

Timothy Frederick Duda

Associate Scientist

Applied Ocean Physics and Engineering Department, MS 11
Woods Hole Oceanographic Institution
Woods Hole, MA 02543

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Birthplace: Chicago, Illinois *Citizenship:* U. S. A.

Research Interests

Internal gravity waves, ocean turbulence and mixing,
ocean acoustic propagation, acoustic remote sensing

Education and Positions

1979	B.A., Physics, Cum Laude Pomona College, Claremont, CA
1986	Ph.D., Oceanography, Scripps Institution of Oceanography, University of California, San Diego (with Prof. Charles S. Cox)
1986	Postgraduate Research, Ocean Research Division, Scripps Institution of Oceanography, UC San Diego (with Prof. Charles S. Cox)
1986—1988	Postgraduate Research, Division of Natural Sciences, University of California, Santa Cruz (with Prof. Stanley M. Flatté)
1988—1991	Research Oceanographer, Division of Natural Sciences, University of California, Santa Cruz
1991—1995	Assistant Scientist, Woods Hole Oceanographic Institution
1995—	Associate Scientist, Woods Hole Oceanographic Institution (Tenure, 1999)

Professional Societies

American Geophysical Union, American Meteorological Society, Acoustical Society of America,
Institute of Electrical and Electronics Engineers (IEEE), IEEE Oceanic Engineering Society

Refereed Publications

- [1] Long, G. L., W. R. Ellington and T. F. Duda, Comparative enzymology and physiological role of D-lactate dehydrogenase from the foot muscle of two gastropod molluscs, *J. Exp. Zool.*, 207, 237-248, 1979.
- [2] Duda, T. F., and C. S. Cox, Vorticity measurement in a region of coastal ocean eddies by observation of near-inertial oscillations, *Geophys. Res. Lett.*, 14, 793-796, 1987.

- [3] Duda, T. F., C. S. Cox and T. K. Deaton, The Cartesian Diver: A self-profiling Lagrangian velocity recorder, *J. Atmos. Oceanic Technol.*, 5, 16-33, 1988.
- [4] Duda, T. F., S. M. Flatté and D. B. Creamer, Modelling meter-scale acoustic intensity fluctuations from oceanic fine structure and microstructure, *J. Geophys. Res.*, 93, 5130-5142, 1988.
- [5] Duda, T. F., and C. S. Cox, Vertical wave number spectra of velocity and shear at small internal wave scales, *J. Geophys. Res.*, 94, 939-950, 1989.
- [6] Flegal, A. R., T. F. Duda and S. Niemeier, High gradients of lead isotopic composition in north-east Pacific upwelling filaments, *Nature*, 339, 458-460, 1989.
- [7] Duda, T. F., Modeling weak fluctuations of undersea telemetry signals, *IEEE J. Oceanic Eng.*, 16, 3-11, 1991.
- [8] Duda, T. F., S. M. Flatté, J. A. Colosi, B. D. Cornuelle, J. A. Hildebrand, W. S. Hodgkiss, Jr., P. F. Worcester, B. M. Howe, J. A. Mercer and R. C. Spindel, Measured wavefront fluctuations in 1000-km pulse propagation in the Pacific Ocean, *J. Acoust. Soc. Am.*, 92, 939-955, 1992.
- [9] Duda, T. F., Analysis of finite-duration wide-band frequency sweep signals for ocean tomography, *IEEE J. Oceanic Eng.*, 18, 87-94, 1993.
- [10] Cornuelle, B. D., P. F. Worcester, J. A. Hildebrand, W. S. Hodgkiss Jr., T. F. Duda, J. Boyd, B. M. Howe, J. A. Mercer and R. C. Spindel, Ocean acoustic tomography at 1000-km range using wavefronts measured with a large aperture vertical array, *J. Geophys. Res.*, 98, 16,365-16,377, 1993.
- [11] Worcester, P. F., B. D. Cornuelle, J. A. Hildebrand, W. S. Hodgkiss Jr., T. F. Duda, J. Boyd, B. M. Howe, J. A. Mercer and R. C. Spindel, A comparison of measured and predicted broadband acoustic arrival patterns in travel time-depth coordinates at 1000-km range, *J. Acoust. Soc. Am.*, 95, 3118-3128, 1994.
- [12] Duda, T. F., and J. B. Bowlin, Ray-acoustic caustic formation and timing effects from ocean sound-speed relative curvature, *J. Acoust. Soc. Am.*, 96, 1033-1046, 1994.
- [13] Duda, T. F., and D. C. Jacobs, Comparison of shear measurements and mixing predictions with a direct observation of diapycnal mixing in the Atlantic thermocline, *J. Geophys. Res.*, 100, 13,481-13,498, 1995.
- [14] Duda, T. F., R. A. Pawlowicz, J. F. Lynch and B. D. Cornuelle, Simulated tomographic reconstruction of ocean features using drifting acoustic receivers and a navigated source, *J. Acoust. Soc. Am.*, 98, 2270-2279, 1995.
- [15] Washburn, L., T. F. Duda and D. C. Jacobs, Interpreting conductivity microstructure: Estimating the temperature variance dissipation rate. *J. Atmos. Oceanic Technol.*, 13, 1166-1188, 1996.
- [16] Preisig, J. C., and T. F. Duda, Coupled acoustic mode propagation through continental shelf internal solitary waves, *IEEE J. Oceanic Eng.*, 22, 256-269, 1997.
- [17] Duda, T. F., and D. A. Trivett, Predicted scattering of sound by diffuse hydrothermal vent plumes at mid-ocean ridges. *J. Acoust. Soc. Am.*, 103, 330-335, 1998.

