

## Herbert Graves Winful

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**Date of Birth:** December 3, 1952

**Citizenship:** USA, Ghana

### Education:

Ph.D. (Electrical Engineering) University of Southern California - 1981  
M.S. (Electrical Engineering) University of Southern California - 1977  
S.B. (Electrical Engineering) Massachusetts Institute of Technology - 1975

### Main Fields of Interest:

Nonlinear optics, integrated optics, nonlinear photonic bandgap structures, semiconductor laser physics, nonlinear dynamics of coupled lasers, nonlinear fiber optics, ultrafast optics, physics of tunneling, metamaterials

### Current and Previous Positions:

Joseph E. and Anne P. Rowe Professor of Electrical Engineering (2019-present)  
Arthur F. Thurnau Professor (1992-present)  
Professor  
Department of Electrical Engineering and Computer Science  
University of Michigan  
September 1992 - present

Associate Professor  
Department of Electrical Engineering and Computer Science  
University of Michigan  
January 1987 - August 1992

Principal Member of Technical Staff  
GTE Laboratories, Inc.  
Waltham, MA  
September 1980 - December 1986

**Patents:** "Optical Pulse Generator," U. S. Patent #4,497,535

"Methods of and Apparatus for Optical Spatial Scanning,"  
U. S. Patent #4,687,286

**Honors and Awards:**

Joseph E. and Anne P. Rowe Professorship in Electrical Engineering, 2019  
Raymond J. and Monica E. Schultz Outreach and Diversity Award, 2018  
Life Fellow, IEEE, 2018  
Provost's Teaching Innovation Prize, 2017  
College of Engineering Service Excellence Award, 2014  
EECS Outstanding Achievement Award, 2014  
Fellow, American Physical Society, 2002  
Fellow, National Society of Black Physicists, 2008  
Sigma Xi Distinguished Lecturer, 1997-1999  
Amoco/University Faculty Teaching Award, 1993-1994  
Tau Beta Pi Outstanding Professor Award, 1993-1994  
Faculty Advisor of the Year, 1993-1994  
Fellow, Institute of Electrical and Electronics Engineers, 1994  
Professor of the Year, EECS Department, 1993  
Arthur F. Thurnau Professorship, 1992  
State of Michigan Teaching Excellence Award, 1991  
Professor of the Year, EECS Department, 1991  
Teaching Excellence Award, College of Engineering, 1990  
Fellow, Optical Society of America, 1990  
Presidential Young Investigator, 1987  
Member, The Electromagnetics Academy

**Service:**

Department, College, and University  
Faculty Advisor, Eta Kappa Nu  
Undergraduate Counselor  
EECS Department Executive Committee  
ES&E Division Executive Committee  
Electrical and Systems Engineering Curriculum Committee  
Advisory Committee, Minority Engineering Program Office  
College Curriculum Committee  
Research Policies Committee  
Committee on Honorary Degrees  
Rackham Executive Board  
Chair, EE Graduate Financial Aid  
Chair, EECS Undergraduate Committee  
College of Engineering Freshman Advisor  
Faculty Senate Assembly  
Advisory Board on Intercollegiate Athletics  
Academic Performance Committee  
Faculty Advisor, Society of Minority Engineers and Scientists- Grad  
Chair, Committee for an Inclusive Department  
Rackham Faculty Ally for Diversity

