Steven Glenn Johnson

Curriculum Vitae

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Degrees

- Ph.D. Physics, Massachusetts Institute of Technology (MIT), 2001, advised by John D. Joannopoulos.
- B.S. Mathematics, B.S. Physics, B.S. Electrical Engineering & Computer Science, MIT, 1995.

Employment

- Professor, Physics, MIT (courtesy appointment), January 2016–present.
- Professor, Applied Mathematics, MIT, July 2015–present.
- Associate Professor (with Tenure), Applied Mathematics, MIT, July 2011–2015
- Associate Professor, Applied Mathematics, MIT, July 2009–2011
- Assistant Professor, Applied Mathematics, MIT, July 2004–June 2009
- Postdoctoral associate, School of Engineering and Applied Sciences, Harvard University, Dec. 2003–June 2004.
- Postdoctoral associate, Department of Physics, MIT, May 2001–Dec. 2003
- Research scientist, OmniGuide Inc. (Cambridge, MA), Aug. 2000–Jan. 2001; consultant until 2007.

Honors

- 2009 Edmund F. Kelly Research Award, awarded every three years by the MIT Mathematics Department for outstanding research by a junior faculty member.
- Ranked among top-10 most-cited authors in the field of "photonic crystals" by *ScienceWatch.com* (October 2008).
- J. H. Wilkinson Prize for Numerical Software (for FFTW); Argonne Natl. Lab., National Physical Lab. (UK), and the Numerical Algorithms Group; 1999.
- Laurels Award in Electronics (for FFTW), *Aviation Week & Space Technology*, 1999.

UROP Students Supervised

- Rodriguez, Alejandro: Fall 2004, Spring 2005, Fall 2005, Spring 2006. Currently an Assistant Professor in Electrical Engineering at Princeton University.
- Shao, Xuancheng; Fall 2006, Spring 2007, Summer 2007. Currently a graduate student in math at Stanford.
- Lang, Ruitian; Fall 2007. Currently a graduate student in economics, MIT.
- Waldwick, Bryn; Spring 2008. Currently, co-founder of Prontotype.
- Lachenmyer, Nathan: Summer 2008. Currently working at Small Design, Inc.

- Nampaisarn, Thanasin: Summer 2008. (Graduated in 2009; Currently a graduate student in astrophysics at Princeton.
- Parzygnat. Arthur; Summer 2009 (REU; was junior at Queens College, NY). Currently a graduate student in physics, CUNY Graduate School.
- Ramirez, David; Spring & Fall 2009, Spring & Fall 2010, Spring 2011 (co-supervised with Prof. Soljacic). Currently a graduate student in physics at Stanford.
- Buenrostro, Issac: Fall 2010, Spring 2011. Currently a graduate student in computational and mathematical engineering at Stanford.
- Varela, Jaime; Spring, Summer, Fall 2010, IAP, Spring & Fall 2011. Currently a graduate student in physics at U.C. Berkeley.
- Zhang, Amy X. : Fall 2010. Currently working at Oracle.
- Rudolph, Katherine: Summer 2011 (Graduated in 2014; current position unknown.)
- Alcorn, Thomas: Fall and Summer 2011, Summer 2012. (Graduate in 2014; current position unknown.)
- Perez, Jorge: Fall 2011, Spring 2012. Currently a graduate student in EECS-MIT.
- Garcia, Alejandro: Fall 2012. Continuing in mechanical engineering, MIT.
- Guyomard, Amy: Fall 2012. (Graduated in 2013; M.Sc from Oxford in 2014; current position unknown.)
- Kurutach, Thanard: Fall 2012, Spring 2013. Continuing as a math major, MIT.
- Khojandi, Aryan: Summer & Fall 2013, Spring 2014. Currently a graduate student at EECS-MIT.
- Buckman, Noam: Spring & Fall 2013. Continuing as a math major, MIT.
- Li, Songtai: Spring 2014. Continuing as a physics major, MIT.
- Chew, Amyas: Summer 2014. Continuing as a physics major, MIT.
- Silwal, Sandeep, Fall 2015. Continuing as a math major, MIT.
- Patrick Ledwidth, Spring 2016–Fall 2016. Continuing as a physics major, MIT.
- Beatrice Nash, Fall 2017.
- Nolan Reilly, Fall 2018.

Ph.D. Students Supervised

- Oskooi (formerly Farjadpour), Ardavan: Dept of Materials Science, MIT: Graduated June 2010. Currently a research fellow at the department of Electrical Engr and Computer Science (EECS), University of Michigan.
- Rodriguez, Alejandro; Dept of Physics, MIT (Co-advisor: J. D. Joannopoulos), June 2010. Currently Assistant Professor of Electrical Engr., Princeton University.
- Zhang, Lei: Co-advisor (with Jacob White Advisor) EECS-MIT: June 2010. Currently at UBS Investment Bank.
- Kurs, André, Dept. of Physics, MIT (Co-advisor: Marin Soljacic): December 2010. Currently at WiTricity.
- Reid, Homer: Co-advisor (with Jacob White Advisor) Dept of Physics, MIT: December 2010. Currently an Instructor in Applied Mathematics, MIT.

- McCauley, Alexander; Dept of Physics, MIT (Co-advisor: J. D. Joannopoulos), September 2011. Currently at WiTricity.
- Lee, Karen; EECS-MIT: June 2011. Currently a lecturer at the Chinese University of Hong Kong.
- Hashemi, Hila: Mathematics, MIT: Janury 2012. (Moved to San Diego, looking for a position.)
- Liang, Xiangdong; Mathematics, MIT: June 2013. Currently a research scientist at Aramco Research Center in Cambridge.
- Liu, David: Dept. of Physics, MIT, September 2015. Currently postdoc at MIT.
- Yoon Kyung Lee: Dept. Mechanical Engineering, MIT (Co-advisor: N. Fang), May 2017. Currently in Harvard Law school.
- Pick, Adi: Dept. of Physics, Harvard, in progress (August 2017). Currently postdoc at Technion.
- Wang, Fan: Mechanical Engr., MIT, in progress (expected 2019).
- Pestourie, Raphael, Applied Math, Harvard, in progress (expected 2019).
- Benzaouia, EECS, MIT, in progress (expected 2020).
- Yao, Wenjie, EECS, MIT, in progress (expected 2020).

Postdoctoral Researchers Supervised

- Nave, Jean-Christophe, 2009–2010, currently Assistant Professor, Dept. of Mathematics, McGill University.
- Oskooi, Ardavan, June-Oct., 2010, currently a research fellow, Dept. of Electrical Engr, University of Michigan.
- Rodriguez, Alejandro, 2010–2013 (jointly with Harvard University). Currently an Assistant Professor of Electrical Engr., Princeton University.
- Reid, Homer, 2010–2017. Currently visiting professor of chemistry, Tokyo University of Science.
- Welters, Aaron, 2012-2014. Currently Assistant Professor in Mathematical Sciences at Florida Tech.
- Wong, Liang Jie, 2013–2015. Currently at SIMTech.
- Miller, Owen, 2012–2016. Currently Assistant Professor of Physics at Yale.
- Shin, Wonseok, 2015–2018. Currently at MIT Lincoln Laboratories.

