to the Mid-Infrared," Nonlinear Optics Topical Meeting, Kauai, HI in July 2011.
- A. L. Gaeta, "Generation of Ultrabroad Frequency Combs On Chip," 2011 Cross-Border Workshop in Rochester, NY in June 2011.
- A. L. Gaeta, "Nonlinear Optical Wave Collapse," Tel Aviv University on June 1, 2011.
- A. L. Gaeta, "Nonlinear Photonics on Silicon Chip," Hebrew University on May 31, 2011.
- A. L. Gaeta, "Ultrafast Optical Processing on a CMOS-Compatible Chip," IEEE Photonics Society's 22nd Annual Workshop on Interconnections within High Speed Digital Systems, in Santa Fe, NM in May 2011.
- A. L. Gaeta, "Silicon-Based Nonlinear Photonics for Light Generation from the Visible to Mid-Infrared," Information Photonics 2011, in Ottawa, Canada in May 2011.

- A. L. Gaeta, "On-Chip Nonlinear Photonics," Information Photonics 2011, in Ottawa, Canada in May 2011.
- A. L. Gaeta (Keynote), "Ultrafast All-Optical Processing on a Silicon Chip," 9<sup>th</sup> International OSA Network of Students Conference, in Salamanca, Spain in April 2011.
- A. L. Gaeta, "Nonlinear Photonics on a Silicon Chip," Institute for Photonics Sciences, Barcelona, Spain in April 5, 2011.
- A. L. Gaeta, "Novel Silicon-Based Nonlinear-Optical Devices," Stanford University in March 28, 2011.
- A. L. Gaeta, "Time-Lens Approach to Ultrafast Processing and A-D Conversion," Optical Fiber Conference Workshop on Photonic Analog-Digital Conversion in Los Angeles, CA in March 2011.
- A. L. Gaeta, "Nonlinear Optics with Gases in Hollow-Core Band-Gap Fibers," Workshop on Next-Generation Optical Fiber Technology, Cocoa Beach, Florida, October 2010.
- A. L. Gaeta, "Ultrafast Nonlinear Optical Devices on a CMOS-Compatible Chip," International Symposium on Ultra-high Capacity Optical Communication and Related Optical Signal Processing and Devices, Copenhagen, Denmark, September 2010.
- A. L. Gaeta, "Nonlinear Optics in Guided-Wave Structures," Quantum and Nonlinear Optics Summer School, Sandbjerg, Denmark, August 2010.
- M. A. Foster and A. L. Gaeta, "Optical Parametric Oscillation on a Chip," Nonlinear Optics in Silicon Nanostructures," OSA Topical Meeting on Integrated Photonics Research, Silicon and Nanophotonics, Monterey, CA, July 2010.
- A. L. Gaeta, "Nonlinear Optics in Silicon Nanostructures," IEEE Summer Topicals: Novel Waveguiding, Structures and Phenomena, Playa del Carmen, Mexico, July 2010.
- A. L. Gaeta, "Ultrafast Nonlinear Optical Devices on CMOS-Compatible Chips," Photonics Workshop 2010, Cancun, Mexico, July 2010.
- A. L. Gaeta, "Nonlinear Optics in Silicon Nanostructures," Laser Physics Conference, Foz de Iguacu, Brazil, July 2010.
- A. L. Gaeta, "Applications of Four-wave Mixing in Silicon Nanostructures" Nonlinear Photonics Topical Meeting, Karlsruhe, Germany in June 2010.
- A. L. Gaeta, (Plenary) "Silicon-Chip Nonlinear Nanophotonics," Photonics North, Niagara Falls, Ontario, Canada in May 2010.
- A. L. Gaeta and B. Shim, 3rd International Symposium on Filamentation, Crete, Greece in May 2010.
- A. L. Gaeta, "Quantum Optics in CMOS – Compatible Devices," Heraeus Seminar, Bad Honnef, Germany in March 2010.
- A. L. Gaeta, The 40<sup>th</sup> Winter Colloquium on the Physics of Quantum Electronics, Snowbird, Utah in January 2010.
- A. L. Gaeta, "Slow Light in Optical Waveguides," Dasan Conference, Jeju, Korea in November 2009.
- A. L. Gaeta, "Ultrafast applications of four-wave mixing on Silicon chip," IEEE LEOS Annual Meeting, Antalya, Turkey in October 2009.
- A. L. Gaeta, "Ultrafast optical processing on a Si chip," Group IV Photonics, San Francisco, California in September 2009.
- A. L. Gaeta, "Ultrafast all-optical processing on a silicon chip," ISPUT2009, Toky, Japan in August 2009.