Department DEI Lead  
Rackham Mentoring Committee (MORE)  
STEM-Africa Committee

#### Professional

General Chair, OSA Conference on Nonlinear Optics, 2017  
Program Chair, OSA Conference on Nonlinear Optics, 2015  
Organizer and Chair, "From Ultrafast to Extreme Light" Mourou@70, 2014  
Organizer and Chair, "Nonlinear Optics at 50", 2011  
Vice-chair, Gordon Conference on Nonlinear Optics and Lasers, 2003  
Guest Editor, IEEE Journal of Selected Topics in Quantum Electronics, 2003  
Member, OSA R.W. Wood Prize Committee 2001-  
Member, OSA Member and Education Services Council 2001-  
Member, Program Committee, OSA Workshop on Novel Solitons and  
Nonlinear Periodic Structures, 1998  
Member, Program Committee, Integrated Photonics Research (OSA), 1994-1995  
Chairman, Nonlinear Optics Technical Group, Optical Society of America, 1991-  
1993  
Co-Chairman, Topical Meeting on Nonlinear Dynamics in Optical Systems  
(OSA), Alpbach, Austria 1992  
Member, Program Committee, International Conference on Nonlinear Optics,  
1992  
Member, Program Committee, Topical Meeting on Nonlinear Guided Wave  
Phenomena (OSA), 1991  
Member, Program Committee, International Conference on Quantum Electronics  
and Laser Science, 1991  
Co-Chairman, SPIE Conference on Laser Noise, 1990  
Member, Program Committee, Nonlinear Dynamics in Optical Systems (OSA),  
1990  
Member, Program Committee, Nonlinear Guided Wave Phenomena (OSA), 1989  
Member, Advisory Board, Electrical and Communication Systems Division of  
the National Science Foundation  
Member, NSF Panel on Communications and Computational Systems  
Member, Planning Committee for the Center for High Technology and New  
Materials, ICTP, Trieste, Italy, 1988  
Director, Winter College on Laser Physics, Trieste, Italy, 1988  
Member, Program Committee, 3rd International Conference on Optical  
Bistability, 1985

#### Teaching: Some Courses Taught

EECS 331 Electromagnetics I (W'87, F'89, F'90, W'91, F'92)  
EECS 332 Electromagnetics II (W'88)  
EECS 334 Introduction to Optics  
EECS 537 Integrated and Guided Wave Optics (F'87, F'88, F'91)  
EECS 539 Lasers and Electro-optics II (W'89)  
EECS 634 Nonlinear Optics (W'90, W'92, F'02, W'03, W'04)  
EECS 538 Optical Waves in Crystals (Sp'96, F'01)  
EECS 210 Electrical Engineering I (W'99)  
EECS 215 Introduction to Electronic Circuits

EECS 230 Electromagnetics I  
EECS 330 Electromagnetics II  
UARTS 250 Creative Process

New Courses Introduced

EECS 634 Nonlinear Optics  
UARTS 250 Creative Process

**Doctoral Students:**

Sandra Feldman (Co-Chairman)  
Graduated August 1991  
Shawe-Shiuan Wang  
Graduated May 1991  
Dun Liu  
Graduated August 1992  
Lutfur Rahman  
Graduated February 1993  
Sujatha Ramanujan  
Graduated July 1995  
Donnell Walton  
Graduated June 1996  
Yuan-Hwang Liao  
Graduated May 1997  
Simin Feng  
Graduated December 2000  
Alranzo Boh Ruffin (Co-Chairman)  
Graduated May 2001  
Victor Perlin  
Graduated January 2003  
Guoqing Chang (Co-Chairman)  
Graduated October 2006  
Ravi Hegde  
Graduated September 2008  
Tsai-wei Wu  
Graduated May 2010  
Chao Zhang  
Graduated August 2013  
Cheng Zhu (Co-Chairman)  
Graduated September 2014  
Shang-Hua Yang (Co-Chairman)  
Graduated July 2016  
Sudarshan Sivaramakrishnan  
Graduated September 2017  
Mark Dong (Co-Chairman)  
Graduated May 2018