Teaching Experience

- MIT course 18.369/8.315, "Mathematical Methods in Nanophotonics," Fall 2005 (listed as 18.325), Spring 2007–/2010/2012/2014/2016/2018.
- MIT course 18.335, "Introduction to Numerical Methods," Fall 2008–2015; Spring 2019.
- MIT course 18.336, "Numerical Methods for Partial Differential Equations," Spring 2006.
- MIT course 18.06, "Linear Algebra," Fall 2007, Spring 2009, Spring/Fall 2017. Fall 2018.
- MIT course 18.03, "Differential Equations," recitation sections Fall 2004, Spring 2005/2011.
- MIT course 18.303, "Linear Partial Differential Equations, Fall 2010–2016.

- MIT course 18.S096, "Performance Computing in a High-Level Language," IAP 2016–2017.

Service

- MIT IAP, one-week course on photonic crystals, 2003.
- Biannual (later became Annual) short course on photonic crystals at SPIE conferences since 2004.
- MIT Science & Engineering Prog. for Teachers lecturer, summers 2004 and 2007.
- MIT IAP mathematics lecture series lecturer, 2005–2017.
- Applied Mathematics Colloquium committee, Fall 2006–present.
- MIT SPUR summer undergraduate mathematics program lecturer, 2007.
- MIT freshman advisor, 2009–present.
- Admissions-folder reviewer for MIT Master of Science Program in Computation for Design and Optimization (CDO), Spring 2008.
- Energy Studies Minor Advisor, Math Department, 2009–present.
- Participant in MIT commencement and hooding, Spring 2010–2013.
- Co-chair of undergraduate advising in the math department (including such duties as running the annual "Grad School Talk" for seniors, and presiding at the Senior Dinner), 2011-present.
- Math Dept UROP Coordinator, 2011-present.
- Co-supervisor (with Ju-Lee Kim) of USWIM (Undergraduate Society of Women in Mathematics), 2011-present.
- Faculty Host to Martin Luther King Visiting Faculty Erika Camacho, 2013-2014.
- Reviewer for numerous scientific journals: *Phys. Rev. Lett.*, *Optics Lett.*, *Optics Express*, *Phys. Rev. B and E*, *IEEE Trans. Signal Processing*, *Applied Physics Lett.*, and *Nature Photonics*, among others.

Publications

Books and Invited Book Chapters

- S. G. Johnson, A. P. McCauley, and A. Rodriguez-Wong, "Computation and visualization of photonic quasicrystal spectra," in *Optics of Aperiodic Structures: Fundamentals and Device Applications* (L. D. Negro, ed.), ch. 11, pp. 451–489, Singapore: Pan Stanford Publishing, January 2014.

- A. Taflove, A. Oskooi, S. G. Johnson, eds: *Advances in FDTD Computational Electrodynamics*. Boston: Artech, January 2013. Co-edited and contributed five invited chapters (with A. Oskooi):
    - "Electromagnetic Wave Source Conditions," pp. 65-96
    - "Rigorous PML Validation and a Corrected Unsplit PML for Anisotropic Dispersive Media," pp. 101-132
    - "Accurate FDTD Simulation of Discontinuous Materials by Subpixel Smoothing," pp. 133-147
    - "Casimir Forces in Arbitrary Material Geometries," pp. 535-562
    - "Meep: A Flexible Free FDTD Software Package," pp. 567-592

- C. W. Hsu, B. Zhen, S.-L. Chua, S. G. Johnson, J. D. Joannopoulos, and M. Soljačić, "Bloch surface eigenstates within the radiation continuum," *Light: Science & Applications*, vol. 2, p. e84, July 2013. Invited paper.

- S. G. Johnson, "Numerical methods for computing Casimir interactions," in *Casimir Physics* (D. Dalvit, P. Milonni, D. Roberts, and F. da Rosa, eds.), vol. 834 of *Lecture Notes in Physics*, ch. 6, pp. 175-218, Berlin: Springer, June 2011.

- J. D. Joannopoulos, S. G. Johnson, J. N. Winn, and R. D. Meade, *Photonic Crystals: Molding the Flow of Light*, 2nd ed., Princeton Univ. Press, Feb. 2008.

- S. G. Johnson, "Implementing FFTs in practice," in *Fast Fourier Transforms* (C. S. Burrus, ed.), ch. 11, Rice University Connexions (2008).

- S. A. Jacobs, B. Temelkuran, O. Weisberg, M. Ibanescu, S. G. Johnson, and M. Soljacic, "Hollow core fibers," in *Specialty Optical Fibers Handbook* (A. Mendez and T. Morse, eds), Elsevier, December 2006.

- S. G. Johnson, M. Soljacic, and J. D. Joannopoulos, "Photonic crystals," in *Encyclopedia of Nonlinear Science* (A. Scott, ed.), Routledge, Taylor, and Francis Group, July 2005.

- S. G. Johnson and J. D. Joannopoulos, "Photonic crystals: Electromagnetic theory," in *Encyclopedia of Modern Optics* (B. D. Guenther et al, eds.), Elsevier, November 2004.

- S. G. Johnson and J. D. Joannopoulos, *Photonic Crystals: The Road from Theory to Practice*, Springer, January 2002.

- J. D. Joannopoulos, S. Fan, A. Mekis, and S. G. Johnson, "Novelties of light with photonic crystals," in *Photonic Crystals and Light Localization in the 21st Century* (C. M. Soukoulis, ed.) vol. 563 of *NATO Science Series C: Mathematical and Physical Sciences*, pp. 1–24 (Kluwer, May 2001).

Journal Publications*

1. Z. Lin, V. Liu, R. Pestourie,* and S. G. Johnson, "Topology optimization of freeform large-area metasurfaces," *Optics Express*, vol. 27, pp. 15765–15775, May 2019.
2. M. Benzaouia,* G. Tokic, O. D. Miller, D. K. P. Yue, and S. G. Johnson, "From solar cells to ocean buoys: Wide-bandwidth limits to absorption by metaparticle arrays," *Physical Review Applied*, vol. 11, p. 034033, March 2019. Editor's suggestion.
3. H. Shim, L. Fan, S. G. Johnson, and O. D. Miller, "Fundamental limits to near-field optical response over any bandwidth," *Physical Review X*, vol. 9, p. 011043, March 2019.

* Asterisks by student names indicate papers that were (or will be) incorporated in a supervised doctoral thesis.