- A. L. Gaeta, "Ultralow power nonlinear optics in Rb-filled band-gap fibers," CLEO/Europe, Munich Germany in June 2009.
- A. L. Gaeta, "Role of spatio-temporal shaping on filamentation dynamics," Workshop on Laser Filamentation, Duke University in February 2009.
- Y. Okawachi and A. L. Gaeta, "Large, tunable all-optical delays via conversion dispersion," delivered at the Symposium on Integrated Optoelectronic Devices at the SPIE Photonics West Conference in San Jose, CA in January 2009.
- M. A. Foster, R. Salem, A. C. Turner, M. Lipson and A. L. Gaeta, "Ultrafast optical processing via four-wave mixing on a silicon chip," delivered at Photonics 2008 International Conference on Fiber Optics and Photonics in New Delhi, India in December 2008.
- A. L. Gaeta, "Ultrafast optical processing on a silicon chip," Yale University in December 2008.
- A. L. Gaeta, "Applications of four-wave mixing in Si nanowires" delivered at the 21<sup>st</sup> Annual Meeting of the IEEE Lasers & Electro Optics Society in New Port Beach, CA in November 2008.
- A. L. Gaeta, "Nonlinear optics in gas-filled photonic band-gap fibers," delivered at the Frontiers in Optics Annual Meeting in October 2008.
- A. L. Gaeta, (Plenary) "Photonics nanowires: Ideal waveguides for nonlinear optics," delivered at the European Optical Society Annual Meeting 2008 in Paris, France in October 2008.
- A. L. Gaeta, "Role of spatio-temporal shaping on filamentation dynamics," delivered at the 2<sup>nd</sup> International Symposium on Filamentation in Paris, France in September 2008.
- A. L. Gaeta, M. Foster, D. Geraghty, R. Salem, and M. Lipson, "Chip-based ultrafast optical oscilloscope" delivered at the Opto-Electronics and Communications Conference in Sidney, Australia in July 2008.
- Y. Okawachi and A. L. Gaeta, "Large optical delays via conversion-dispersion in optical waveguides," delivered at the OSA Slow and Fast Light Meeting in Boston, MA in July 2008.
- A. L. Gaeta (Plenary), "Photonic nanowires: Ideal waveguides for nonlinear optics," delivered at the International Conference on Optical, Optoelectronic and Photonic Materials and Applications, in Edmonton, Alberta in July 2008.
- I. H. Agha, Y. Okawachi, A. L. Gaeta, "Broadband cascaded four-wave mixing in high-Q silica microspheres," delivered at the Conference on Quantum Electronics and Laser Science in San Jose, CA in May 2008.
- M. A. Foster, R. Salem, A. C. Turner, D. F. Geraghty, M. Lipson, and A. L. Gaeta, "Silicon-chip-based single-shot ultrafast optical oscilloscope," delivered at the Conference on Lasers and Electro-Optics in San Jose, CA in May 2008.
- A. L. Gaeta, "Nonlinear optics in gas-filled photonic band-gap fibers," delivered at the Joint CLEO/QELS Symposium on Hollow-Core Photonic-Crystal Fibers in San Jose, CA in May 2008.
- Y. Okawachi and A. L. Gaeta, "Tunable all-optical delays in optical waveguides," delivered at the Symposium on Integrated Optoelectronic Devices at the SPIE Photonics West Conference in San Jose, CA in January 2008.
- A. L. Gaeta (Plenary), "Efficient nonlinear optical devices based on photonic nanowires," delivered at the IEEE LEOS Winter Topical Meeting in Sorrento, Italy in January 2008.
- A. L. Gaeta "Nonlinear interactions in nanowaveguides," delivered at Frontiers in Optics Conference, in San Jose, CA in September 2007.
- A. L. Gaeta, "Slow light in optical waveguides," delivered at the Laser Science Conference in San Jose, CA in September 2007.