**Publications:** (Cited ~ 8500 times; h-index ~46 on Google Scholar)

1. E. Garmire, J. H. Marburger, S. D. Allen and H. G. Winful, "Transient response of hybrid bistable optical devices," *Appl. Phys. Lett.*, 34, 374 (1979).
2. H. G. Winful, J. H. Marburger, and E. Garmire, "Theory of bistability in nonlinear distributed feedback structures," *Appl. Phys. Lett.*, 35, 376 (1979).
3. H. G. Winful and J. H. Marburger, "Hysteresis and optical bistability in degenerate four-wave mixing," *Appl. Phys. Lett.*, 36, 613 (1980).
4. J. C. Diels, W. C. Wang and H. G. Winful, "Dynamics of the nonlinear four-wave mixing interaction," *Appl. Phys. B.*, 26, 105 (1981).
5. H. G. Winful, "Optical Bistability in periodic structures and in degenerate four-wave mixing," *Proceedings International Conference Excited States and Multiresonant Nonlinear Optical Processing in Solids*, Aussois, France, 1981.
6. H. G. Winful and M. Dagenais, "Excited states and multiresonant nonlinear optical processes in solids," *Appl. Opt.*, 20, 3599 (1981).
7. H. G. Winful and G. D. Cooperman, "Self-pulsing and chaos in distributed feedback bistable optical devices," *Appl. Phys. Lett.*, 40, 298 (1982).
8. H. G. Winful, "Nonlinear reflection in cholesteric liquid crystals: mirrorless optical bistability," *Phys. Rev. Lett.*, 49, 1179 (1982).
9. H. G. Winful and G. I. Stegeman, "Periodic structures for nonlinear guided-wave optics," *Proceedings of the NSF Grantee-User Meeting on Optical Communications Systems*, 212, 1983.
10. M. Dagenais and H. G. Winful, "Low power transverse optical bistability near bound excitons in cadmium sulfide," *Appl. Phys. Lett.*, 44, 574 (1984).
11. G. Cooperman, M. Dagenais and H. G. Winful, "Switching behavior of bistable resonators filled with two-level atoms," in *Optical Bistability II*, C. M. Bowden, H. M. Gibbs, and S. L. McCall, eds. (Plenum Press, New York, 1984).
12. H. G. Winful, "Optical bistability in cholesteric liquid crystals," in *Optical Bistability II*, C. M. Bowden, H. M. Gibbs, and S. L. McCall, eds. (Plenum Press, New York, 1984).
13. G. I. Stegeman, C. Liao and H. G. Winful, "Distributed feedback bistability in channel waveguides," in *Optical Bistability II*, C. M. Bowden, H. M. Gibbs, and S. L. McCall, eds. (Plenum Press, New York, 1984).
14. M. Dagenais and H. G. Winful, "Low power optical bistability near bound excitons in cadmium sulfide," in *Optical Bistability II*, C. M. Bowden, H. M. Gibbs, and S. L. McCall, eds. (Plenum Press, New York, 1984).

15. G. I. Stegeman, C. T. Seaton, and H. G. Winful, "Applications of guided waves to nonlinear optics," *Phil. Trans. Roy. Soc. London*, A313, 321 (1984).
16. W. M. Hetherington, C. T. Seaton, G. I. Stegeman, and H. G. Winful, "Nonlinear third order integrated optics," in *Integrated Optics*, G.- P. Nolting and R. Ulrich, eds. (Springer-Verlag, Berlin, 1985).
17. H. G. Winful, "Pulse compression in optical fiber filters," *Appl. Phys. Lett.*, 46, 527 (1985).
18. H. G. Winful and G. I. Stegeman, "Applications of nonlinear periodic structures in guided wave optics," *Proc. SPIE Int. Conf. on Integrated Opt.*, 517 (1985).
19. C. Liao, G. Stegeman, C. T. Seaton, R. Shoemaker, J. D. Valera, and H. G. Winful, "Nonlinear distributed waveguide couplers," *J. Opt. Soc. Am. A.*, 2, 490 (1985).
20. H. G. Winful, "Self-induced polarization changes in birefringent optical fibers," *Appl. Phys. Lett.*, 47, 213 (1985).
21. H. G. Winful, Y. C. Chen, and J. M. Liu, "Subharmonic bifurcations and irregular pulsing behavior of modulated semiconductor lasers," *Appl. Phys. Lett.*, 47, 208 (1985).
22. C. T. Seaton, G. I. Stegeman, and H. G. Winful, "Nonlinear guided wave applications," *Opt. Engin.*, 24, 593 (1985).
23. M. Dagenais, A. Surkis, W. Sharfin, and H. G. Winful, "Intracavity optical bistability due to thermally induced changes in absorption and refraction," *IEEE J. Quantum Electron.*, 21, 1458 (1985).
24. H. G. Winful and Y. C. Chen, "Effect of noise on the bifurcation to chaos in modulated diode lasers," in *Optical Instabilities*, R. W. Boyd, M. G. Raymer, and L. M. Narducci, eds. (Cambridge University Press, 1985).
25. C. T. Seaton, G. I. Stegeman, and H. G. Winful, "Intensity-dependent guided wave phenomena," *Proc. SPIE*, 578, 143 (1985).
26. H. G. Winful, "Polarization instabilities in birefringent nonlinear media: application to fiber-optics devices," *Opt. Lett.*, 11, 33 (1986).
27. H. G. Winful, Y. C. Chen, and J. M. Liu, "Frequency locking, quasiperiodicity, and chaos in modulated self-pulsing semiconductor lasers," *Appl. Phys. Lett.*, 48, 616 (1986).
28. H. G. Winful, Y. C. Chen, and J. M. Liu, "Quasiperiodic route to chaos in self-pulsing semiconductor lasers under large signal modulation," in *Optical Bistability III*, H. M. Gibbs and N. Peyghambarian, eds. (Springer-Verlag, Berlin, 1986).
29. H. G. Winful, "Polarization instabilities in birefringent nonlinear media," in *Optical Bistability III*, H. M. Gibbs and N. Peyghambarian, eds. (Springer-Verlag, Berlin, 1986).