4. A. Pick, A. Cerjan, and S. G. Johnson, "Ab-initio theory of quantum fluctuations and relaxation oscillations in multimode lasers," *Journal of the Optical Society of America B*, vol. 36, pp. C22–C40, February 2019.
5. Y. Liu, L. Fan, Y. E. Lee, N. X. Fang, S. G. Johnson, and O. D. Miller, "Optimality of optical forces and torques on nanoparticles via illumination/scattering channels," *ACS Photonics*, vol. 6, pp. 395–402, February 2019.
6. R. Pestourie,* C. Pérez-Arancibia, Z. Lin, W. Shin, F. Capasso, and S. G. Johnson, "Inverse design of large-area metasurfaces," *Optics Express*, vol. 26, pp. 33732–33747, December 2018.
7. C. Pérez-Arancibia, R. Pestourie, and S. G. Johnson, "Sideways adiabaticity: Beyond ray optics for slowly varying metasurfaces," *Optics Express*, vol. 26, pp. 30202–30230, November 2018.
8. D. M. Kita, J. Michon, S. G. Johnson, and J. Hu, "Are slot and sub-wavelength grating waveguides better than strip waveguides for sensing?," *Optica*, vol. 5, pp. 1046–1054, August 2018.
9. F. Wang,* J. Lee, D. J. Phillips, S. G. Holliday, S.-L. Chua, J. Bravo-Abad, J. D. Joannopoulos, M. Soljačić, S. G. Johnson, and H. O. Everitt, "A high-efficiency regime for gas-phase terahertz lasers," *Proceedings of the National Academy of Sciences*, vol. 115, pp. 6614–6619, June 2018.
10. Y. Yang, A. Massuda, C. Roques-Carmes, S. E. Kooi, T. Christensen, S. G. Johnson, J. D. Joannopoulos, O. D. Miller, I. Kaminer, and M. Soljačić, "Maximal spontaneous photon emission and energy loss from free electrons," *Nature Physics*, vol. 14, pp. 894–899, June 2018.
11. B. Liu, J. D. Joannopoulos, S. G. Johnson, and L. Lu, "Generalized Gilat-Raubenheimer method for density-of-states calculation in photonic crystals," *Journal of Optics*, vol. 20, p. 044005, February 2018.
12. O. D. Miller, O. Ilic, T. Christensen, M. T. H. Reid, H. A. Atwater, J. D. Joannopoulos, M. Soljačić, and S. G. Johnson, "Limits to the optical response of graphene and two-dimensional materials," *Nano Letters*, August 2017.
13. A. Pick,* B. Zhen, O. D. Miller, C. W. Hsu, F. Hernandez, A. W. Rodriguez, M. Soljačić, and S. G. Johnson, "General theory of spontaneous emission near exceptional points," *Optics Express*, vol. 25, pp. 12325–12348, May 2017.
14. Y. E. Lee,* O. D. Miller, M. T. H. Reid, S. G. Johnson, and N. X. Fang, "Computational inverse design of non-intuitive illumination patterns to maximize optical force or torque," *Optics Express*, vol. 25, pp. 6757–6766, March 2017.
15. D. Liu, B. Zhen, L. Ge, F. Hernandez, A. Pick, S. Burkhardt, M. Liertzer, S. Rotter, and S. G. Johnson, "Symmetry, stability, and computation of degenerate lasing modes," *Physical Review A*, vol. 95, p. 023835, February 2017.
16. H. Zhou, B. Zhen, C. W. Hsu, O. D. Miller, S. G. Johnson, J. D. Joannopoulos, and M. Soljačić, "Perfect single-sided radiation and absorption without mirrors," *Optica*, vol. 3, pp. 1079–1086, September 2016.

17. E. L. Anquillare, O. D. Miller, C. W. Hsu, B. G. DeLacy, J. D. Joannopoulos, S. G. Johnson, and M. Soljačić, "Efficient, designable, and broad-bandwidth optical extinction via aspect-ratio-tailored silver nanodisks," *Optics Express*, vol. 24, pp. 10806–10816, May 2016.
18. O. D. Miller, A. G. Polimeridis, M. T. H. Reid, C. W. Hsu, B. G. DeLacy, J. D. Joannopoulos, M. Soljačić, and S. G. Johnson, "Fundamental limits to the optical response in absorptive systems," *Optics Express*, vol. 24, pp. 3329–3364, February 2016.
19. Z. Lin, X. Liang, M. Lončar, S. G. Johnson, and A. W. Rodriguez, "Cavity-enhanced second harmonic generation via nonlinear-overlap optimization," *Optica*, vol. 3, pp. 233–238, February 2016.
20. L. Lu, C. Fang, L. Fu, S. G. Johnson, J. D. Joannopoulos, and M. Soljačić, "Symmetry-protected topological photonic crystal in three dimensions," *Nature Physics*, January 2016. Published online ahead of print.
21. O. D. Miller, S. G. Johnson, and A. W. Rodriguez, "Shape-independent limits to near-field radiative heat transfer," *Physical Review Letters*, vol. 115, p. 204302, November 2015.
22. A. Cerjan, A. Pick,* Y. Chong, S. G. Johnson, and A. D. Stone, "Quantitative test of general theories of the intrinsic laser linewidth," *Optics Express*, vol. 23, pp. 28316–28340, November 2015.
23. A. G. Polimeridis, M. T. H. Reid, W. Jin, S. G. Johnson, J. K. White, and A. W. Rodriguez, "Fluctuating volume-current formulation of electromagnetic fluctuations in inhomogeneous media: Incandescence and luminescence in arbitrary geometries," *Physical Review B*, vol. 92, p. 134202, October 2015.
24. Z. Lin, S. G. Johnson, A. W. Rodriguez, and M. Lončar, "Design of diamond microcavities for single photon frequency down-conversion," *Optics Express*, vol. 23, pp. 25279–25294, September 2015.
25. A. Pick,* A. Cerjan, D. Liu, A. W. Rodriguez, A. D. Stone, Y. D. Chong, and S. G. Johnson, "Ab-initio multimode linewidth theory for arbitrary inhomogeneous laser cavities," *Physical Review A*, vol. 91, p. 063806, June 2015.
26. M. T. H. Reid and S. G. Johnson, "Efficient computation of power, force, and torque in BEM scattering calculations," *IEEE Transactions on Antennas and Propagation*, vol. PP, pp. 1–11, June 2015.
27. C. W. Hsu, O. D. Miller, S. G. Johnson, and M. Soljačić, "Optimization of sharp and viewing-angle-independent structural color," *Optics Express*, vol. 23, pp. 9516–9526, April 2015.
28. B. G. DeLacy, O. D. Miller, C. W. Hsu, Z. Zander, S. Lacey, R. Yagloski, A. W. Fountain, E. Valdes, E. Anquillare, M. Soljačić, S. G. Johnson, and J. D. Joannopoulos, "Coherent plasmon–exciton coupling in silver platelet-J-aggregate nanocomposites," *Nano Letters*, March 2015. Published online before print.

