

CURRICULUM VITAE

James H. Churnside

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Education

Ph.D. - Department of Applied Physics and Electronic Science, Oregon Graduate Center
(now Oregon Health and Science University), Beaverton, Oregon 1978

B.S. - Physics, Mathematics and Computer Science, Whitworth College, Spokane,
Washington 1974

Selected Awards

Atomic Energy Commission Fellowship, 1973
Magna Cum Laude, Whitworth College, 1974
Wilson Clark Fellowship, 1976-1977
Distinguished Authorship Award, U.S. Dept. of Commerce, 1989 and 1998
Howard Vollum Prize, Oregon Graduate Institute, 1990
US Department of Commerce Bronze Medal, 1996 and 2007
World Meteorological Organization Vilho Vaisala Award, 2001
NOAA Administrator's Award, 2002
US Department of Commerce Silver Award, 2004

Professional Societies

Fellow, Optical Society of America
Atmospheric and Oceanic Optics Technical Group Vice Chair, 1990-1991, Chair,
1992-1993; Allen Prize Committee Member, 1993-1995, Chair, 1995
Member, SPIE
Member, American Geophysical Union
Member, The Oceanographic Society

Research Interests

The interaction of electrodynamic waves with geophysical fluids, and the applications of those interactions for remote sensing of the atmosphere and oceans. Of special interest are the characteristics of light scattered from the ocean surface and near-surface layer and applications to remote sensing of phytoplankton, zooplankton, and epipelagic fish schools.

Experience

- 2001 to present Physicist
NOAA Earth System Research Laboratory (Environmental Technology Laboratory before October 1, 2005)
- Currently developing NOAA Fish Lidar for airborne surveys of fish and applying the lidar to various fisheries research problems.
- 1991 to 2001 Chief, Ocean Remote Sensing Division
NOAA Environmental Technology Lab., Boulder, Colorado
- Managed a division of approximately 35 scientific and support staff and performed personal research in ocean optics. Division projects included high-frequency (HF) radar measurement of surface current and near-surface wind, low-frequency acoustic propagation modeling in the ocean, microwave radiometry of the sea surface and of the marine atmosphere, and optical sensing of the sea surface
- 1985 to 1991 Physicist
NOAA Wave Propagation Lab., Boulder, Colorado
- Developed theory for probability-density function of optical irradiance in the turbulent atmosphere and verified experimentally. Measured enhanced backscatter effect in the turbulent atmosphere. Developed several techniques to measure wind and refractive turbulence in the atmosphere using spatially filtered scintillations.
- 1979 to 1985 Member of the Technical Staff
The Aerospace corporation, Los Angeles, California
- Invented novel laser Doppler velocimeter. Developed and experimentally verified theory of laser speckle from a rotating target. Developed theory of second-harmonic generation on partially coherent light.
- 1978 to 1979 Postdoctoral Research Associate
Oregon Graduate Center, Beaverton, Oregon
- Measured statistics of irradiance for laser speckle plus glint after propagation through refractive turbulence in the atmosphere.
- 1974 to 1978 Research Assistant - Ph.D. Thesis Research
Oregon Graduate Center, Beaverton, Oregon

Publications

1. James H. Churnside and Charles M. McIntyre, "Averaged Threshold Receiver for Direct Detection of Optical Communications through the Lognormal Atmospheric Channel," *Appl. Opt.* **16** 2669-2676 (1977).
2. James H. Churnside and Charles M. McIntyre, "Signal Current Probability Distribution for Optical Heterodyne Receivers in the Turbulent Atmosphere. 1: Theory," *Appl. Opt.* **17**, 2141-2147 (1978).
3. James H. Churnside and Charles M. McIntyre, "Signal Current Probability Distribution for Optical Heterodyne Receivers in the Turbulent Atmosphere. 2: Experiment," *Appl. Opt.* **17**, 2148-2152 (1978).
4. James H. Churnside and Charles M. McIntyre, "Partial Tracking Optical Heterodyne Receiver Arrays," *J. Opt. Soc. Am.* **68**, 1672-1675 (1978).
5. James H. Churnside and Charles M. McIntyre, "Joint Signal Current Probability Distribution for Optical Heterodyne Receiver Arrays in the Turbulent Atmosphere," *Appl. Opt.* **18**, 2315-2322 (1979).
6. C. M. McIntyre, M. H. Lee, J. R. Kerr, and J. H. Churnside, "Enhanced Variance of Irradiance from Target Glint," *Appl. Opt.* **18**, 3211-3212 (1979).
7. James H. Churnside and Charles M. McIntyre, "Heterodyne Receivers for Atmospheric Optical Communications," *Appl. Opt.* **19**, 582-590 (1980).
8. C. M. McIntyre, M. H. Lee, and J. H. Churnside, "Statistics of Irradiance from a Diffuse Target Containing Multiple Glints," *J. Opt. Soc. Am.* **70**, 1084-1095 (1980).
9. James H. Churnside, "Optical Communications through a Dispersive Medium: A Performance Bound for Photocounting," *Appl. Opt.* **20**, 573-578 (1981).
10. J. H. Churnside and H. T. Yura, "Velocity Measurement using Laser Speckle Statistics," *Appl. Opt.* **20**, 3539-3541 (1981).
11. J. H. Churnside and H. T. Yura, "Laser Vector Velocimetry: A 3-D Technique." *Appl. Opt.* **21**, 845-850 (1982).
12. J. H. Churnside, "Speckle from a Rotating Diffuse Object," *J. Opt. Soc. Am.* **72**, 1464-1469 (1982).
13. J. H. Churnside and H. T. Yura, "Speckle Statistics of Atmospherically Backscattered Laser Light," *Appl. Opt.* **22**, 2559-2565 (1983).