30. H. G. Winful and A. Hu, "Intensity discrimination with twisted birefringent optical fibers," *Opt. Lett.*, 11, 668 (1986).
31. H. G. Winful, "Nonlinear optical phenomena in single mode fibers," in *Optical Fiber Transmission*, E. E. Basch, ed. (Howard Sams, Indianapolis, 1987).
32. J. E. Sipe and H. G. Winful, "Nonlinear Schroedinger solitons in a periodic structure," *Opt. Lett.*, 13, 132 (1988).
33. S. S. Wang and H. G. Winful, "Dynamics of phase-locked semiconductor laser arrays," *Appl. Phys. Lett.*, 52, 1774 (1988).
34. N. Yu, R. K. DeFreez, D. J. Bossert, R. A. Elliott, H. G. Winful, and D. F. Welch, "Observation of sustained self-pulsation in CW operated flared Y-coupled laser arrays," *Electron. Lett.*, 24, 1203 (1988).
35. L. G. Rahman and H. G. Winful, "Optical properties of a quasi-periodic sequence of directional couplers," *Phys. Rev. A.*, 38, 4935 (1988).
36. H. G. Winful and S. S. Wang, "Stability of phase locking in coupled semiconductor laser arrays," *Appl. Phys. Lett.*, 53, 1894 (1988).
37. R. K. DeFreez, D. J. Bossert, N. Yu, R. A. Elliott, and H. G. Winful, "Spectral and picosecond temporal properties of flared guide Y-coupled phase-locked laser arrays," *Appl. Phys. Lett.*, 53, 2380 (1988).
38. R. K. DeFreez, D. J. Bossert, N. Yu, J. M. Hunt, H. Ximen, R. A. Elliott, N. W. Carlson, M. Lurie, G. A. Evans, J. M. Hammer, D. P. Bour, S. L. Palrey, R. Amantea, H. G. Winful, and S. S. Wang, "Picosecond optical properties of a grating surface emitting two-dimensional coherent laser array," *Photonics Tech. Lett.*, 1, 209 (1989).
39. S. Feldman, D. Weinberger, and H. G. Winful, "Observation of polarization instabilities and modulational gain in a low-birefringence optical fiber," *Opt. Lett.*, 15, 311 (1990).
40. H. Winful and L. Rahman, "Synchronized chaos and spatiotemporal chaos in arrays of coupled lasers," *Phys. Rev. Lett.*, 65, 1575 (1990).
41. D. Liu and H. G. Winful, "Parametric solitons: nonlinear propagation of coherently coupled pulses generated through four-photon mixing," *Opt. Lett.*, 16, 67 (1991).
42. H. G. Winful, R. Zamir, and S. F. Feldman, "Modulational instability in nonlinear periodic structures: implications for gap solitons," *Appl. Phys. Lett.*, 58, 1001 (1991).
43. G. Wilson, R. K. DeFreez, and H. G. Winful, "Modulation of twin-emitter semiconductor lasers beyond the frequency of relaxation oscillations," *Opt. Comm.*, 82, 293 (1991).