A. L. Gaeta, "Slow light in optical waveguides," delivered at the IEEE LEOS Photonics in Switching Conference in San Francisco, CA in August 2007.

L.T. Vuong, A.A. Ishaaya, and A.L. Gaeta, "Nonlinear interactions between optical vortex beams," delivered at the Laser Physics Workshop, Leon, Mexico in August (2007).

A. L. Gaeta, "Slow light in optical waveguides," delivered at the OSA Slow and Fast Light Meeting in Salt Lake City, Utah in July 2007.

L.T. Vuong, A.A. Ishaaya, T.D. Grow, A.L. Gaeta, E.R. Eliel, and Gert 't Hooft, "Experiments showing orbital angular momentum exchange between optical vortex beams," delivered at the International Quantum Electronics Conference, Munich, Germany in June (2007).

A. L. Gaeta, "Interaction of light with atoms and molecules in photonic band-gap fibers," delivered at the Ninth Rochester Conference on Coherence and Quantum Optics in Rochester, NY in June 2007.

A. A. Ishaaya, T. D. Grow, L. T. Vuong and A. L. Gaeta, "Spatial collapse dynamics in self-focusing Kerr media," delivered at the International Conference on Coherent and Nonlinear Optics (ICONO 2007), Minsk, Belarus in May (2007).

A. L. Gaeta, "Interaction of light with atoms and molecules in photonic band-gap fibers," delivered at the 2007 Cross-Border Workshop in Toronto, Ontario in May 2007.

M. A. Foster and A. L. Gaeta, "Pulse compression down to single-cycle pulses in photonic crystal fibers," delivered at the International Conference on Optics and Optoelectronics in Prague, Czech Republic in April 2007.

A. L. Gaeta "Optical interactions in photonic crystal fibers," delivered at the Applied Physics Seminar, California Institute of Technology, in March 2007.

A. L. Gaeta, "Slow light in optical waveguides," delivered at the Optical Fiber Conference Workshop on Slow Light in Anaheim, CA in March 2007.

A. L. Gaeta, "Pulse compression down to single-cycle pulses in photonic crystal fibers," delivered at the Advanced Optical and Quantum Memories and Computing IV Symposium at the SPIE Photonics West Conference in San Jose, CA in January 2007.

A. L. Gaeta, "Slow light in optical waveguides," delivered at the Advanced Optical and Quantum Memories and Computing IV Symposium at the SPIE Photonics West Conference in San Jose, CA in January 2007.

A. L. Gaeta "Ultrafast nonlinear interactions in photonic nanowires," delivered at Annual Meeting of the IEEE Lasers and Electro-Optics Society, in Montreal, Quebec in October 2006.

A. L. Gaeta "Nonlinear interactions in photonic nanowires," delivered at the EECS/RLE Seminar Series, Massachusetts Institute of Technology, in October 2006.

A. L. Gaeta, M. A. Foster, J. E. Sharping, A. C. Turner, B. S. Schmidt, and M. Lipson, "Broad-bandwidth amplification and wavelength conversion on a silicon chip," delivered at the Group IV Meeting of the IEEE Lasers and Electro-Optics Society, in Ottawa, Ontario, in September 2006.

A. L. Gaeta "Collapse dynamics of non-Gaussian optical waves," delivered at the Society for Industrial and Applied Mathematics Conference on Nonlinear Waves and Coherent Structures in Seattle, Washington in September 2006.

A. L. Gaeta, "Ultrafast nonlinear interactions in photonic crystal fibers," delivered at the Conference on Lasers and Electro-Optics in Long Beach, CA, in May 2006.

J. E. Sharping and A. L. Gaeta, "Slow light in optical waveguides," delivered at the Advanced Optical and Quantum Memories and Computing III Symposium at the SPIE Photonics West Conference in San Jose, CA in January 2006.