14. James H. Churnside, "Laser Doppler Velocimetry by Modulating a CO₂ Laser with Backscattered Light," *Appl. Opt.* **23**, 61-66 (1984).

also reprinted in *Selected Papers on Interference, Interferometry, and Interferometric Metrology*, P. Hariharan and D. Malacara, eds. (SPIE Optical Engineering Press, Bellingham, Washington, 1995).
15. James H. Churnside, "Signal-to-Noise in a Backscatter Modulated Doppler Velocimeter," *Appl. Opt.* **23**, 2097-2106 (1984).
16. James H. Churnside, "Second Harmonic Generation using Partially Coherent Light," *Opt. Commun.* **51**, 207-212 (1984).

also reprinted in *Selected Papers on Resonant and Collective Phenomena in Quantum Optics*, G. S. Agarwal, ed. (SPIE Optical Engineering Press, Bellingham, Washington, 1994).
17. J. H. Churnside, M. T. Tavis, H. T. Yura, and G. A. Tyler, "Zernike Polynomial Expansion of Turbulence Induced Centroid Anisoplanatism," *Opt. Lett.* **10**, 258-260 (1985).
18. James H. Churnside, "Speckle Correlation Measurements using Clipped Intensity Signals," *Appl. Opt.* **24**, 2488-2489 (1985).
19. James H. Churnside and R. J. Hill, "Probability Density of Irradiance Scintillations for Strong Path-Integrated Refractive Turbulence," *J. Opt. Soc. Am. A*, **4** 727-733 (1987).
20. S. F. Clifford and James H. Churnside, "Refractive Turbulence Profiling using Synthetic Aperture Spatial Filtering of Scintillation," *Appl. Opt.* **26**, 1295-1303 (1987).
21. James H. Churnside and Richard J. Lataitis, "Angle-of-Arrival Fluctuations of a Reflected Beam in Atmospheric Turbulence," *J. Opt. Soc. Am. A* **4**, 1264-1272 (1987).
22. James H. Churnside and Steven F. Clifford, "The Lognormal-Rician Probability Density Function of Optical Scintillations in the Turbulent Atmosphere," *J. Opt. Soc. Am. A* **4**, 1923-1930 (1987).
23. R. J. Hill and J. H. Churnside, "Measured Statistics of Optical Scintillation in Strong Refractive Turbulence Relevant to Laser Eye Safety," *Health Phys.* **53**, 639-647 (1987).
24. Reginald J. Hill and James H. Churnside, "Observational Challenges of Strong Scintillations of Irradiance," *J. Opt. Soc. Am. A* **5**, 445-447 (1988).

25. James H. Churnside, Richard J. Lataitis, and Robert S. Lawrence, "Localized Measurements of Refractive Turbulence using Spatial Filtering of Scintillations," *Appl. Opt.* **27**, 2199-2213 (1988).
26. James H. Churnside and Steven F. Clifford, "Refractive Turbulence Profiling using Stellar Scintillation and Radar Wind Profiles," *Appl. Opt.* **27**, 4884-4890 (1988).
27. James H. Churnside, "Angle-of-Arrival Fluctuations of Retroreflected Light in the Turbulent Atmosphere," *J. Opt. Soc. Am. A* **6**, 275-279 (1989).
28. James H. Churnside, Reginald J. Hill, Giuliano Conforti, and Anna Consortini, "Aperture-Size and Bandwidth Requirements for Measuring Strong Scintillation in the Atmosphere," *Appl. Opt.* **28**, 4126-4132 (1989).
29. R. G. Frehlich and James H. Churnside, "Statistical Properties of Estimates of the Moments of Laser Scintillation," *J. Mod. Opt.* **36**, 1645-1659 (1989).
30. James H. Churnside and R. G. Frehlich, "Experimental Evaluation of the Log-Normally Modulated Rician and IK Models of Optical Scintillation in the Atmosphere," *J. Opt. Soc. Am. A* **6**, 1760-1766 (1989).
31. James H. Churnside, "Joint Probability Density Function of Irradiance Scintillations in the Turbulent Atmosphere," *J. Opt. Soc. Am.* **6**, 1931-1940 (1989).
32. James H. Churnside, "A Spectrum of Refractive Turbulence in the Turbulent Atmosphere," *J. Mod. Opt.* **37**, 13-16 (1990).
33. James H. Churnside and Richard J. Lataitis, "Wander of an Optical Beam in the Turbulent Atmosphere," *Appl. Opt.* **29**, 926-930 (1990).
34. J. H. Churnside and E. P. Gordov, "Sensitive Absorption Measurements using Amplitude Squeezed Light," *Atmos. Opt.* **4**, 131-136 (1991).
35. James H. Churnside, "Aperture Averaging of Optical Scintillations in the Turbulent Atmosphere," *Appl. Opt.* **30**, 1982-1994 (1991)
36. James H. Churnside and Phillip A. McGillivray, "Optical Properties of Several Pacific Fishes," *Appl. Opt.* **30**, 2925-2927 (1991).
37. James H. Churnside, Richard J. Lataitis, and James J. Wilson, "Two-Color Correlation of Atmospheric Scintillation," *Appl. Opt.* **31**, 4285-4290 (1992).
38. James H. Churnside and A. Jay Palmer, " Δk Lidar Sensing of Surface Waves in a Wave Tank," *Appl. Opt.* **32**, 339-342 (1993).