44. G. Wilson, R. K. DeFreez, and H. G. Winful, "Modulation of phased-array semiconductor lasers at K-band frequencies," *IEEE J. Quantum Electron.*, 27, 1696 (1991).
45. H. G. Winful, "Instabilities and chaos in phase-locked semiconductor laser arrays," in *Coherence and Quantum Optics VI*, J. Eberly, L. Mandel, E. Wolf, eds. (Plenum, NY, 1990).
46. N. Yu, R. K. DeFreez, D. J. Bossert, G. A. Wilson, R. A. Elliott, S. S. Wang, and H. G. Winful, "Spatiospectral and picosecond spatiotemporal properties of a broad area operating channeled-substrate-planar laser array," *Appl. Opt.*, 30, 2503 (1991).
47. P. K. Jakobsen, R. A. Indik, J. V. Moloney, A. C. Newell, H. G. Winful, and L. Rahman, "Diode-laser array modes: discrete and continuous models and their stability," *J. Opt. Soc. Am. B.*, 8, 1674 (1991).
48. H. G. Winful, "Instability threshold for an array of coupled semiconductor lasers," *Phys. Rev. A.*, 46, 6093 (1992).
49. H. G. Winful and D. T. Walton, "Passive mode locking through nonlinear coupling in a dual-core fiber laser," *Opt. Lett.*, 17, 1688 (1992).
50. H.G. Winful, S.S. Wang, R.K. Defreez, and N. Yu, "Spatiotemporal dynamics of semiconductor laser arrays," World Scientific Press, 1992.
51. D. T. Nichols and H. G. Winful, "The effect of nonlinear gain on the stability of evanescently coupled semiconductor laser arrays," *J. Appl. Phys.*, 73, 459 (1993).
52. S. S. Wang and H. G. Winful, "Propagation model for the dynamics of gain-guided semiconductor laser arrays," *J. Appl. Phys.*, 73, 462 (1993).
53. L. Rahman and H. G. Winful, "Improved coupled-mode theory for the dynamics of semiconductor laser arrays," *Opt. Lett.*, 18, 128 (1993).
54. D. T. Walton and H. G. Winful, "Passive mode locking with an active nonlinear directional coupler: positive group velocity dispersion," *Opt. Lett.*, 18, 720 (1993).
55. S. Ramanujan and H. G. Winful, "Dynamics of resonant optical waveguide semiconductor laser arrays," *Appl. Phys. Lett.*, 62, 3226 (1993).
56. S. Feldman, D. A. Weinberger, and H. G. Winful, "Polarization instabilities in a twisted birefringent optical fiber," *J. Opt. Soc. Am. B.*, 10, 1191 (1993).
57. H. G. Winful, S. Allen, and L. Rahman, "On the validity of the coupled oscillator model for laser array dynamics," *Opt. Lett.*, 18, 1810 (1993).
58. H. Winful, "Nonlinear Dynamics of Semiconductor Laser Arrays," in *Nonlinear Dynamics and Spatial Complexity in Optical Systems*, R. G. Harrison and J. S. Uppal, eds., SSUSP, (1993).



59. L. Rahman and H. G. Winful, "Dynamics of semiconductor laser arrays: a meanfield model," *IEEE J. Quantum Electron.*, 30, 1405, (1994).
60. S. F. Feldman, B. A. Moore, D. A. Weinberger, and H. G. Winful, "Additive pulse mode-locking using a birefringent optical fiber," *Opt. Comm.*, 105, 113 (1994).
61. S. Ramanujan, H. G. Winful, M. Felisky, R. DeFreez, D. Botez, M. Jansen, and P. Wiseman, "The temporal behavior of resonant-optical-waveguide phase-locked diode laser arrays," *Appl. Phys. Lett.*, 64, 827 (1994).
62. H. G. Winful and R. K. DeFreez, "Dynamics of coherent semiconductor laser arrays," in *Semiconductor Laser Arrays*, D. Botez, ed. (Cambridge University Press, 1994).
63. S. Ramanujan and H. G. Winful, "Spontaneous Emission Induced Filamentation in Flared Amplifiers," *IEEE J. Quantum Electron.*, 32, 784 (1996).
64. S. Ramanujan, G.P. Agrawal, J.M. Chwalek, and H. Winful, "Elliptical Polarization Emission from GaAlAs Laser Diodes in an External Cavity Configuration," *IEEE J. Quantum Electron.*, 32, 213 (1996).
65. S. Ramanujan and H.G. Winful, "Operation and stability of antiguided flared amplifiers," *Appl. Phys. Lett.*, 68, 2472 (1996).
66. H. Liao and H. G. Winful, "Dynamics of distributed-feedback fiber lasers: effect of nonlinear refraction," *Opt. Lett.*, 21, 471 (1996).
67. B. A. Malomed and H. G. Winful, "Stable solitons in two-component active systems," *Phys. Rev. E.*, 53, 5365 (1996).
68. Y. H. Liao and H. G. Winful, "Extremely high frequency self-pulsations in chirped-grating distributed feedback semiconductor lasers," *Appl. Phys. Lett.*, 69, 2989 (1996).
69. M. Krumpholz, H. G. Winful, and L. P. B. Katehi, "Nonlinear time-domain modeling by multiresolution time domain (MRTD)," *IEEE Trans. on Microwave Theory and Technol.*, 45, 385 (1997).
70. S. Feng, H. G. Winful, and R. W. Hellwarth, "Gouy shift and temporal reshaping of focused single-cycle electromagnetic pulses," *Opt. Lett.*, 23, 385 (1998).
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72. M. A. Franke and H. G. Winful, "All-optical switching in an angled-grating semiconductor Bragg amplifier," *IEEE Photon. Technol. Lett.*, 11, 815-817 (1999).
73. S. Hunsche, S. Feng, H. G. Winful, A. Leitenstorfer, M. C. Nuss, and E. P. Ippen, "Spatiotemporal focusing of single-cycle light pulses," *J. Opt. Soc. Am. A.*, 16, 2025-2028 (1999).