- A. L. Gaeta, "Nonlinear optics in photonic crystal fibers," delivered at the Physics Colloquium, Lehigh University, in November 2005.
- A. L. Gaeta, "Slow light in optical fibers," (Tutorial) delivered at the Frontiers in Optics Annual Meeting of the Optical Society in Tuscon, Arizona, in October 2005.
- J. E. Sharping and A. L. Gaeta, "Nonlinear optics in photonic band-gap fibers," delivered at Annual Meeting of the IEEE Lasers and Electro-Optics Society, in Sydney, Australia, in October 2005.
- A. L. Gaeta, "Slow light in optical fibers," delivered at the Stanford Photonics Research Center Symposium at Stanford University in Palo Alto, CA in September 2005.
- A. L. Gaeta, Y. Okawachi, M. S. Bigelow, J. E. Sharping, Z. Zhu, A. Schweinsberg, D. J. Gauthier, and R. W. Boyd, "Slow light in optical waveguides," delivered at the Nonlinear Guided Waves Topical Meeting in Dresden, Germany, in September 2005.
- A. L. Gaeta, "Nonlinear optics in photonic crystal fibers," delivered at the Institute of Optics Seminar, University of Erlangen-Nürnberg, in September 2005.
- A. L. Gaeta, "Slow light in optical fibers," delivered at the Complex Media VI: Light and Complexity Symposium at the SPIE Optics and Photonics Conference in San Diego, CA in July 2005.
- G. Fibich, A. L. Gaeta, K. Moll, B. Ilan, A. Dubietis, G. Tamosauskas, S. Eisenmann, and A. Zigler, "Self-focusing and multiple filamentation of intense laser pulses," delivered at the 2005 International Quantum and Electronics Conference, Tokyo, Japan, in May 2005.
- A. L. Gaeta, "Nonlinear optics in photonic crystal fibers: A new regime of light-matter interactions," (Plenary) delivered at the 2005 Laser Physics Workshop, Kyoto, Japan, in May 2005.
- A. L. Gaeta, "Nonlinear optics in hollow-core photonic crystal fibers," (Tutorial) delivered at the European Conference on Lasers and Electro-Optics, Munich, Germany, in May 2005.
- Y. Okawachi, M. S. Bigelow, J. E. Sharping, Z. Zhu, A. Schweinsberg, D. J. Gauthier, R. W. Boyd, and A. L. Gaeta, "Tunable all-optical delays via Brillouin slow light in optical fibers," delivered at the Conference on Lasers and Electro-Optics in Baltimore, MD, in May 2005.
- A. L. Gaeta, "Novel nonlinear optical interactions in photonic crystal fibers," delivered at the Nanophotonics for Information Systems Conference, San Diego, CA, in April 2005.
- A. L. Gaeta, "Nonlinear optics in photonic crystal fibers: A new regime of light-matter interactions," delivered at the Physics Colloquium, University of Toronto, in March 2005.
- A. L. Gaeta, "Slow light in optical fibers," delivered at the Physics of Quantum Electronics Conference in Snowbird, UT, in January 2005.
- A. L. Gaeta, "Slow light in optical fibers," delivered at the Advanced Optical and Quantum Memories and Computing II Symposium at the SPIE Photonics West Conference in San Jose, CA in January 2005.
- A. L. Gaeta, "Nonlinear optics in photonic crystal fibers," delivered at the Electrical and Computer Engineering Seminar, University of California at San Diego, in December 2004.
- A. L. Gaeta, "Nonlinear optics in photonic crystal fibers," delivered at the Institute of Optics Colloquium, University of Rochester, in November 2004.
- A. L. Gaeta, "Nonlinear optics in photonic crystal fibers," delivered at the Ultrafast Lasers Symposium at the SPIE Photonics North Conference in Ottawa, ON in September 2004.
- A. L. Gaeta, "Nonlinear interactions in photonic band-gap fibers," delivered at the Nonlinear Optics Topical Meeting, Waikoloa, HI, August 2004.

S. T. Cundiff and A. L. Gaeta, “Noise and pulse properties of supercontinuum generation in microstructured fibers,” (Tutorial) delivered at the Quantum Electronics and Laser Science Conference in San Francisco, CA, in May 2004.

A. L. Gaeta, “Nonlinear frequency conversion in microstructured and band-gap, fibers,” delivered at the Optical Soliton Workshop, Toronto, ON, March 2004.

A. L. Gaeta, “Nonlinear wave collapse of ultrashort laser pulses,” delivered at the Electrical and Computer Engineering Seminar, Northwestern University, in March 2004.

A. L. Gaeta, “Generation of megawatt solitons in hollow-core band-gap fibers,” delivered at the High-Power Fiber Lasers Symposium at the SPIE Photonics West Conference in San Jose, CA in January 2004.