39. James H. Churnside and James J. Wilson, "Enhanced Backscatter of a Reflected Beam in Atmospheric Turbulence," *Appl. Opt.* **32**, 2651-2655 (1993).
40. E. P. Gordov, V. M. Orlovskii, A. G. Poteryaev, A. V. Khachatryan, and J. H. Churnside, "Hybrid Autodyne Lidar," *Atmos. Ocean. Opt.* **6**, 267-269 (1993).
41. A. Consortini, F. Cochetti, J. H. Churnside, and R. J. Hill, "Inner-Scale Effect on Irradiance Variance Measured for Weak-to-Strong Atmospheric Scintillation," *J. Opt. Soc. Am. A.* **10**, 2354-2362 (1993).
42. J. H. Churnside, "Image Jitter, Blur, and Scintillation Regarding the Retinal Hazards of Lasers," *Health Phys.* **66**, 159-162 (1994).
43. J. H. Churnside, T. A. Stermitz, and J. A. Schroeder, "Temperature Profiling with Neural Network Inversion of Microwave Radiometer Data," *J. Atmos. Oceanic. Technol.* **7**, 105-109 (1994).
44. J. H. Churnside and S. G. Hanson, "Effect of Penetration Depth and Swell-Generated Tilt on Delta-k Lidar Performance," *Appl. Opt.* **33**, 2363-2368 (1994).
45. S. G. Hanson, J. H. Churnside, and J. J. Wilson, "Remote Sensing of Wind Velocity and Strength of Refractive Turbulence using a Two-Spatial-Filter Receiver," *Appl. Opt.* **33**, 5859-5868 (1994).
46. J. H. Churnside, S. G. Hanson, and J. J. Wilson, "Determination of Ocean Wave Spectra from Images of Backscattered Incoherent Light," *Appl. Opt.* **34**, 962-968 (1995).
47. J. A. Shaw, J. B. Snider, J. H. Churnside, and M. D. Jacobson, "Comparison of Infrared Atmospheric Brightness Temperatures Measured by a Fourier Transform Spectrometer and a Filter Radiometer," *J. Atmos. Oceanic. Technol.* **12**, 1124-1128 (1995).
48. Y. Han, J. A. Shaw, J. H. Churnside, P. D. Brown, and S. A. Clough, "Infrared Spectral Radiance Measurements in the Tropical Pacific Atmosphere," *J. Geophys. Res.* **102**, 4353-4356 (1997).
49. J. A. Shaw and J. H. Churnside, "Fractal Laser Glints from the Ocean Surface," *J. Opt. Soc. Am. A* **14**, 1144-1150 (1997).
50. J. A. Shaw and J. H. Churnside, "Scanning-Laser Glint Measurements of Sea-Surface Slope Statistics," *Appl. Opt.* **36**, 4202-4213 (1997).
51. J. H. Churnside, J. J. Wilson, and V. V. Tatarskii, "Lidar Profiles of Fish Schools," *Appl. Opt.* **36**, 6011-6020 (1997).
52. J. H. Churnside, V. V. Tatarskii, and J. J. Wilson, "Oceanographic Lidar Attenuation Coefficients and Signal Fluctuations Measured from a Ship in the Southern California Bight," *Appl. Opt.* **37**, 3105-3112 (1998).

53. C. M. R. Platt, S. A. Young, P. J. Manson, G. R. Patterson, S. C. Marsden, R. T. Austin, and J. H. Churnside, "The Optical Properties of Equatorial Cirrus from Observations in the ARM Pilot Radiation Observation Experiment," *J. Atmos. Sci.* **55**, 1977-1996 (1998).
54. E. R. Westwater, Y. Han, J. B. Snider, J. H. Churnside, J. A. Shaw, M. J. Falls, C. N. Long, T. P. Ackerman, K. S. Gage, E. Ecklund, and A. Riddle, "Ground-Based Remote Sensor Observations during PROBE in the Tropical Western Pacific," *Bull. Am. Meteor. Soc.* **80**, 257-270 (1999).
55. K. Mitra and J. H. Churnside, "Transient Radiative Transfer Equation Applied to Oceanographic Lidar," *Appl. Opt.* **38**, 889-895 (1999).
56. J. A. Shaw, J. J. Bates, H. M. Zorn, and J. H. Churnside, "Observations of Downwelling Infrared Spectral Radiance at Mauna Loa, Hawaii during the 1997-1998 ENSO Event," *Geophys. Res. Lett.* **26**, 1727-1730 (1999).
57. H. M. Zorn, J. H. Churnside, and C. W. Oliver, "Laser Safety Thresholds for Cetaceans and Pinnipeds," *Marine Mammal Sci.* **16**, 186-200 (2000).
58. N. C. H. Lo, J. R. Hunter, and J. H. Churnside, "Modeling Statistical Performance of an Airborne Lidar Survey for Anchovy," *Fish. Bull.* **98**, 264-282 (2000).
59. J. H. Churnside, J. J. Wilson, and V. V. Tatarskii, "Airborne Lidar for Fisheries Applications," *Opt Eng.* **40**, 406-414 (2001).
60. J. H. Churnside, K. Sawada, and T. Okumura, "A Comparison of Airborne Lidar and Echo Sounder Performance in Fisheries," *J. Marine Acoust. Soc. Jpn.* **28**, 49-61 (2001).
61. J. A. Shaw, D. Cimini, E. R. Westwater, Y. Han, H. M. Zorn, and J. H. Churnside, "Scanning Infrared Radiometer for Measuring the Air-Sea Temperature Difference," *Appl. Opt.* **40**, 4807-4815 (2001).
62. E. D. Brown, J. H. Churnside, R. L. Collins, T. Veenstra, J. J. Wilson, and K. Abnett, "Remote Sensing of Capelin and Other Biological Features in the North Pacific Using Lidar and Video Technology," *ICES J. Mar. Sci.* **59**, 1120-1130 (2002).
63. J. H. Churnside, D. A. Demer, and B. Mahmoudi, "A Comparison of Lidar and Echosounder Measurements of Fish Schools in the Gulf of Mexico," *ICES J. Mar. Sci.* **60**, 147-154 (2003).
64. D. Cimini, J. A. Shaw, E. R. Westwater, Y. Han, V. Irisov, V. Leuski, and J. H. Churnside, "Air temperature profile and air/sea temperature difference measurements by infrared and microwave scanning radiometers," *Radio Sci.* **38**, 8045-8063. doi:10.1029/2002RS002632 (2003).