- [18] Duda, T. F., and D. C. Jacobs, Stress/shear correlation: Internal wave/wave interaction and energy flux in the upper ocean, *Geophys. Res. Lett.*, 25, 1919-1922, 1998.
- [19] Duda, T. F., and J. C. Preisig, A modeling study of acoustic propagation through moving shallow-water solitary wave packets, *IEEE J. Oceanic Eng.*, 24, 16-32, 1999.
- [20] Rehmann, C. R., and T. F. Duda, Diapycnal diffusivity inferred from scalar microstructure measurements near the New England shelf/slope front, *J. Phys. Oceanogr.*, 30, 1354-1371, 2000.
- [21] Duda, T. F., and C. R. Rehmann, Systematic microstructure variability in double-diffusively stable coastal waters of nonuniform density gradient, *J. Geophys. Res.*, 107(C10), 3144, doi:10.1029/2001JC000844, 2002.
- [22] Duda, T. F., Acoustic mode coupling by nonlinear internal wave packets in a shelfbreak front area, *IEEE J. Oceanic Eng.*, 29, 118-125, 2004.
- [23] Duda, T. F., Finescale shear at 1660 and 2850 decibars over the Mid-Atlantic Ridge in the eastern Brazil Basin, *J. Phys. Oceanogr.*, 34, 1281-1292, 2004.
- [24] Duda, T. F., J. F. Lynch, J. D. Irish, R. C. Beardsley, S. R. Ramp, C.-S. Chiu, T. Y. Tang and Y. J. Yang, Internal tide and nonlinear internal wave behavior at the continental slope in the northern South China Sea, *IEEE J. Oceanic Eng.*, 29, 1105-1130, 2004.
- [25] Chiu, C.-S., S. R. Ramp, C. W. Miller, J. F. Lynch, T. F. Duda and T. Y. Tang, Acoustic intensity fluctuations induced by South China Sea internal tides and solitons, *IEEE J. Oceanic Eng.*, 29, 1249-1263, 2004.
- [26] Duda, T. F., J. F. Lynch, A. E. Newhall, L. Wu, and C.-S. Chiu, Fluctuation of 400 Hz sound intensity in the 2001 ASIAEX South China Sea experiment, *IEEE J. Oceanic Eng.*, 29, 1264-1279, 2004.
- [27] Ramp, S. R., T. Y. Tang, T. F. Duda, J. F. Lynch, A. K. Liu, C.-S. Chiu, F. Bahr, H.-R. Kim and Y. J. Yang, Internal solitons in the northeastern South China Sea part I: Sources and deep water propagation, *IEEE J. Oceanic Eng.*, 29, 1157-1181, 2004.
- [28] Beardsley, R. C., T. F. Duda, J. F. Lynch, S. R. Ramp, J. D. Irish, C.-S. Chiu, T. Y. Tang, Y. J. Yang, and G. Fang, Barotropic tide in the northeast South China Sea, *IEEE J. Oceanic Eng.*, 29, 1075-1086, 2004.
- [29] Wei, R.-C., C.-F. Chen, A. E. Newhall, J. F. Lynch, T. F. Duda, C.-S. Liu and P.-C. Lin, Preliminary examination of the low-frequency ambient noise field in the South China Sea, *IEEE J. Oceanic Eng.*, 29, 1308-1315, 2004.
- [30] Ledwell, J. R., T. F. Duda, M. Sundermeyer, and H. Seim, Mixing in a coastal environment part I: A view from dye dispersion, *J. Geophys. Res.*, 109(C10013), doi:10.1029/2003JC002194, 2004.
- [31] Wang, S. Q., L. X. Wu, H. W. Wang, R. H. Zhang, J. F. Lynch, and T. F. Duda, Observations on fluctuations of sound transmission and temperature field from the ASIAEX 2001 South China Sea experiment and inversion of the characterizations of internal tides (waves) *Prog. Nat. Sci.*, 14, 793-799, 2004.