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76. S. M. Feng and H. G. Winful, "Spatiotemporal structure of isodiffracting ultrashort electromagnetic pulses," *Phys. Rev. E.*, 61, 862-873 (2000).
77. V. E. Perlin and H. G. Winful, "Nonlinear pulse switching using long-period fiber gratings," *J. Lightwave Technol.*, 18, 329-333 (2000).
78. H. G. Winful and V. Perlin, "Raman gap solitons," *Phys. Rev. Lett.*, 84, 3586-3589 (2000).
79. Y. S. Lee, T. Meade, V. Perlin, H. Winful, T. B. Norris, and A. Galvanauskas, "Generation of narrow-band terahertz radiation via optical rectification of femtosecond pulses in periodically poled lithium niobate," *Appl. Phys. Lett.*, 76, 2505-2507 (2000).
80. S. M. Feng and H. G. Winful, "Cavity phase engineering for stable enhanced terahertz pulse trains," *J. Opt. Soc. Am. A.*, 17, 2096-2100 (2000).
81. V. E. Perlin and H. G. Winful, "Distributed feedback fiber Raman laser," *IEEE J. Quantum Electron.*, 37, 38-47 (2001).
82. S. M. Feng and H. G. Winful, "Physical origin of the Gouy phase shift," *Opt. Lett.*, 26, 485-487 (2001).
83. S. M. Feng and H. G. Winful, "High-order transverse modes of ultrashort isodiffracting pulses – art. no. 046602," *Phys. Rev. E.*, 6304, 6602-6611 (2001).
84. V. E. Perlin and H. G. Winful, "Nonlinear pulse switching using cross-phase modulation and fiber Bragg gratings," *IEEE Photon. Technol. Lett.*, 13, 960-962 (2001).
85. V. E. Perlin and H. G. Winful, "Stimulated Raman scattering in nonlinear periodic structures – art. no. 043804," *Phys. Rev. A*, 6404, 3804-3819 (2001).
86. V. E. Perlin and H. G. Winful, "All-fiber wavelength conversion using cross-phase modulation and Bragg gratings," *IEEE Photon. Technol. Lett.*, 14, 176-178 (2002).
87. V. E. Perlin and H. G. Winful, "Optimal design of flat-gain wide-band fiber Raman amplifiers," *J. Lightwave Technol.*, 20, 250 (2002).
88. V. E. Perlin and H. G. Winful, "On distributed Raman amplification for ultrabroad-band long-haul WDM systems," *J. Lightwave Technol.*, 20, 409 (2002).