65. J. H. Churnside and J. J. Wilson, "Airborne lidar imaging of salmon," *Appl. Opt.* **43**, 1416-1424 (2004).
66. J. H. Churnside and L. A. Ostrovsky, "Lidar observation of a strongly nonlinear internal wave train in the Gulf of Alaska," *Int. J. Remote Sens.* **26**, 167-177 (2005).
67. J. A. Shaw, N. L. Seldomridge, D. L. Dunkle, P. W. Nugent, L. H. Spangler, J. J. Bromenshenk, C. B. Henderson, J. H. Churnside, and J. J. Wilson, "Polarization lidar measurements of honey bees in flight for locating land mines," *Opt. Express* **13**, 5853-5856 (2005).
68. E. J. Walsh, M. L. Banner, J. H. Churnside, J. A. Shaw, D. C. Vandemark, C. W. Wright, J. B. Jensen, and S. Lee, "Visual demonstration of three-scale sea-surface roughness under light wind conditions," *IEEE Trans. Geosci. Remote Sens.* **43**, 1751-1762 (2005).
69. J. H. Churnside and R. E. Thorne, "Comparison of airborne lidar measurements with 420 kHz echo-sounder measurements of zooplankton," *Appl. Opt.* **44**, 5504-5511 (2005).
70. E. Tenningen, J. H. Churnside, A. Slotte, and J. J. Wilson, "Lidar target-strength measurements on Northeast Atlantic mackerel (*Scomber scombrus*)," *ICES J. Mar. Sci.* **63**, 677-682 (2006).
71. D. W. Fahey, J. H. Churnside, J. W. Elkins, A. J. Gasiewski, K. H. Rosenlof, S. Summers, M. Aslaksen, T. A. Jacobs, J. D. Sellars, C. D. Jennison, L. C. Freuding, and M. Cooper, "Altair unmanned aircraft system achieves demonstration goals," *EOS* **87**, 197-201 (2006).
72. J. H. Churnside and J. W. Wilson, "Power spectrum and fractal dimension of laser backscattering from the ocean," *J. Opt. Soc. Am. A* **23**, 2829-2833 (2006).
73. P. Carrera, J. H. Churnside, G. Boyra, V. Marques, C. Scalabrin and A. Uriarte, "Comparison of airborne lidar with echosounders: a case study in the coastal Atlantic waters of southern Europe," *ICES J. Mar. Sci.* **63**, 1736-1750 (2006).
74. W. G. Pichel, J. H. Churnside, T. S. Veenstra, D. G. Foley, K. S. Friedman, R. E. Brainard, J. B. Nicoll, Q. Zheng, and P. Clemente-Colon, "Marine debris collects within the north Pacific subtropical convergence zone," *Mar. Pollut. Bull.* **54**, 1207-1211 (2007).
75. J. H. Churnside, "Polarization effects on oceanographic lidar," *Opt. Exp.* **16**, 1196-1207 (2008).
76. J. H. Churnside and J. J. Wilson, "Ocean color inferred from radiometers on low-flying aircraft," *Sensors* **8**, 860-876 (2008).
77. J. H. Churnside, H. E. Bravo, K. A. Naugolnykh, and I. M. Fuks, "Effects of underwater sound and surface ripples on scattered laser light," *Acoustic. J.* **54**, 244-250 (2008) (in Russian). *and Acoust. Phys.* **54**, 204-209 (2008) (in English).

78. J. H. Churnside, L. Ostrovsky, and T. Veenstra, "Thermal footprints of whales," *Oceanography* **22**, 206-209 (2009).
79. J. H. Churnside and P. L. Donaghay, "Thin scattering layers observed by airborne lidar," *ICES J. Mar. Sci.* **66**, 778-789 (2009).
80. J. H. Churnside, E. Tenningen, and J. J. Wilson, "Comparison of data-processing algorithms for the lidar detection of mackerel in the Norwegian Sea," *ICES J. Mar. Sci.* **66**, 1023-1028 (2009). doi:10.1093/icesjms/fsp026
81. J. H. Churnside, D. A. Demer, D. Griffith, R. L. Emmett, and R. D. Brodeur, "Comparisons of lidar, acoustic and trawl data on two scales in the northeast Pacific Ocean," *CalCOFI Rep.* **50**, 118-122 (2009).
82. J. H. Churnside, "Lidar signature from bubbles in the sea," *Opt. Exp.* **18**, 8294-8299 (2010).
83. M. A. Montes-Hugo, J. H. Churnside, R. W. Gould, R. A. Arnone, and R. Foy, "Spatial coherence between remotely sensed ocean color data and vertical distribution of lidar backscattering in coastal stratified waters," *Remote Sens. Environ.* **114**, 2584-2593 (2010). DOI: 10.1016/j.rse.2010.05.023.
84. J. H. Churnside, A. F. Sharov, and R. A. Richter, "Aerial surveys of fish in estuaries: a case study in Chesapeake Bay," *ICES J. Mar. Sci.* **in press**