A. L. Gaeta, H.-K. Ng, and K. Moll, “Self-similar collapse of BEC’s,” delivered at the Laser Science Conference, XIX, in Tuscon, AZ in September 2003.

A. L. Gaeta, “Nonlinear interactions in microstructured, band-gap, and hollow fibers,” (Lectures) delivered at the Summer School on New Frontiers in Optical Technologies, Tampere University of Technology, Tampere, Finland, August 2003.

A. L. Gaeta, “Nonlinear interactions in microstructured, band-gap, and hollow fibers,” delivered at the Gordon Research Conference on Nonlinear Optics and Lasers, New London, NH, July 2003.

D. G. Ouzounov, F. R. Ahmad, and A. L. Gaeta, “Solitons generation in a hollow-core photonic band-gap fiber,” delivered at the 12<sup>th</sup> International Laser Physics Workshop in Hamburg, Germany in July 2003.

K. Moll, H.-K. Ng and A. L. Gaeta, “Experimental observation of the self-similar collapse of an optical beam,” delivered at the 2003 Cross-Border Workshop on Laser Science in Waterloo, Ontario in May 2003.

K. Moll, H.-K. Ng and A. L. Gaeta, “Experimental observation of the self-similar collapse of an optical beam,” delivered at the Third IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory in Athens, GA, in April 2003.

A. L. Gaeta, “Photonic crystal fibers: waveguides of the future?,” delivered at the Department of Electrical Engineering at the SUNY at Buffalo, NY in February 2003.

A. L. Gaeta, “Spatial and temporal dynamics of nonlinear wave collapse,” Workshop on *Emerging Applications of the Nonlinear Schrödinger Equations*, UCLA Institute for Pure and Applied Mathematics, Los Angeles, CA, February 2003.

D. G. Ouzounov, K. D. Moll, M. A. Foster, W. R. Zipfel, W. W. Webb, and A. L. Gaeta, “Fiber delivery of femtosecond laser pulses,” delivered at the Commercial and Biomedical Applications of Ultrafast Lasers at the SPIE Photonics West Conference in San Jose, CA in January 2003.

A. L. Gaeta, “The universal nature of nonlinear wave collapse,” plenary talk delivered at the Physics of Quantum Electronics Conference in Snowbird, UT, in January 2003.

A. L. Gaeta “Origin of supercontinuum generation in microstructured fibers,” delivered at the 2002 Annual Meeting of Laser and Electro-Optics Society, Glasgow, Scotland, UK.

A. L. Gaeta “Spatio-temporal collapse and soliton formation,” delivered at the Optical Soliton Workshop, Varenna, Italy, in August 2002.

K. Moll and A. L. Gaeta, “Robust collapse of light beams: Observation of the Townes soliton,” delivered at the 10<sup>th</sup> International Laser Physics Workshop in Bratislava, Slovak Republic in July 2002.

A. L. Gaeta, “Robust collapse of light beams: Observation of the Townes soliton,” delivered at the Physics of Quantum Electronics Conference in Snowbird, UT, in January 2002.