- [32] Lynch, J. F., J. A. Colosi, G. Gawarkiewicz, T. F. Duda, A. D. Pierce, M. Badiey, B. G. Katznelson, J. E. Miller, W. Siegmann, C.-S. Chiu, and A. Newhall, Consideration of fine-scale coastal oceanography and 3-D acoustics effects for the ESME sound exposure model, *IEEE J. Oceanic Engineering*, 31, 33-48, 2006.
- [33] Duda, T. F., Ocean sound channel ray path perturbations from internal-wave shear and strain, *J. Acoust. Soc. Am.*, 118, 2899-2903, 2005.
- [34] Duda, T. F., Comparison of deep-ocean fine-scale shear at two sites along the Mid-Atlantic Ridge, *Deep-Sea Research II*, 53, 207-225, 2006.
- [35] Duda, T. F., Temporal and cross-range coherence of sound traveling through shallow-water nonlinear internal wave packets, *J. Acoust. Soc. Am.*, 119, 3717-3725, 2006.

Technical Reports, Conference Proceedings and Theses

- Duda, T. F., *Observations of Horizontal Flow, Vertical Shear and Microstructure in the Upper Ocean*, Ph. D. Dissertation, University of California, San Diego, 151 pages, 1986.
- Duda, T. F., and S. M. Flatté, Remote sensing of ocean turbulence using unsaturated acoustic transmission, in *Preprints from the Eighth Symposium on Turbulence and Diffusion*, American Meteorological Society, pp. 168-171, 1988.
- Duda, T. F., and C. S. Cox, Quasi-Lagrangian measurements of microstructure and shear near a front in the coastal California thermocline, *Scripps Inst. Oceanog. Reference Series 88-15*, 33 pages, 1988.
- Howe, B. M., J. A. Mercer, R. C. Spindel, P. F. Worcester, J. A. Hildebrand, W. S. Hodgkiss, Jr., T. F. Duda and S. M. Flatté, SLICE89: A single slice tomography experiment, in *Proceedings of the Workshop on Ocean Variability and Acoustic Propagation*, J. Potter and A. Warn-Varnas, Eds., Kluwer, pp. 81-86, 1991.
- Flatté, S. M., J. Colosi, G. L. Rovner and T. F. Duda, Impulse response analysis of ocean acoustic propagation, in *Proceedings of the Workshop on Ocean Variability and Acoustic Propagation*, J. Potter, A. Warn-Varnas, Eds., Kluwer, pp. 161-172, 1991.
- Duda, T. F., and J. F. Lynch, Smoothly modulated frequency-bounded impulse signals for tomography, Woods Hole Oceanographic Institution Tech. Rept. WHOI-91-13, 19 pages, 1991.
- Cornuelle, B. D., P. F. Worcester, J. A. Hildebrand, W. S. Hodgkiss, Jr., T. F. Duda, B. M. Howe, J. A. Mercer and R. C. Spindel, Vertical slice ocean acoustic tomography at 1000-km range in the North Pacific Ocean, *Scripps Inst. Oceanog. Reference Series 92-17*, 44 pages, 1992.