Book Chapters

1. J. H. Churnside, "Optical Remote Sensing," in *Wave Propagation in Random Media (Scintillation)* V. I. Tatarskii, A. Ishimaru, and V. U. Zavorotny, eds. (SPIE, Bellingham, Washington and Techno House, Bristol, England, 1993) pp. 235-247.
2. J. H. Churnside and A. V. Smirnov, "Remote Sensing of Internal Waves in the Ocean," in *The Oceans: Physical-Chemical Dynamics and Human Impact*, S. K. Majumdar, E. W. Miller, G. S. Forbes, R. F. Schmaltz, and A. A. Panah, eds. (Pennsylvania Academy of Science, Easton, Pennsylvania, 1994) pp. 146-156.
3. D. Killinger, J. H. Churnside, and L. S. Rothman, "Atmospheric Optics," in *Handbook of Optics*, M. Bass, ed. (McGraw-Hill, New York, 1995) chap. 44.
4. Churnside, J. H., J. Horne, P. Adam, R. D. Brodeur, D. Reese, E. Brown, K. J. Benoit-Bird, and A. Kaltenberg (2009) "Combining techniques for remotely assessing pelagic nekton: getting the whole picture," in *The Future of Fisheries Science in North America*, R. J. Beamish and B. R. Rothschild eds. Springer, Berlin, pp. 345-356.
5. D. Killinger, J. H. Churnside, and L. S. Rothman, "Atmospheric Optics," in *Handbook of Optics, Third Edition, Volume V*, M. Bass, ed. (McGraw-Hill, New York, 2010) chap. 3.

Patents

1. J. H. Churnside, S. F. Clifford, and S. G. Hanson, "Single-Ended Dual Spatial Filter Detector for the Passive Measurement of Winds and Turbulence Aloft," U.S. Patent 5159407 (1992).
2. A. J. Bedard, Jr., J. H. Churnside, and R. T. Nishiyama, "Apparatus and Method for Reducing Acoustic or Electromagnetic Energy in the Vicinity of a Source," U.S. Patent 5393940 (1995).
3. J. H. Churnside, E. P. Gordov, and V. M. Orlovskii, "Autodyne Lidar System Utilizing a Hybrid Laser," U.S. Patent 5778019 (1998).

Conference Presentations

1. James H. Churnside and Charles M. McIntyre, "Joint Signal Probability Distribution of an Optical Heterodyne Array," SPIE Technical Symposium East '78, Washington, D.C. March 28-31, 1978.
2. Charles M. McIntyre and James H. Churnside, "Heterodyne Receiver for Visible Radiation Transmitted through the Atmosphere," SPIE Technical Symposium East '78, Washington, D.C., March 28-31, 1978.

3. Charles M. McIntyre and James H. Churnside, "Diversity Arrays for Optical Communications through Atmospheric Turbulence," SPIE 22nd Annual International Technical Symposium, San Diego, California, August 28-31, 1978.
4. James H. Churnside, Charles M. McIntyre, and Myung Hun Lee, "Statistics of Irradiance from Coherently Illuminated Targets in the Atmosphere," Annual Meeting of the Optical Society of America, San Francisco, California, October 31-November 3, 1978.
5. J. H. Churnside and H. T. Yura, "Atmospheric Modulation Noise in Coherent Lidar Systems," Topical Meeting on Coherent Laser Radar for Atmospheric Sensing, Aspen, Colorado, July 15-17, 1980.
6. J. H. Churnside and H. T. Yura, "Transverse Velocity Measurements using Coherent Lidar," SPIE 25th Annual International Technical Symposium, San Diego, California, August 24-28, 1981.
7. J. H. Churnside and H. T. Yura, "Speckle Phenomena in Laser Remote Sensing," Topical Meeting on Optical Techniques for Remote Probing of the Atmosphere, Incline Village, Nevada, January 10-12, 1983.
8. J. H. Churnside, "Laser Doppler Velocimetry by Backscatter Modulation of the Source," 2nd Topical Meeting on Coherent Laser Radar: Technology and Applications, Aspen, Colorado, August 1-4, 1983.
9. H. T. Yura and J. H. Churnside, "Speckle Statistics of Atmospherically Backscattered Light," 2nd Topical Meeting on Coherent Laser Radar: Technology and Applications, Aspen, Colorado, August 1-4, 1983 (invited).
10. James H. Churnside, "Second-Harmonic Generation by Partially Coherent Light," Annual Meeting of the Optical Society of America, San Diego, California, November 29-December 2, 1984.
11. J. H. Churnside, R. J. Hill, and G. R. Ochs, "Yet Another Probability Distribution for Intensity Fluctuations in Strong Turbulence," International Conference on Optical and Millimeter Wave Propagation and Scattering in the Atmosphere, Florence, Italy, May 27-30, 1986.
12. R. J. Hill and J. H. Churnside, "Measurements of Laser Scintillation in Strong Turbulence Relevant to Laser Eye Safety," International Conference on Optical and Millimeter Wave Propagation and Scattering in the Atmosphere, Florence, Italy, May 27-30, 1986.
13. S. F. Clifford and J. H. Churnside, "Synthetic Aperture Spatial Filtering of Scintillation: A New Technique for Measuring Optical Refractive Turbulence Profiles," International Conference on Optical and Millimeter Wave Propagation and Scattering in the Atmosphere, Florence, Italy, May 27-30, 1986 (invited).