89. V. E. Perlin and H. G. Winful, "Optimizing the noise performance of broad-band WDM systems with distributed Raman amplification," *IEEE Photon. Technol. Lett.*, 14, 1199-1201 (2002).
90. H. G. Winful, "Energy storage in superluminal barrier tunneling: Origin of the "Hartman effect", *Opt. Express* 10, 1491 (2002).
91. H. G. Winful, "Nature of superluminal barrier tunneling," *Phys. Rev. Lett.* 90, 023901 (2003).
92. H. G. Winful, "Physical mechanism for apparent superluminality in barrier tunneling," *IEEE J. Sel. Topics in Quantum Electron.*, 9, 17 (2003).
93. G. C. Chang, T. B. Norris, and H. G. Winful, "Optimization of supercontinuum generation in photonic crystal fibers for pulse compression," *Opt. Lett.* 28, 546, (2003).
94. H. G. Winful, "Mechanism for 'superluminal' tunneling," *Nature* 424, 638 (2003).
95. H. G. Winful, "Group delay, stored energy, and the tunneling of evanescent electromagnetic waves," *Phys. Rev. E*, 68, 016615 (2003)
96. H. G. Winful, "Delay time and the Hartman effect in quantum tunneling" *Phys. Rev. Lett.* 91, 260401 (2003).
97. H. G. Winful and V. E. Perlin, "Raman gap solitons in nonlinear photonic crystals," in *Nonlinear Photonic Crystals* (Springer, Berlin, 2003) R. E. Slusher and B. J. Eggleton (eds.) pp. 61-71.
98. G. Q. Chang, A. Galvanauskas, H. G. Winful, and T. B. Norris, "Dependence of parabolic pulse amplification on stimulated Raman scattering and gain bandwidth," *Opt. Lett.* 29, 2647 (2004).
99. H. G. Winful, M. Ngom, and N. Litchinitser, "Relation between quantum tunneling times for relativistic particles," *Phys. Rev. A* 70, 052112 (2004).
100. R. S. Hegde and H. G. Winful, "Zero-n gap soliton," *Opt. Lett.* 30, 1852 (2005).
101. G. Q. Chang, H. G. Winful, A. Galvanauskas, and T. B. Norris, "Self-similar parabolic beam generation and propagation," *Phys. Rev. E* 72, 016609 (2005).
102. R. S. Hegde and H. G. Winful, "Optical bistability in periodic nonlinear structures containing left handed materials," *Microwave and Opt. Technol. Lett.* 46, 528 (2005).
103. H. G. Winful, "Apparent superluminality and the generalized Hartman effect in double-barrier tunneling," *Phys. Rev. E* 72, 046608 (2005).
104. J. Yang and H. G. Winful, "A generalized eikonal treatment of the Gouy phase shift," *Opt. Lett.* 31, 104 (2006).

105. G. Q. Chang, H. G. Winful, A. Galvanauskas, and T. Norris, "Incoherent self-similarities of the coupled amplified nonlinear Schrödinger equations," *Phys. Rev. E* **73**, 016616 (2006).
106. H. G. Winful, "The meaning of group delay in barrier tunneling: a re-examination of superluminal group velocities," *New J. Phys.* **8**, 101 (2006).
107. H. G. Winful, "Tunneling time, the Hartman effect, and superluminality: a proposed resolution of an old paradox," *Phys. Rep.* **436**, 1 (2006).
108. C. Xia, M. Kumar, M.-Y. Cheng, R. S. Hegde, M. N. Islam, A. Galvanauskas, H. G. Winful, F. L. Terry, Jr., M. J. Freeman, M. Poulain, and G. Mazé, "Power scalable mid-infrared supercontinuum generation in ZBLAN fluoride fibers with up to 1.3 watts time-averaged power," *Opt. Express*, **15**, 865 (2007).
109. S. Doiron, A. Hache, and H. G. Winful, "Direct space-time observation of pulse tunneling in and electromagnetic band gap," *Phys. Rev. A* **76**, 023823 (2007).
110. H. G. Winful, "Comment on 'Alternative perspective on photonic tunneling' and 'Theoretical evidence for the superluminality of evanescent waves'," *Phys. Rev. A* **76**, 057803 (2007).
111. T. W. Wu, L. Dong, and H. G. Winful, "Bend performance of leakage channel fibers," *Opt. Express*, **16**, 4278 (2008).
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### **Some Invited Conference Papers:**