- Bowlin, J. B., J. L. Spiesberger, T. F. Duda and L. E. Freitag, Ocean acoustical ray-tracing software RAY, WHOI Tech Rept., WHOI-93-10, 47 pages, 1993
- Duda, T. F., and D. C. Jacobs, Stress/shear correlation: Observations of internal wave/wave interaction and energy flux in the upper ocean, in *Preprints from the 11th Conference on Atmospheric Oceanic Fluid Dynamics*, American Meteorological Society, pp. 287-291, 1997.
- Duda, T. F., and D. C. Webb, The drifting, rotating deep-ocean shearmeter, in *Oceans'97 Conference Proceedings*, MTS/IEEE, pp. 794-799, 1997.

- Duda, T. F., C. R. Rehmann and J. R. Ledwell, Mixing in a Bottom Layer Associated with the New England Shelf/Slope Water Front, in Coastal Ocean Processes Symposium: A tribute to William D. Grant, WHOI Tech Rept., WHOI-99-04, pp. 57-60, 1999.
- Duda, T. F., and D. M. Farmer, Editors, *The 1998 WHOI/IOS/ONR Internal Solitary Wave Workshop: Contributed Papers*. WHOI Tech. Rept., WHOI-99-07, 251 pages, 1999.
- Duda, T. F., and J. C. Preisig, Acoustic mode coupling within internal solitary waves and wave groups, in *The 1998 WHOI/IOS/ONR Internal Solitary Wave Workshop: Contributed Papers*. WHOI Tech. Rept., WHOI-99-07, 22-28, 1999.
- Newhall, A., L. Costello, T. Duda, J. Dunn, G. Gawarkiewicz, J. Irish, J. Kemp, N. McPhee, S. Liberatore, J. Lynch, W. Ostrom, T. Schroeder, R. Trask, and K. Von der Heydt, Preliminary acoustic and oceanographic observations from the ASIAEX 2001 South China Sea Experiment, WHOI Tech. Rept., WHOI-2001-12, 93 pages, 2001.
- Duda, T. F., B. J. Guest, C. M. Wooding, C. M. Jones, S. Lelievre, and D. C. Webb, Shearwater floats in the area of the WHOI Brazil Basin Tracer Release Experiment: Technical and Oceanographic Data, WHOI Tech. Rept., WHOI-2002-01, 44 pages, 2002.
- Duda, T. F., Relative influences of various environmental factors on 50-1000 Hz sound propagation in shelf and slope areas, in *Impact of Littoral Environmental Variability on Acoustic Predictions and Sonar Performance*, N. G. Pace and F. B. Jensen, Eds., Kluwer, Dordrecht, pp. 393-400, 2002.
- Duda, T. F., Internal wave effects on acoustic propagation, in *Proceedings of 1st International Conference on Underwater Acoustic Measurements: Technologies and Results*, J. S. Papadakis and L. Bjorno, Eds., 2005.