14. James H. Churnside and Richard J. Lataitis, "Image Motion of a Laser-Illuminated Object in the Turbulent Atmosphere," Conference on Lasers and Electro-Optics, San Francisco, California, June 9-13, 1986.
15. James H. Churnside, "Phenomenological Probability Density Function of Turbulence-Induced Intensity Fluctuations," Annual Meeting of the Optical Society of America, Seattle, Washington, October 19-25, 1986 (invited).
16. S. F. Clifford and James H. Churnside, "Synthetic Aperture Spatial Filtering of Scintillation: A New Technique for Measuring Optical Refractive Turbulence Profiles," Annual Meeting of the Optical Society of America, Seattle, Washington, October 19-25, 1986.
17. Reginald J. Hill and James H. Churnside, "Joint Statistics of Irradiance and its Duration Measured in Strong Refractive Turbulence," Annual Meeting of the Optical Society of America, Seattle, Washington, October 19-25, 1986.
18. James H. Churnside, "Remote Sensing of Refractive Turbulence with Optical Spatial Filters," Topical Meeting on Laser and Optical Remote Sensing: Instrumentation and Techniques, North Falmouth, Massachusetts, September 28-October 1, 1987 (invited).
19. James H. Churnside and Steven F. Clifford, "The Lognormal-Rician Probability Density Function of Optical Irradiance Scintillations in the Turbulent Atmosphere," Eighth Annual Electro-Optical Systems Atmospheric Library and Tactical Weather Intelligence Conference, Las Cruces, New Mexico, December 1-3, 1987.
20. James H. Churnside, "Two-Point Probability Density Function of Irradiance in the Turbulent Atmosphere," European Conference on Optics, Optical Systems, and Applications, Birmingham, United Kingdom, March 22-25, 1988.
21. J. H. Churnside, R. J. Hill, G. Conforti, and A. Consortini, "How Small a Receiver Aperture is Needed to Imitate a Point Receiver for Measuring Scintillation?" European Conference on Optics, Optical Systems, and Applications, Birmingham, United Kingdom, March 22-25, 1988.
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29. James H. Churnside and Steven F. Clifford, "Optical Scintillometer / Doppler Radar Instrument for Profiling Turbulence," 1989 Technical Symposium on Aerospace Sensing, Orlando, Florida, March 27-31, 1989.
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38. James H. Churnside, "A Physical Model of Optical Scintillation," ICO Topical Meeting on Atmospheric, Volume and Surface Scattering and Propagation, Florence, Italy, August 27-30, 1991 (invited).
39. Anna Consortini, Fausto Cochetti, James H. Churnside, and Reginald Hill, "Laser Scintillation, C_n^2 , I_0 measurements in Evolving Atmospheric Turbulence," ICO Topical Meeting on Atmospheric, Volume and Surface Scattering and Propagation, Florence, Italy, August 27-30, 1991.
40. E. R. Westwater and J. H. Churnside, "Ground-Based Remote Sensing of Atmospheric Water Vapor," Lower Tropospheric Profiling: Needs and Technologies, Boulder, Colorado, September 10-13, 1991 (invited).
41. James H. Churnside and Evgenii P. Gordov, "Sub-Poisson Photoelectron Statistics from a Semiconductor Laser with Electronic Feedback," Annual Meeting of the Optical Society of America, San Jose, California, November 3-8, 1991.
42. James H. Churnside and Joseph A. Shaw, "Infrared Emission Measurements as Part of an Integrated Weather Sounding System," Workshop on Infrared Emission Measurements by FTIR, Quebec, Quebec, February 12-14, 1992.
43. J. H. Churnside, "Optical Remote Sensing," Scintillation, Seattle, Washington, August 3-7, 1992. (invited)
44. A. Consortini, F. Cochetti, J. H. Churnside, and R. J. Hill, "Inner Scale Effect on Laser Intensity Variance through Atmospheric Turbulence," Scintillation, Seattle, Washington, August 3-7, 1992.
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46. A. J. Palmer and J. H. Churnside, " Δk -Lidar Sensing of the Ocean Surface," Oceans 92, Newport, Rhode Island, October 26-29, 1992.
47. S. Y. Matrosov, D. K. Lynch, and J. H. Churnside, "Possibilities of Using IR Spectrometer for Sizing Cirrus Cloud Particles," SPIE Symposium on Passive Infrared Remote Sensing of Clouds and the Atmosphere, Orlando, Florida, April 13-15, 1993.
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55. J. A. Shaw and J. H. Churnside, "Ocean Ripple Statistics Measured with a Scanning-Laser Glint Sensor," IGARSS'96, Lincoln, Nebraska, May 27-31, 1996.
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57. J. H. Churnside, "Lidar Observations of Fish in the Southern California Bight," Pacific Ocean Remote Sensing Conference, Victoria, British Columbia, August 13-16, 1996.
58. J. A. Shaw, J. H. Churnside, Y. Han, E. R. Westwater, and J. B. Snider, "Field Measurements of Infrared Spectral Radiance from the Tropical Atmosphere," International Radiation Symposium, Fairbanks, Alaska, August 19-24, 1996.
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62. J. H. Churnside, "HF Radar for Surface Winds and Currents," International Workshop of the Arctic Atmospheric Environment," Tokyo, Japan, March 17-19, 1997.
63. J. A. Shaw and J. H. Churnside, "Laser-Glint Techniques for Sensing Sea-Surface Roughness," Advances in Laser Remote Sensing for Terrestrial and Oceanographic Applications, Orlando, Florida, April 21-22, 1997.
64. J. H. Churnside, "Lidar Detection of Fish Schools," IGARSS'98, Seattle, Washington, July 6-10, 1998.
65. J. R. Hunter and J. H. Churnside, "An Evaluation of the Potential use of Airborne Lidar for Inventorying Epipelagic Fish Schools," Annual Meeting of the American Fisheries Society, Hartford, Connecticut, August 23-27, 1998.
66. N. C. H. Lo, J. R. Hunter, and J. H. Churnside, "Modeling Properties of Airborne Lidar Surveys for Epipelagic Fish," Annual Meeting of the American Fisheries Society, Hartford, Connecticut, August 23-27, 1998.
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75. J. H. Churnside, "Airborne Lidar Measurements of Springtime Distributions of Herring in Prince William Sound and Kodiak," Marine Science in the Northeast Pacific, Anchorage, Alaska, January 13-17, 2003.
76. E. D. Brown, M. A. Montes, J. H. Churnside, and C. O. Coyle, "Using Airborne Remote Sensing to Map Spatial Variability in Zooplankton Patch Size, Standing Stocks, Associated Oceanographic Conditions, and to Identify Zooplankton Communities by Optical Signatures," Third International Zooplankton Production Symposium, Gijon, Spain, May 20-23, 2003
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78. J. H. Churnside, "Recent Advances in Airborne Lidar," ICES Working Group on Fisheries Acoustics Science and Technology, Bergen Norway, June 18-21, 2003.
79. W. G. Pichel, T. Veenstra, J. H. Churnside, E. Arabini, D. Foley, R. Brainard, D. Kiefer, S. Ogle, P. Clemente-Colon, K. S. Friedman, X. Li, and J. Nicoll, "GhostNet-Driftnet Detection and Tracking in the North Pacific using Satellite and Airborne Remote Sensing and Surface Drifters," International Geoscience and Remote Sensing Symposium, Toulouse, France, 21-25 July, 2003.
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86. J. H. Churnside and J. J. Wilson, "Ocean Color Measurements from a Low-Flying Aircraft: Atmospheric Correction," Ocean Optics XVII, Fremantle, Australia, October 25-29, 2004.
87. J. H. Churnside, D. A. Demer, J. R. Hunter, D. A. Griffith, R. D. Brodeur, and R. E. Emmett, "Sardine Detection by Airborne Lidar," California Cooperative Oceanic Fisheries Investigations Annual Conference and Trinational Sardine Forum, San Diego, California, November 15-18, 2004.
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90. D. W. Fahey, A. J. Gasiewski, M. Aslaksen, S. Summers, C. D. Jennison, N. Trongale, J. H. Churnside, J. W. Elkins, D. Hurst, T. Jacobs, M. Klein, S. J. Oltmans, B. W. Orr, and J. D. Sellears, "The NOAA unmanned Aerial Vehicle (UAV) Demonstration Project using the General Atomics Altair UAV," American Institute of Aeronautics and Astronautics Infortech@Aerospace Conference, Arlington, Virginia, September 26-29, 2005.
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92. J. H. Churnside, "2000 Kilometers of Thin Layers," Ocean Sciences, Honolulu, Hawaii, February 20-24, 2006. (invited)