29. C. Khandekar, A. Pick, S. G. Johnson, and A. W. Rodriguez, "Radiative heat transfer in nonlinear Kerr media," *Physical Review B*, vol. 91, p. 115406, March 2015.

30. L. J. Wong, B. Freelon, T. Rohwer, N. Gedik, and S. G. Johnson, "All-optical three-dimensional electron pulse compression," *New Journal of Physics*, vol. 17, p. 013051, January 2015.

31. A. W. Rodriguez, P.-C. Hui, D. P. Woolf, S. G. Johnson, M. Lončar, and F. Capasso, "Classical and fluctuation-induced electromagnetic interactions in micron-scale systems: designer bonding, antibonding, and Casimir forces," *Annalen der Physik*, vol. 527, pp. 45–80, January 2015.

32. A. G. Polimeridis, M. T. H. Reid, S. G. Johnson, J. K. White, and A. W. Rodriguez, "On the computation of power in volume integral equation formulations," *IEEE Transactions on Antennas and Propagation*, vol. 63, pp. 611–620, December 2014.

33. H. Men, K. Y. K. Lee, R. M. Freund, J. Peraire, and S. G. Johnson, "Robust topology optimization of three-dimensional photonic-crystal band-gap structures," *Optics Express*, vol. 22, pp. 22632–22648, September 2014.

34. M. T. H. Reid, J. K. White, and S. G. Johnson, "Generalized Taylor–Duffy method for efficient evaluation of Galerkin integrals in boundary-element method computations," *IEEE Transactions on Antennas and Propagation*, vol. 63, pp. 195–209, November 2014.

35. A. Welters, Y. Avniel, and S. G. Johnson, "Speed-of-light limitations in passive linear media," arXiv:1405.0238, *Physical Review A,* vol. 90, p. 023847, August 2014.

36. S. Esterhazy, D. Liu,* M. Liertzer, A. Cerjan, L. Ge, K. G. Makris, A. D. Stone, J. M. Melenk, S. G. Johnson, and S. Rotter, "A scalable numerical approach for the steady-state ab-initio laser theory," arXiv:1312.2488, *Physical Review A,* vol. 90, p. 023816, August 2014.

37. C. W. Hsu, B. G. DeLacy, S. G. Johnson, J. D. Joannopoulos, and M. Soljačić, "Theoretical criteria for scattering dark states in nanostructured particles," *Nano Letters*, vol. 14, pp. 2783–2788, May 2014.

38. Z. Lin, T. Alcorn, M. Lončar, S. G. Johnson, and A. W. Rodriguez, "High-efficiency degenerate four-wave mixing in triply resonant nanobeam cavities," *Physical Review A*, vol. 89, p. 053839, May 2014.

39. O. D. Miller, S. G. Johnson, and A. W. Rodriguez, "The effectiveness of thin films in lieu of hyperbolic metamaterials in the near field," *Physical Review Letters*, vol. 112, p. 157402, April 2014.

40. O. D. Miller, C. W. Hsu, M. T. H. Reid, W. Qiu, B. G. DeLacy, J. D. Joannopoulos, M. Soljačić, and S. G. Johnson, "Fundamental limits to extinction by metallic nanoparticles," *Physical Review Letters*, vol. 112, p. 123903, March 2014.

41. Y. Shen, D. Ye, I. Celanovic, S. G. Johnson, J. D. Joannopoulos, , and M. Soljačić, "Optical broadband angular selectivity," *Science*, vol. 343, pp. 1499–1501, March 2014.

42. L. J. Wong, F. X. Kärtner, and S. G. Johnson, "Improved beam waist formula for ultrashort, tightly focused linearly, radially, and azimuthally polarized laser pulses in free space," *Optics Letters*, vol. 39, pp. 1258–1261, February 2014.

43. X. Liang* and S. G. Johnson, "Formulation for scalable optimization of microcavities via the frequency-averaged local density of states," *Optics Express*, vol. 21, pp. 30812–30841, December 2013.

44. A. W. Rodriguez, M. T. H. Reid, F. Intravaia, A. Woolf, D. A. R. Dalvit, F. Capasso, and S. G. Johnson, "Geometry-induced Casimir suspension of oblate bodies in fluids," *Physical Review Letters*, vol. 111, p. 180402, November 2013.

45. J. J. Kaufman, R. Ottman, G. Tao, S. Shabahang, E.-H. Banaei, X. Liang, S. G. Johnson, Y. Fink, R. Chakrabarti, and A. F. Abouraddy, "In-fiber production of polymeric particles for biosensing and encapsulation," *Proceedings of the National Academy of Sciences*, vol. 110, pp. 15549–15554, September 2013.

46. B. G. DeLacy, W. Qiu, M. Soljačić, C. W. Hsu, O. D. Miller, S. G. Johnson, and J. D. Joannopoulos, "Layer-by-layer self-assembly of plexcitonic nanoparticles," *Optics Express*, vol. 21, pp. 19103–19112, August 2013.

47. R. Movassagh and S. G. Johnson, "Optical Bernoulli forces," *Physical Review A*, vol. 88, p. 023829, August 2013.

48. B. Zhen, S.-L. Chua, J. Lee, A. W. Rodriguez, X. Liang, S. G. Johnson, J. D. Joannopoulos, M. Soljačić, and O. Shapira, "Enabling enhanced emission and low-threshold lasing of organic molecules using special Fano resonances of macroscopic photonic crystals," *Proceedings of the National Academy of Sciences*, vol. 110, pp. 13711–13716, August 2013.

49. M. T. H. Reid,* J. White, and S. G. Johnson, "Fluctuating surface currents: An algorithm for efficient prediction of Casimir interactions among arbitrary materials in arbitrary geometries.," *Physical Review A*, vol. 88, p. 022514, August 2013.

50. A. W. Rodriguez, M. T. H. Reid, and S. G. Johnson, "Fluctuating surface-current formulation of radiative heat transfer: Theory and applications," *Physical Review B*, vol. 88, p. 054305, August 2013.

51. C. W. Hsu, B. Zhen, S.-L. Chua, S. G. Johnson, J. D. Joannopoulos, and M. Soljačić, "Bloch surface eigenstates within the radiation continuum," Light: Science & Applications, vol. 2, p. e84, July 2013. Invited paper.

52. C. W. Hsu, B. Zhen, J. Lee, S.-L. Chua, S. G. Johnson, J. D. Joannopoulos, and M. Soljačić, "Observation of trapped light within the radiation continuum," *Nature*, vol. 499, pp. 188–191, July 2013.