1. M. Dagenais and H. G. Winful, "Bound-exciton optical nonlinearity, transverse bistability and self-pulsation in cadmium sulfide," Optical Society of America, Annual Meeting, New Orleans, October 1, 1983.
2. G. I. Stegeman and H. G. Winful, "Applications of guided waves to nonlinear optics," Royal Society Meeting on Optical Bistability, Dynamic Nonlinearity, and Photonic Logic, London, March 1984.
3. H. G. Winful, "New models for optical chaos," at U. S.- Japan Seminar on Coherence, Incoherence, and Chaos in Quantum Electronics, Nara, Japan, August/September 1984.
4. H. G. Winful and Y. C. Chen, "Effect of noise on the bifurcations to chaos in a modulated diode laser," Topical Meeting on Instability and Dynamics of Lasers and Nonlinear Optical Systems, Rochester, New York, June 1985.
5. W. M. Hetherington II, C. T. Seaton, G. I. Stegeman and H. G. Winful, "Nonlinear third order integrated optics," 3rd European Conference on Integrated Optics, Berlin, May 1985.
6. H. G. Winful, "Polarization instabilities in birefringent nonlinear media," 10th International Quantum Electronic Conference, Baltimore, May 1987.
7. H. G. Winful, "Instabilities in birefringent and periodic optical fibers," 10th European Conference on Optical Communications, Brighton, UK, September 1988.
8. H. G. Winful, "Self-synchronization of active waveguide devices," 13th European Workshop on Optical Waveguide Theory, Arundel, UK, September 11, 1988.
9. H. G. Winful, "Self-organization and spatio-temporal chaos," National Society of Black Physicists, AT&T Bell Labs, April 6, 1989.
10. H. G. Winful, "Nonlinear dynamics of semiconductor superlattices," First Michigan-San Diego Joint Workshop on Nonlinear Patterns and Dynamics, Ann Arbor, MI, May 7, 1989.
11. H. G. Winful, "Nonlinear dynamics of phase-locked semiconductor laser arrays," Gordon Research Conference on Nonlinear Optics and Lasers, Wolfeboro, NH, July 1989.
12. H. G. Winful, "The dynamic behavior of laser arrays," International Conference on Lasers '89, New Orleans, LA, December 1989.
13. H. G. Winful, "Nonlinear dynamics of semiconductor laser arrays," SPIE Conference on Optics, Electro-Optics and Laser Applications in Science and Engineering, Los Angeles, CA, January 1990.

14. H. G. Winful, "Self-organization and spatio-temporal chaos in semiconductor laser arrays," US-USSR Symposium on Physics of Optical Phenomena, Irvine, CA, January 1990.
15. H. G. Winful, "Laser arrays as coupled nonlinear oscillators," Space-Time Complexity in Nonlinear Optics, Tucson, AZ, March 1990.
16. H. G. Winful, "On the collective dynamics of semiconductor laser arrays," Integrated Photonics Research Conference, Hilton Head, SC, March 1990.
17. H. G. Winful, "Deterministic beam position noise in arrays of coupled lasers," Nonlinear Optics Conference, Kauai, HI, July 1990.
18. H. G. Winful, "Nonlinear dynamics of phase-locked semiconductor laser arrays," 2nd Bouchet Conference on Physics and Technology, Accra, Ghana, August 1990.
19. H. G. Winful, "Self-organization and spatiotemporal chaos in semiconductor laser arrays," 1st Experimental Chaos Conference, Arlington, VA, October, 1991.
20. H. G. Winful, "Nonlinear dynamics of semiconductor laser arrays," Lasers 95, St. Petersburg, Russia, August 1995.
21. H.G. Winful, "Nonlinear dynamics of semiconductor laser arrays," Optical Society of America, Annual Meeting, Rochester, NY, October 20-29, 1996.
22. H.G. Winful, "Nonlinear dynamics of semiconductor laser arrays," Lasers and Electro-Optics Society, Annual Meeting, Boston, MA, November 18-21, 1996.
23. H.G. Winful, A.B. Ruffin, J.V. Rudd, S. Feng, J. Whitaker, "Direct observation of the Gouy phase with single-cycle terahertz pulses," Invited Paper, Conference on Lasers and Electrooptics, (CLEO '99), Baltimore MD, May 27, 1999.
24. H. G. Winful and V. Perlin, "Stimulated Raman scattering in photonic bandgap structures," Invited Paper, Annual Meeting of the Optical Society of America, Orlando FL, 2002.
25. H. G. Winful, "The meaning of group delay in barrier tunneling: a re-examination of superluminal group velocities," Invited Paper, Slow and Fast Light Conference, Washington, DC, July 26, 2006.
26. H. G. Winful, "Do single photons tunnel faster than light?" Invited Paper, SPIE Conference on The Nature of Photons, San Diego, CA, August, 2007.
27. H. G. Winful, "A resolution of the tunneling time conundrum," Invited Paper, Physics of Quantum Electronics, Snowbird, UT, January 7, 2008.
28. H. G. Winful, "Tunneling time in frustrated total internal reflection," Invited Paper, Physics of Quantum Electronics, Snowbird, UT, January 6, 2009.
29. H. G. Winful, "Nonlinear phenomena in periodic structures," Nonlinear Optics at 50, Suzdal, Russia, 2011.

30. H. G. Winful, "Excursions in nonlinear periodic structures," George Stegeman Memorial Symposium, CREOL, University of Central Florida, January 7-8, 2016.