93. A. M. Kaltenberg, K. J. Benoit-Bird, R. D. Brodeur, J. K. Horne, and J. H. Churnside, "A Study of Sardines in the NE Pacific Using Multiple Platforms and Technologies," Ocean Sciences, Honolulu, Hawaii, February 20-24, 2006.
94. E. D. Brown and J. H. Churnside, "Documenting and Describing Ephemeral Foraging Events Using Aerial Surveys and Remote Sensing," Ocean Sciences, Honolulu, Hawaii, February 20-24, 2006.
95. J. K. Horne, J. H. Churnside, and P. Adam, "Potential Integration of Acoustic and LIDAR Backscatter Data," Ocean Sciences, Honolulu, Hawaii, February 20-24, 2006.
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98. S. Parker-Stetter, J. Horne, and J. Churnside, "Acoustic and optic characterization of forage fish distribution in the Bering Sea," Fourth Joint Meeting of the Acoustical Society of America and the Acoustical Society of Japan, Honolulu, Hawaii, November 28 – December 2, 2006.
99. J. H. Churnside, J. Horne, P. Adam, R. D. Brodeur, D. Reese, E. Brown, K. J. Benoit-Bird, and A. Kaltenberg, "Combining techniques for remotely assessing pelagic nekton: getting the whole picture," American Institute of Fishery Research Biologist Symposium on The Future of Fishery Science in North America, Seattle, Washington, February 13-15, 2007.
100. P. M. Adam, J. K. Horne, and J. H. Churnside, "Unveiling time: using optics to quantify movement effects on acoustic abundance estimates," American Institute of Fishery Research Biologist Symposium on The Future of Fishery Science in North America, Seattle, Washington, February 13-15, 2007.
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102. J. H. Churnside, "LIDAR detection of plankton in the ocean," International Geoscience and Remote Sensing Symposium, Barcelona, Spain, July 23-27, 2007. (invited)