53. P.-C. Hui, D. Woolf, E. Iwase, Y.-I. Sohn, D. Ramos, M. Khan, A. W. Rodriguez, S. G. Johnson, F. Capasso, and M. Lončar, "Optical bistability with a repulsive optical force in coupled silicon photonic crystal membranes," *Applied Physics Letters*, vol. 103, p. 021102, July 2013.

54. A. Gumennik, L. Wei, G. Lestoquoy, A. M. Stolyarov, X. Jia, P. H. Rekemeyer, M. J. Smith, X. Liang, B. J.-B. Grena, S. G. Johnson, S. Gradečak, A. F. Abouraddy, J. D. Joannopoulos, and Y. Fink, "Silicon-in-silica spheres via axial thermal gradient in-fibre capillary instabilities," *Nature Communications*, vol. 4, p. 2216, July 2013.

55. D. Liu,* L. H. Gabrielli, M. Lipson, and S. G. Johnson, "Transformation inverse design," *Optics Express*, vol. 21, pp. 14223–14243, June 2013.

56. J. Zou, Z. Marcet, A. W. Rodriguez, M. T. H. Reid, A. P. McCauley, I. I. Kravchenko, T. Lu, Y. Bao, S. G. Johnson, and H. B. Chan, "Casimir forces on a silicon micromechanical chip," *Nature Communications*, vol. 4, p. 1845, May 2013.

57. D. Woolf, P.-C. Hui, E. Iwase, M. Khan, A. W. Rodriguez, P. Deotare, I. Bulu, S. G. Johnson, F. Capasso, and M. Lončar, "Optomechanical and photothermal interactions in suspended photonic crystal membranes," *Optics Express*, vol. 21, pp. 7258–7275, March 2013.

58. A. W. Rodriguez, M. T. H. Reid, J. Varela, J. D. Joannopoulos, F. Capasso, and S. G. Johnson, "Anomalous near-field heat transfer between a cylinder and a perforated surface," *Physical Review Letters*, vol. 110, p. 014301, January 2013.

59. D. Shemuly, Z. M. Ruff, A. M. Stolyarov, G. Spektor, S. G. Johnson, Y. Fink, and O. Shapira, "Asymmetric wave propagation in planar chiral fibers," *Optics Express*, vol. 21, pp. 1465–1472, January 2013.

60. A. W. Rodriguez, M. T. H. Reid, and S. G. Johnson, "Fluctuating surface-current formulation of radiative heat transfer for arbitrary geometries," *Physical Review B*, vol. 86, p. 220302(R), December 2012.

61. L. Lu, L. L. Cheong, H. I. Smith, S. G. Johnson, J. D. Joannopoulos, and M. Soljačić, "Three-dimensional photonic crystals by large-area membrane stacking," *Optics Letters*, vol. 37, pp. 4726–4728, November 2012.

62. L. H. Gabrielli, D. Liu, S. G. Johnson, and M. Lipson, "On-chip transformation optics for multimode waveguide bends," *Nature Communications*, vol. 3, p. 1217, November 2012.

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179. M. Skorobogatiy, M. Ibanescu, S. G. Johnson, O. Weiseberg, T. D. Engeness, M. Soljacic, S. A. Jacobs, and Y. Fink, "Analysis of general geometric scaling perturbations in a transmitting waveguide. The fundamental connection between polarization mode dispersion and group-velocity dispersion," *J. Opt. Soc. Am B,* vol. 19, 2867–2875 (2002).

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196. R. L. Morrison, A. L. Lentine, S. G. Johnson, and W. H. Knox, "Design and demonstration of a high-speed, multichannel, optical-sampling oscilloscope," *Appl. Optics,* vol. 35, 1187–1194 (1996).

197. W. M. Soyars and S. G. Johnson, "Simulating the Tevatron liquid Helium satellite refrigerators," *Advances in Cryogenic Engineering,* vol. 39, 1231–1235 (1994).

Refereed Conference Publications

1. K. K. Lee,* A. Farjadpour,* Y. Avniel, J. D. Joannopoulos, and S. G. Johnson, "A tale of two limits: fundamental properties of photonic-crystal fibers," *Proc. SPIE,* vol. 6901, 69010K, January 2008. Invited paper.

2. M. L. Povinelli, M. Loncar, E. J. Smythe, M. Ibanescu, S. G. Johnson, F. Capasso, and J. D. Joannopoulos, "Enhancement mechanisms for optical forces in integrated optics," *Proc. SPIE,* vol. 6326, 632609 (2006).

3. A. Farjadpour,* D. Roundy, A. Rodriguez, M. Ibanescu, P. Bermel, J. D. Joannopoulos, S. G. Johnson, and G. W. Burr, "Improving accuracy by subpixel smoothing in FDTD," *Proc. SPIE,* vol. 6322, 63220G (2006).

4. M. L. Povinelli, S. G. Johnson, and J. D. Joannopoulos, "Tunable time delays in photonic-crystal waveguides," *Proc. SPIE,* vol. 6128, p 61280R (2006).

5. M. Ibanescu, M. Soljacic, S. G. Johnson, and J. D. Joannopoulos, "Ultra-flat bands in two-dimensional photonic crystals, *Proc. SPIE,* vol. 6128, p 612808 (2006).

6. P. T. Rakich, H. Sotobayashi, J. T. Gopinath, J. W. Sickler, C. W. Wong, S. G. Johnson, M. Qi, E. Lidorikis, H. I. Smith, J. D. Joannopoulos, and E. P. Ippen, "Broadband optical studies of 1-D and 3-D photonic crystals," *Proc. SPIE,* vol. 6017, p 601702 (2005). Invited paper.

7. M. L. Povinelli, S. G. Johnson, and J. D. Joannopoulos, "High-index-contrast, photonic-band-edge waveguides for tunable time delays," *Proc. SPIE,* vol. 5926, p 59620D (2005).

8. C. W. Wong, X. Yang, P. T. Rakich, S. G. Johnson, M. Qi, Y. Jeon, G. Barbasthatis, and S.-G. Kim, "Strain-tunable photonic bandgap microcavity waveguides in silicon at 1.55 μm," *Proc. SPIE,* vol. 5511, 156–164 (2004).

9. M. Skorobogatiy, S. A. Jacobs, S. G. Johnson, M. Meunier, and Y. Fink, "Modeling the impact of manufacturing imperfections on photonic crystal device performance; design of perturbation-tolerant PBG components," *Proc. SPIE,* vol. 5450, 161–172 (2004).

10. C. Luo, S. G. Johnson, M. Soljacic, J. D. Joannopoulos, and J. B. Pendry, "Novel optical phenomena with photonic crystals," *Proc. SPIE,* vol. 5166, 207–219 (2004).