Invited Abstracts (Professional Meetings)

- Duda, T. F., Statistical descriptions of fine structure and microstructure from propagation experiments. 119th ASA Meeting, State College, PA, May 1990, *J. Acoust. Soc. Am.*, 87(S1), S6.
- Duda, T. F., *et al.*, A single slice tomography experiment using a long vertical array of receivers. 120th ASA Meeting, San Diego, CA, November 1990, *J. Acoust. Soc. Am.*, 88(S1), S117.
- Flatté, S. M., *et al.*, Wave-front fluctuations in the 1000-km SLICE89 experiment. 121st ASA Meeting, Baltimore, MD, April/May 1991, *J. Acoust. Soc. Am.*, 89(4), 1962 (Speaker: Flatté).
- Lynch, J., R. Pawlowicz, T. Duda and A. Newhall, Relative arrival tomographic reconstruction using drifting receivers and a ship-board source. 124th ASA Meeting, New Orleans, LA, October/November 1992, *J. Acoust. Soc. Am.*, 92(4), 2324-5 (Co-speaker with Lynch).
- Duda, T. F., C. R. Rehmann and J. R. Ledwell, Mixing in a bottom layer associated with the New England shelf/slope water front. in Coastal Ocean Processes Symposium, a Tribute to William D. Grant, September 1998, WHOI Tech. Report, WHOI-99-04, pp. 57-60.
- Duda, T.F, Fluctuating coupled-mode acoustic propagation through internal solitary-type waves, AGU Ocean Sciences Meeting, Portland, OR, January 2004, Eos Trans. AGU, 84(52), Ocean Sci. Meet. Suppl., Abstract OS22G-04, 2003

Duda, T. F., Internal tides in the northern South China Sea, CGU/AGU/SEG/EEGS Joint Assembly, Montreal, Quebec, May 2004.

Contributed Abstracts Since 1999 (Professional Meetings)

Duda, T. F. and J. C. Preisig, Signal coherence and energy effects of propagating internal solitary wave packets, 137th ASA meeting, Berlin, Germany, March 1999, *J. Acoust. Soc. Am.*, 105, 1361.

Duda, T. F. and J. C. Preisig, Studies of internal wave and bottom effects on broadband shallow-water propagation, 138th ASA meeting, Columbus, Ohio, November 1999, *J. Acoust. Soc. Am.*, 106, 2303.

Duda, T. F. and C. R. Rehmann, Observations and implications of stratification-dependent summertime shelf diapycnal diffusivity, AGU/ASLO Ocean Sciences Meeting, San Antonio, TX, January 2000, *Eos*, 80, *Supplement*, p. OS61.

Duda, T. F., A relationship between fine structure and turbulent flux on the continental shelf, AGU/ASLO Ocean Sciences Meeting, Honolulu, HI, February 2002, *Eos*, 83, *Supplement*, p. OS359.

Duda, T. F., J. F. Lynch and A. E. Newhall, Comparison of ASIAEX South China Sea acoustic fluctuations with oceanographic variability, 143rd ASA meeting, Pittsburgh, Pa., June 2002, *J. Acoust. Soc. Am.*, 111, 2458.

Chiu, C.-S., S. Ramp, C. Miller, J. Lynch, T. Duda, A. Newhall, K. von der Heydt, and J. Kemp, Measurement and analysis of acoustic intensity fluctuations induced by South China Sea internal solitons, 144th ASA meeting, Cancun, Mexico, December 2002, *J. Acoust. Soc. Am.*, 112, 2448.

Ramp, S. R., C.-S. Chiu, F. L. Bahr, J. Lynch, T. Duda, D. Tang, and A. K. Liu, Clustering the generation sites and packet variability of internal solitons in the South China Sea, 144th ASA meeting, Cancun, Mexico, December 2002, *J. Acoust. Soc. Am.*, 112, 2449.

Duda, T. F., J. F. Lynch, A. E. Newhall, C.-S. Chiu, S. R. Ramp, C.-F. Chen, Correlation of acoustic scattering variables and physical oceanographic parameter time series in the 2001 ASIAEX South China Sea experiment, 144th ASA meeting, Cancun, Mexico, December 2002, *J. Acoust. Soc. Am.*, 112, 2449.