- A. L. Gaeta, "Nonlinear propagation of femtosecond pulses in microstructured fibers," delivered at the Ultrafast Optics Meeting Montebello, Quebec, in July 2001.
- A. L. Gaeta "Supercontinuum generation in microstructured fibers," delivered at the Workshop on Ultrafast Nonlinear Optics and Semiconductor Lasers, Cork, Ireland, in September 2001.
- A. L. Gaeta, "Collapse dynamics of ultrashort pulses: nonlinear dynamics at the femtosecond time scale," delivered at the Physics Colloquium at Duke University, March 2001.
- A. L. Gaeta, "Spatio-temporal collapse dynamics of light pulses," delivered at the Physics of Quantum Electronics Conference in Snowbird, UT, in January 2001.
- A. L. Gaeta, "Linear and nonlinear propagation in microstructured fibers," delivered at the Workshop on Quantum Electronics in Jackson Hole, WY, in July 2000.
- A. L. Gaeta "Self-focusing dynamics and catastrophic collapse of ultrashort laser pulses," delivered at the Conference for Lasers and Electro-Optics in San Francisco, CA, in May 2000.
- A. L. Gaeta, "Catastrophic collapse of ultrashort pulses," delivered at the Physics Colloquium at University of Toronto, March 2000.
- A. L. Gaeta, "Spatio-temporal collapse of ultrashort pulses: nonlinear dynamics at the femtosecond time scale," delivered at the Physics of Quantum Electronics Conference in Snowbird, UT, in January 2000.
- A. L. Gaeta, "Catastrophic collapse of ultrashort laser pulses," delivered at the International Biomedical Optics Symposium at the SPIE Photonics West Conference in San Jose, CA in January 2000.
- A. L. Gaeta, "Femtosecond pulse characterization through use of two-photon absorption in photodetectors," delivered at the Integrated Optoelectronics Symposium at the SPIE Photonics West Conference in San Jose, CA in January 2000.
- A. L. Gaeta, "Catastrophic collapse of ultrashort pulses in condensed matter," delivered at the Center for Ultrafast Optical Science Seminar at the University of Michigan, November 1999.
- A. L. Gaeta, "Catastrophic collapse of ultrashort pulses in condensed matter," delivered at Physics Colloquium at Penn State University, October 1999.
- A. L. Gaeta, K. Moll, and A. M. Streltsov, "Nonlinear propagation of ultrashort pulses in dispersive media," delivered at the International Congress on Industrial and Applied Mathematics in Edinburgh, Scotland in July 1999.
- A. L. Gaeta, K. Moll, and A. M. Streltsov, "Catastrophic collapse of ultrashort pulses in condensed matter," delivered at the 8<sup>th</sup> International Laser Physics Workshop in Budapest, Hungary in July 1999.
- A. L. Gaeta, "Ultrashort pulse propagation and breakdown in condensed matter," delivered at the Commercial and Biomedical Applications of Ultrafast Lasers Symposium at the SPIE Photonics West Conference in San Jose, CA in January 1999.
- A. L. Gaeta and S. Wielandy, "Polarization control via quantum coherence," delivered at the Physics of Quantum Electronics Conference in Snowbird, UT, in January 1999.
- A. L. Gaeta, "Nonlinear pulse propagation in condensed matter," delivered at the International Workshop on Ultrafast Intense Laser Pulse Propagation and Its Applications, Quebec City, Canada in June 1998.
- A. L. Gaeta and J. K. Ranka, "Propagation dynamics of high-powered femtosecond laser pulses in optically transparent media," delivered at the Biomedical Optics Symposium at the SPIE Photonics West Conference in San Jose, CA in January 1998

A. L. Gaeta, T. D. Krauss, J. K. Ranka, and F. W. Wise, "Characterization of the tensor nature of  $\chi^{(3)}$  in wide-gap semiconductors," delivered at the Novel Optical Materials and Applications Workshop, Cetraro, Italy, June 1997.

A. L. Gaeta, J. K. Ranka, and R. W. Schirmer, "Pulse-splitting dynamics of self-focused femtosecond laser pulses," delivered at the Physics of Quantum Electronics Conference in Snowbird, UT, in January 1997.

A. L. Gaeta, R. W. Boyd, and T. R. Moore, "Stochastic dynamics in stimulated scattering," delivered at the International Quantum Electronics Conference in Anaheim, CA, in May 1994.

### **Patents**

"System for Combining Laser Beams by Transferring Energy therebetween in Atomic Vapor," R. W. Boyd, A. L. Gaeta, M. T. Gruneisen, K. R. MacDonald, #4,918,699, April 17 1990.

"Optical Fiber Delivery and Collection System for Biological Applications such as Multiphoton Microscopy, Spectroscopy, and Endoscopy," A. L. Gaeta, D. G. Ouzounov, W. W. Webb, R. Williams, W. R. Zipfel, Patent 7,702,381 (2010).

"Fiber optical parametric oscillator with high power and bandwidth," J. Sharping, A. L. Gaeta, M. Foster, Patent 7,898,731 (2008).

"All-Optical Controllable Pulse Delay Generator," A. L. Gaeta, J. Sharping, C. Xu, Patent 7,538,935 (2010).

"Silicon integrated photonic parametric amplifier, oscillator, and wavelength converter," M. A. Foster, A. L. Gaeta, M. Lipson, J. Sharping, and A. C. Turner, Patent 8,041,157 (2011), 8,270,783 (2012).