11. E. Lidorikis, M. L. Povinelli, S. G. Johnson, M. Soljacic, M. Ibanescu, Y. Fink, and J. D. Joannopoulos, "Modeling of nanophotonics," *Proc. SPIE,* vol. 5255, 7–19 (2003). Invited.

12. M. Soljacic, M. Ibanescu, C. Luo, S. G. Johnson, S. Fan, Y. Fink, and J. D. Joannopoulos, "All-optical switching using optical bistability in nonlinear photonic crystals," *Proc. SPIE,* vol. 5000, 200–214 (2003). Invited.

13. S. G. Johnson, M. L. Povinelli, P. Bienstman, M. Skorobogatiy, M. Soljacic, M.Ibanescu, E. Lidorikis, and J. D. Joannopoulos, "Coupling, scattering, and perturbation theory: Semi-analytical analyses of photonic-crystal waveguides," in *Proc. 5th Intl. Conf. On Transparent Optical Networks and 2nd European Symp. On Photonic Crystals,* vol. 1, 103–198 (2003). Invited.

14. S. G. Johnson, M. Ibanescu, M. A. Skorobogatiy, O. Weisberg, T. D. Engeness, M. Soljacic, S. A. Jacobs, J. D. Joannopoulos, and Y. Fink, "Breaking the glass ceiling: Hollow OmniGuide fibers," *Proc. SPIE,* vol. 4655, 1–15 (2002).

15. M. Soljacic, S. G. Johnson, S. Fan, M. Ibanescu, E. P. Ippen, and J. D. Joannopoulos, "Enhancement of phase sensitivity by exploring slow light in photonic crystals," *Proc. SPIE,* vol. 4870, 248–258 (2002).

16. E. K. Chow, S.-Y. Lin, S. G. Johnson, and J. D. Joannopoulos, "Transmission measurement of quality factor in two-dimensional photonic-crystal microcavity," *Proc. SPIE,* vol. 4646, 199–204 (2002).

17. S. G. Johnson, M. L. Povinelli, and J. D. Joannopoulos, "New photonic crystal system for integrated optics," *Proc. SPIE,* vol. 4532, 167–179 (2001). Invited.

18. E. K. Chow, S.-Y. Lin, S. G. Johnson, J. D. Joannopoulos, J. A. Bur, and P. R. Villeneuve, "Demonstration of high waveguide bending efficiency (>90%) in a photonic-crystal slab at 1.5-μm wavelengths," *Proc. SPIE,* vol. 4283, 453–461 (2001).

19. M. Frigo and S. G. Johnson, "FFTW: An adaptive software architecture for the FFT," *Proc. Intl. Conf. Acoustics Speech Signal Process. 1998,* vol. 3, 1381–1384 (1998).

20. R. L. Morrison, S. G. Johnson, A. L. Lentine, and W. H. Knox, "Multichannel optical oscilloscope for sampling broadband free-space optoelectronic circuits," *Proc. SPIE,* vol. 2692, 158–163 (1996).

Invited Presentations

- "Adventures in code generation," JuliaCon 2019, Baltimore (July 2019).
- "Deterministic models of randomness in electromagnetic systems," NEMO 2019, Cambridge MA (May 2019).
- "Large-scale Optimization in Nanophotonics," University of Toronto Computational Science and Engineering Symposium (May 2019).
- "Real physics from 'unphysical' simulations," Computational Aspects of Time Dependent Electromagnetic Wave Problems in Complex Materials, ICERM (June 2018).
- "Theory and optimization of slowly varying electromagnetic metasurfaces," IPMS 2018, Malta (May 2018).
- "How Strongly Can Light and Matter Interact?," Basic Research Forum, US Army Research Center, Arlington VA (September 2017).
- "Simulations Aren't Just Experiments: The Role of Analysis in Photonics Computation," Metamaterials 2017, Marseille (August 2017).
- "Nonlinear models of lasers, noise, and the SALT equations," WAVES 2017, UMN (May 2017).
- "Large-scale optimization for photonic design," Emerging Topics in Optics, UMN (April 2017).
- "Bounds on Light-Matter Interactions," Applied Math Colloquium, NJIT (March 2017).
- "From Virtual Photons to Quantum Pinwheels: Fluctuation Effects in Nanophotonics," Novel Optical Materials, IMA (March 2017).
- "Nonlinear resonances and the SALT model of lasing," Mathematical and Computational Aspects of Maxwell's Equations, Durham University (July 2015).
- "Limits (or Targets) of Metamaterials: Bounds on Light-Matter Interactions," Metamaterials Beyond Photonics, ICMS (June 2016).
- "Nonlinear models of lasers, noise, and the SALT equations," SIAM Conference on Mathematical Aspects of Materials, Philadelphia (May 2016).
- "What's new with Maxwell's equations," MIT Physics Faculty Lunch (March 2016).
- "Fluctuation phenomena in optics," Applied Mathematics Colloqiuim, Imperial College (March 2016).
- "Analysis of fluctuation phenomena in optics," Applied Math Seminar, U. WA (2015).
- "Julia and Python," Python APAC, Taipei (June 2015).
- "Shape-independent upper limits to the optical response of lossy media," Mathematics of Novel Materials, Institut Mittag–Leffler (June 2015).
- "The mathematics of lasers: From nonlinear eigenproblems to linear noise," AIMS seminar, Northeastern University (Oct 2014).
- "Hot topics in thermal radiation," MIT Physics Colloquium (Sept 2014).
- "Crossing Language Barriers with Julia, SciPy, and IPython," Keynote Speaker: 7th European Conference on Python in Science, EuroScipy (August 2014).
- "Johnson-Nyquist Noise in Nanophotonics," Physics Colloquium, Institute of Physics, Federal University of Dio de Janeiro (July 2014).