Mignerey, P. C., M. H. Orr, B. H. Pasewark, T. F. Duda, J. F. Lynch, and C.-S. Chiu, Soliton-induced matched-field array-gain variability in the South China Sea, 144th ASA meeting, Cancun, Mexico, December 2002, *J. Acoust. Soc. Am.*, 112, 2450.

Fredricks, A., J. Colosi, J. Lynch, G. Gawarkiewicz, T. Duda, C.-S. Chiu and P. Abbot, Observations and modeling of acoustic intensity fluctuations seen during the 1996 summer New England shelfbreak PRIMER experiment, 144th ASA meeting, Cancun, Mexico, December 2002, *J. Acoust. Soc. Am.*, 112, 2451.

Duda, T., S. Ramp, J. Lynch, D. Tang and Y. Yang, Conversion of internal tides to nonlinear waves in the northern South China Sea, Europ. Geophys. Soc., AGU, and Europ. Union of Geosciences joint assembly, Nice, France, April 2003.

- Duda, T. F., J. F. Lynch, G. G. Gawarkiewicz, C.-S. Chiu, R.-C. Wei, and P. Abbot, Directional noise and correlation of signal and noise variability in the ASIAEX South China Sea Experiment, 146th ASA meeting, Austin, Texas, November 2003, *J. Acoust. Soc. Am.*, 114, 2461.
- Reilly-Raska, L. K., W. L. Siegmann, J. F. Lynch, J. A. Colosi, and T. F. Duda, Intensity fluctuations from deterministic and random azimuthal variability, 146th ASA meeting, Austin, Texas, November 2003, *J. Acoust. Soc. Am.* 114, 2461
- Duda, T. F., Long-term measurements of shear over the Mid-Atlantic Ridge, AGU Ocean Sciences meeting, Portland, OR, January 2004, *Eos Trans. AGU*, 84(52), Ocean Sci. Meet. Suppl., Abstract OS12G-05, 2003
- Lynch, J., A. Pierce, and T. F. Duda, Acoustic "Whispering Gallery Modes" due to Fronts and Solitons in Shallow Water AGU Ocean Sciences meeting, Portland, OR, January 2004, *Eos Trans. AGU*, 84(52), Ocean Sci. Meet. Suppl., Abstract OS42D-06, 2003
- Heney, F. S., T. F. Duda and J. F. Lynch, Solitary Wave Model for Waves Observed in ASIAEX, AGU Ocean Sciences meeting, Portland, OR, January 2004, *Eos Trans. AGU*, 84(52), Ocean Sci. Meet. Suppl., Abstract OS42D-05, 2003
- Ramp, S. R., et al., Internal Solitons in the Northeastern South China Sea: Sources and Deep Water Propagation, AGU Ocean Sciences meeting, Portland, OR, January 2004, *Eos Trans. AGU*, 84(52), Ocean Sci. Meet. Suppl., Abstract OS22G-03, 2003
- T. Duda, J. Lynch, P. Abbot, and R.-C. Wei, Vertical line array beamforming of signal and noise in shallow-water regions, 148th ASA meeting, San Diego, CA, November 2004, *J. Acoust. Soc. Am.*, 116, 2535.
- Irish, J. D., T. F. Duda, L. Rainville, S. R. Ramp and T. Tang, Internal Tide Observations in the Northern South China Sea, AGU Ocean Sciences meeting, Honolulu, HI, February 2006, *Eos Trans. AGU*, 87(36), Ocean Sci. Meet. Suppl., Abstract OS26H-11, 2006.
- Duda, T. F., Explaining variations of shear statistics measured above the Mid-Atlantic Ridge, AGU Ocean Sciences meeting, Honolulu, HI, February 2006, *Eos Trans. AGU*, 87(36), Ocean Sci. Meet. Suppl., Abstract OS36A-07, 2006.