103. D. C. Reese, R. D. Brodeur, J. H. Churnside, and R. T. O'Malley, "Identifying spatial relationships between marine biological hotspots and fronts in the Northern California Current using remote-sensing techniques," ESA/SER Joint Meeting, San Jose, California, August 5-10, 2007.
104. D. C. Reese, R. D. Brodeur, J. H. Churnside, and R. T. O'Malley, "Using lidar and satellite imagery to identify the spatial relationship between nekton 'hotspot' areas and surface water conditions in the northern California Current," American Fisheries Society Annual Meeting, San Francisco, California, September 2-6, 2007.
105. A. Sharov, J. H. Churnside, C. Tipton, C. Bonzek, and R. Latour, "Lidar survey of menhaden population in Chesapeake Bay," American Fisheries Society Annual Meeting, San Francisco, California, September 2-6, 2007.
106. J. H. Churnside, "Hot spot observations in the SE Bering Sea," Alaska Marine Science Symposium, Anchorage, Alaska, January 20-23, 2008.
107. J. H. Churnside, "Birds disrupt thin zooplankton layers at the surface," 2008 Ocean Sciences meeting, Orlando, Florida, March 2-7, 2008.
108. P. M. Adam, J. K. Horne, and J. H. Churnside, "Temporal variability in acoustic and optical backscatter measurements: implications for survey design," Symposium on the Ecosystem Approach with Fisheries Acoustics and Complementary Technologies, Bergen, Norway, June 16-20, 2008.
109. J. H. Churnside, E. Tenningen, and J. J. Wilson, "Comparison of data processing algorithms for fish LIDAR detection of mackerel in the Norwegian Sea," Symposium on the Ecosystem Approach with Fisheries Acoustics and Complementary Technologies, Bergen, Norway, June 16-20, 2008.
110. J. A. Shaw, J. H. Churnside, J. J. Wilson, N. E. Lerner, R. R. Tiensvold, P. E. Bigelow, and T. M. Koel, "Airborne lidar mapping of invasive lake trout in Yellowstone Lake," 24th International Laser Radar Conference, Boulder, Colorado, June 23-27, 2008.
111. J. H. Churnside, "Dual-polarization backscatter lidar in the ocean," 24th International Laser Radar Conference, Boulder, Colorado, June 23-27, 2008.
112. J. H. Churnside and P. L. Donaghay, "Spatial variability of the optical backscatter from thin layers," Ocean Optics XIX, Barga, Italy, October 6 – 10, 2008.
113. J. H. Churnside, "Lidar: Aerial surveys of menhaden in the Chesapeake Bay," NOAA Chesapeake Bay Office Fisheries Science Symposium, Laurel, Maryland, April 21-22, 2009.
114. M. A. Montes-Hugo, R. Gould, Z. Lee, R. Arnone, D. Gray, and J. Churnside, "Spectral variability of airborne ocean color data linked to variations in lidar backscattering profiles," SPIE Symposium on Ocean Remote Sensing: Methods and Applications, San Diego, California, August 2, 2009.

115. Y. Hu, R. A. Arnone, and J. H. Churnside, "An overview of ocean lidar studies at NRL Stennis, NOAA ESRL, and NASA LaRC," AGU Fall Meeting, San Francisco, California, December 14-18, 2009. (invited)
116. J. H. Churnside, P. L. Donaghay, R. E. Rines, J. M. Sullivan, M. McFarland, R. Marchbanks, and A. Weidemann, "Tracking the progression of a diatom bloom with airborne lidar," AGU Fall Meeting, San Francisco, California, December 14-18, 2009.
117. J. H. Churnside, "Variability in Near-Surface Lidar Returns," Ocean Sciences Meeting, Portland, Oregon, February 22-26, 2010.
118. J. Rines, M. McFarland, P. L. Donaghay, J. M. Sullivan, J. H. Churnside, and A. Weidemann, "Characterization of a Novel Diatom Bloom with Scanning, In-line Flow Cytometry," Ocean Sciences Meeting, Portland, Oregon, February 22-26, 2010.
119. M. A. Montes-Hugo, R. W. Gould, Z. Lee, J. H. Churnside, and R. A. Arnone, "Vertical structure of Lidar backscattering is connected to above-surface ocean color variability," Ocean Sciences Meeting, Portland, Oregon, February 22-26, 2010.
120. P. L. Donaghay, J. H. Churnside, J. Sullivan, J. Rines, and A. Weidemann, "Quantifying The Temporal and Spatial Evolution of the Fine-Scale Vertical Structure of a Submesoscale Diatom Bloom Using Real-Time Data from Airborne Lidar and Autonomous Profilers to Guide Ship-Based Sampling," Ocean Sciences Meeting, Portland, Oregon, February 22-26, 2010.
121. J.H. Churnside, "Lidar measurements along the food chain," Ocean Optics XX, Anchorage, Alaska, September 27 – October 1, 2010. (invited)
122. M. Montes-Hugo, A. Weideman, R. Gould, J. Jason, R. Arnone, and J. Churnside, "Ocean color patterns help to predict depth of optical layers in coastal marine waters," Ocean Optics XX, Anchorage, Alaska, September 27 – October 1, 2010.