- Short Course (4 Lecturers): "Photonic Crystals and Nanophotonics," Winter School on Modern Optics, University of Campinas, Brazil (July-Aug 2014).
- "Nonlinear Laser linewidths in the SALT framework," 44th Physics of Quantum Electronics Conference, Snowbird UT (January 2014).
- "Poking Holes in the Invisbility Cloak," Chez Pierre Seminar Series, MIT Physics (Sept 2013).
- "Formulating optimization problems for inverse design in nanophotonics," Photnoic Crylstals School, Advanced School in Technical Advances (ENSTA ParisTech) (April 2013).
- "Mathematical forumations of radiative heat transfer," Nanyang Technological University, Physics & Applied Physics Seminar, Singapore (January 2013).
- "Numerical methods for fluctuation interactions," 3 one-hour lectures: Pan-American Advanced Institute: Frontiers of Casimir Physics, Indiana University (October 2012).
- "On the limits of invisibility," CRM-ISM (Centre de Recherches Math. —Inst des Scis Math) Colloquium, McGill University (March 2012).
- "When PML isn't P," CRM Applied Mathematics Seminar (March 2012).
- "Casimir forces in complex geometries: Numerical methods and applications," Casimir Physics School Workshop, Lorentz Center School: Intern Center for Workshops in the Sciences, the Netherlands (March 2012).
- "Virtual photons at the nanoscale: The world of electromagnetic fluctuations," Joint Atomic Physics & Quantum Optics Colloquium, Harvard (Feb. 2012).
- "On the limits of invisibility: From cloaking to computation," Physics Dept Colloquium, Northeastern University (October 2012).
- "Photonic crystals: A crash course, from bandgaps to fibers," SPIE (Intern Soc for Optics & Photocis) Photonics West 2012, San Francisco (Jan 2012).
- Course in photonic crystals: Dibartolo Summer School, Ettore Majorana Fnd and Centre for Scientific Culture (July 2012).
- "Photonic crystals: A crash course, from bandgaps to fibers," SPIE Photonics West 2011, San Francisco (Jan 2011).
- "Waves from nothing: Modeling fluctuation interactions," Columbia Applied Math Colloquium (Nov 2010).
- "Waves from nothing: Modeling fluctuation interactions," MIT Applied Math Colloquium (Oct 2010).
- :Combining computation with analysis: The universality of resonance," Institute of Physics Society, Photon 10 Conference (August 2010).
- "Photonic crystals: A crash course, from bandgaps to fibers," SPIE Photonics West 2011, San Francisco (Aug 2010).
- "EM effects and dosimetry," State-of-the-Sciences Series (on Blast Injury Dosimetry), Chantilly, VA (June 2010).
- "Computational Nanophotonics," International Center for Theoretical Physics (Trieste, Italy), Spring College on Computational Nanoscience (May 2010).
- "When PML isn't P: Limitations of Absorbing Layers for Modeling Wave Equations," Cornell Applied Math Colloquium (April 2010).

- "Blast-induced Electromagnetic Pulses in the Brain from Bone Piezoelectricity," 159th meeting of the Acoustical Society of America and NOISE-CON 2010; Baltimore, MD (April 2010).
- "Universal descriptions of resonant processes, from linear filters to nonlinear frequency conversion," Los Alamos National Laboratory, Center for Nonlinear Science "Quantum Lunch" seminar series (Jan. 2010).
- "Photonic crystals: A crash course," SPIE Photonics West (Jan. 2010).
- "Modeling quantum fluctuations and forces in macroscopic dielectric structures," Multi-scale Materials Modeling, Texas A&M (Dec. 2009).
- "Numerical Methods for Casimir Interactions," New Frontiers in Casimir Force Control, Santa Fe, NM (Sep. 2009).
- "Geometry-independent methods to compute Casimir forces," 9th Conf. On Quantum Field Theory Under the Influence of External Conditions, Univ. OK, Norman OK (Sep. 2009).
- "Photonic Crystals: A Crash Course," SPIE Optics + Photonics, San Diego (August 2009).
- "Blast-induced electromagnetic fields in the brain," International State-of-the-Science Meeting on Non-Impact, Blast-Induced Mild Traumatic Brain Injury, Herndon, VA (May 2009).
- "Universal descriptions of resonant processes, from linear optical filters to nonlinear frequency conversion," Columbia University Optics Seminar (2009).
- "Virtual photons in imaginary time: Computing Casimir forces in new geometries," APS March Meeting, Pittsburgh (2009).
- "Photonic Crystals: A Crash Course, " SPIE Photonics West, San Jose (2009).
- "FFTW and Software Architectures to Mitigate Hardware Complexity," Symposium on Computing Challenges, Kavli Institute at Cornell University (Oct. 2008).
- "Photonic Crystals: A Crash Course," SPIE Optics + Photonics, San Diego (Aug. 2008).
- "Virtual photons in imaginary time: Computing Casimir forces in new geometries," The Theory and Practice of Fluctuation-Induced Interactions, Kavli Institute for Theoretical Physics, UC Santa Barbara (Aug. 2008).
- "Rigorous conditions for guided modes in photonic-crystal fibers and microstructured waveguides," Intl. Conf. Appl. Math., Hong Kong (June 2008).
- "How microcavities change nonlinear optics," Chinese Academy of Sciences Institute of Semiconductor Research, Beijing (May 2008).
- "Virtual photons in imaginary time: Casimir forces in nanophotonic media," Optics and Optoelectronics Seminar, Stanford University (May 2008).
- "Why does a waveguide guide?" MIT Physical Mathematics Seminar (Apr. 2008).
- "Unusual Casimir interactions in non-planar geometries: Opportunities and Challenges," Gordon Conference on Mechanical Systems in the Quantum Regime, Ventura CA (Feb. 2008).
- "A Tale of Two Limits: Fundamental Properties of Photonic-Crystal Fibers," SPIE Photonics West, San Jose (Jan. 2008).

- "Photonic Crystals: A Crash Course," SPIE Photonics West, San Jose (Jan. 2008).
- "What Maxwell didn't know about his own equations: Periodic surprises in nanophotonic media," OSA Lecture series, INAOEP, Mexico (Jan. 2008).
- "Photonic Crystals: A Crash Course," SPIE Optics and Photonics, San Diego (August 2007).
- "Photonic Crystals and Their Applications," Advanced Photon Source Colloquium, Argonne National Laboratories (July 2007).
- "Robust Design of Slow-Light Tapers in Periodic Waveguides," presented by Almir Mutapcic, SIAM Conference on Control and Its Applications, San Francisco (June 2007).
- "Computation and Design of Photonic Crystals," Chinese Academy of Sciences Engineering Colloquium, Beijing (June 2007).
- "The Magic of Periodicity in Electromagnetism: Photonic Crystals, Defects, and Quasicrystals," Workshop on Symbolic Dynamics and Engineering Applications, Boston University (June 2007).
- "Photonic crystals: From waves to photons," University of Toronto Cross-border Workshop on Laser Science, Toronto (May 2007).
- "Quantum effects in photonics: Single-photon switches and Casimir forces," Cornell Photonics Seminar series, Cornell (October 2006).
- "Computational Photonics: Frequency and Time-domain Methods," Cornell Nanoscale Facility Fall Workshop, Cornell (October 2006).
- "Photonic Crystals: From Order to Disorder," Europhysical Conference on Defects in Insulating Materials, Milan, Italy (July 2006).
- "From Pixels to Photons: Large Effects from Small Perturbations in Nanophotonics," Asia-Pacific Conference on Transducers and Micro-Nano Technology, Singapore (June 2006).
- "Virtual photons in imaginary time: Computing Casimir forces," Conf. on Synergy between Experiment and Computation in Nanoscale Science, Harvard (June 2006).
- "Perturbative Methods in Nanophotonics," Advanced Computational Electromagnetics Workshop, Boston Univ. (May 2006).
- "Effects of bandgaps on roughness losses: correcting the volume-current method," Intl. Conf. on Mat. for Adv. Tech., Singapore (July 2005).
- "Photonic crystals: From order to disorder," Intl. Symp. on Photonic and Electromag. Crystal Structures VI, Crete (June 2005).
- "Design and Disorder in Photonic Crystals," MIT Center for Integrated Photonics Systems annual meeting, (May 2005).
- "FFTW: The Fastest Fourier Transform in the West," Computational Research in Boston, Cambridge, MA (April 2005).
- "Surface roughness in photonic crystals," Nanophotonics for Information Syst. Topical Meeting, San Diego, CA (April 2005).
- "Photonic crystals: A crash course in designer electromagnetism," IEEE Lasers and Electro-optics Soc. workshop on photonic crystals, MIT Lincoln Labs (Mar. 2005).

- "Deviations from periodicity in photonic crystals," Science Colloquium series, IBM Almaden Research, San Jose, CA (February 2005).
- "FFTW: Toward a minimial compositional framework for high-performance FFTs," Conf. on Scalable Approaches to High Performance and High Productivity Computing, Bertinoro, Italy (Sep. 2004).
- "When photonic-crystal waveguides go bad," Intl. Symp. on Photonic and Electromag. Crystal Structures V, Kyoto, Japan (March 2004).
- "The design and modeling of microstructured optical fiber," Opt. Fiber Commun. Conf. and Expo., Los Angeles (Feb. 2004).
- "Understanding Broken Symmetry in Photonic Crystals: Semi-analytical approaches to disorder and slow tapers," Nat. Taiwan Normal University, Taiwan (Oct. 2003).
- "Photonic crystals: Perfect except for the imperfections," Stanford Photonics Symposium, Stanford (September 2003).
- "Imperfect photonic-crystal waveguides," Intl. Symp. on Mod. Opt. and Appl., Bandung, Indonesia (August 2003).
- "Coupling, Scattering, and Perturbation Theory: Semi-analytical Analyses of Photonic-Crystal Waveguides," Europ. Symp. on Photonic Crystals, Warsaw (June 2003).
- "Photonic crystals: Periodic surprises in electromagnetism," Columbia University, New York (April 2003).
- "Photonic crystals: New opportunities for controlling the flow of light," DARPA/MTO PBG Topical Meeting, San Diego (January 2003).
- "Coupling to photonic-crystal waveguides with adiabatic tapers," MRS Fall Meeting, Boston (December 2002).
- "High-Q cavities without a complete photonic band gap," ETOPIM: Electrical Transport and Optical Properties of Inhomogeneous Media, Salt Lake City (July 2002).
- "Iterative eigensolver techniques and Maxwell's equations in periodic systems," PIERS: Progress In Electromagnetics Research Symposium, Cambridge MA (July 2002).
- "Breaking the glass ceiling: Hollow OmniGuide fibers," ESPC: European Symposium on Photonic Crystals, Warsaw (April 2002).
- "Minimizing scattering losses in photonic-crystal slabs," Materials Research Society (MRS) meeting, San Francisco, CA (April 2002).
- "Breaking the Glass Ceiling: Hollow OmniGuide Fibers," SPIE Optoelectronics 2002, San Jose, CA (January 2002).
- "A Novel Photonic-Crystal System for Integrated Optics," ITCom 2001, Denver, Colorado (August 2001).
- "Modeling Linear Waveguides in Photonic Crystals," 9th Intl. Workshop on Optical Waveguide Theory and Numerical Modeling, Paderborn, Germany (April 2001).
- "FFTW, FFTs, Portability, and Performance," Conference for Computational Physics, Australia (December 2000).

- "FFTW: An Adaptive Software Architecture for the FFT," Cornell University, Ithaca NY (February 2000).
- "Photonic Crystal Slabs: Hybrid Structures for Integrated Optics," Corning Research, Corning NY (February 2000).
- "Designing a Photonic Crystal Slab," Sandia Natl. Laboratory, Albuquerque NM (August 1999).
- "The Fastest Fourier Transform in the West," ICIAM '99 (Wilkinson Prize Symposium), Edinburgh, Scotland (July 1999).
- "Photonic Crystals: Theory and Applications," Northeastern University, Boston MA (May 1999).

Patents

- "Composite photonic crystals," U.S. Patent #6134043: S. G. Johnson, S. Fan, P. R. Villeneuve, L. Kolodziejski, and J. D. Joannopoulos.
- "Optical waveguide crossings," U.S. Patent #6198860: S. G. Johnson, S. Fan, P. R Villeneuve, C. Manolatou, H. A. Haus, and J. D. Joannopoulos.
- "Electromagnetic mode conversion in photonic crystal multimode waveguides," U.S. Patent #6563981: O. Weisberg, S. G. Johnson, J. D. Joannopoulos, M. Shapiro, Y. Fink, and M. Ibanescu.
- "Electromagnetic mode conversion in photonic crystal multimode waveguides," U.S. Patent #6728439: O. Weisberg, S. G. Johnson, J. D. Joannopoulos, M. Shapiro, Y. Fink, M. Ibanescu.
- "Periodic dielectric structure having a complete three-dimensional photonic band gap," U.S. Patent #6597851: S. G. Johnson, M. L. Povinelli, and J. D. Joannopoulos.
- "Low-loss photonic crystal waveguide having large core radius," U.S. Patent #6625364: S. G. Johnson, M. Ibanescu, O. Weisberg, Y. Fink, J. D. Joannopoulos, M. Skorobogatiy, T. Engeness, M. Soljacic, and S. A. Jacobs.
- "Low-loss photonic crystal waveguide having large core radius" [continuation of #6625364], U.S. Patent #7072553: S. G. Johnson et al. (as for #6625364).
- "High index-contrast fiber waveguides and applications" [TIR devices], U.S. Patent #6788864: R. U. Ahmad, M. Soljacic, M. Ibanescu, T. Engeness, M. Skorobogatiy, S. G. Johnson, O. Weisberg, Y. Fink, L. Pressman, W. A. King, E. Anderson, and J. D. Joannopoulos.
- "High index-contrast fiber waveguides and applications" [codrawing rules] U.S. Patent #6801698: W. A. King, E. Anderson, M. Soljacic, M. Ibanescu, T. Engeness, M. Skorobogatiy, S. G. Johnson, O. Weisberg, Y. Fink, R. Ahmad, and L. Pressman.
- "High index-contrast fiber waveguides and applications" [axial modulation] U.S. Patent #6898359: M. Soljacic, M. Ibanescu, T. Engeness, M. Skorobogatiy, S. G. Johnson, O. Weisberg, Y. Fink, R. Ahmad, L. Pressman, W. King, E. Anderson, and J. D. Joannopoulos.
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