Oceanographic Cruises and Field Work

- July 1980: *RV Ellen B. Scripps*, San Diego, CA, Chief Scientist C. Cox. Cartesian Diver velocity and microstructure profiler testing.
- June 1980: *RV Melville*, San Diego, CA to La Paz, BCS Mexico, Co-chief Scientists J. McClain and K. McDonald. Navigated-cable ocean bottom seismometer array deployment at East Pacific Rise (21 N); bottom dredging.
- November 1980: *RV New Horizon*, San Diego, CA, Co-Chief Scientists C. Cox and L. Regier. AMETEK ADCP testing against VMCM mooring; Cartesian Diver profiler deployment.
- November 1983: *RV Acania*, Monterey, CA, Co-Chief Scientists T. P. Stanton and R. Lueck. Cartesian Diver deployment; concurrent turbulent dissipation profiling (CAMEL 2); mixed-layer tow-yoing near the drifting platform R/P *FLIP* (MILDEX program).

- March 1984: *RV Ellen B. Scripps*, San Diego, CA, Chief Scientist C. Cox. Cartesian Diver velocity profiling in San Diego Trough; electric field recorder tests.
- May 1984: *MV Fisherette*, San Diego, CA, Chief Scientist T. Duda. Cartesian Diver velocity profiling in San Diego Trough.
- August 1984: *RV John D. Isaacs*, San Diego, CA, Chief Scientist T. Duda. Cartesian Diver velocity profiling in a coastal jet offshore of San Luis Obispo, CA.
- April 1985: *RV Robert G. Sproul*, San Diego, CA, Chief Scientist C. Cox. Cartesian Diver profiling west of Baja California; attempted drag recovery of stranded active electromagnetic crustal sounding gear.
- September 1985: *MV Sand Dollar*, San Diego, CA, Chief Scientist T. Duda. Cartesian Diver velocity profiling in San Diego Trough.
- October 1985: *MV Sand Dollar*, San Diego, CA, Chief Scientist T. Duda. Cartesian Diver velocity profiling in San Diego Trough.
- August 1988: *RV Columbus Iselin*, Miami, FL, Chief Scientist H. Deferrari. Set and recover deep-sea acoustic source and receiver array moorings for a 300-km propagation study. (Two 6-day trips.)
- May 1989: *RV Columbus Iselin*, Miami, FL, Chief Scientist H. Deferrari. Set and recover source and receiver moorings for acoustic propagation study. (Two 6-day trips.)
- April/May 1993: *CSS Hudson*, Halifax, NS, Canada to Las Palmas, Gran Canaria, Spain, Chief Scientist N. Oakey. Sample J. Ledwell's intentional-release chemical tracer; sample microstructure; Cartesian Diver velocity profiling (NATRE mixing study, 39 days).
- September 1995: *RV Oceanus*, Woods Hole, MA, Chief Scientist J. Ledwell. Inject and sample dye; physical measurements (Coastal Mixing and Optics (CMO) Tracer Diffusion Expt., 6 days).
- September 1995: Shearwater testing at Seneca Lake, New York, with Douglas Webb (Webb Research Corp.). Small boats.
- June 1996: Shearwater testing at Seneca Lake, New York, with Douglas Webb and Clayton Jones (Webb Research Corp.). Small boats.
- September 1996: *RV Oceanus*, Woods Hole, MA, Chief Scientist J. Ledwell. Inject and sample dye; physical measurements; microstructure profiling (EPSONDE, N. Oakey) (CMO, 14 days).
- August 1997: *RV Oceanus*, Woods Hole, MA, Chief Scientist J. Ledwell. Inject and sample dye; physical measurements; microstructure profiling (EPSONDE, N. Oakey); towed microstructure recording (CMO, 14 days).
- April 2000: *RV Revelle*, Pusan, Korea to Kaohsiung, Taiwan, Chief Scientist J. Lynch. ASIAEX pilot study: moorings, CTD, bottom sampling, seismic survey. (20 days)
- February 2001: *RV Oceanus*, Bridgetown, Barbados to Fortaleza, Brazil, Chief Scientist R. Limeburner. Mooring and CTD's in Antarctic Bottom Water at the equator in the Atlantic; deployment of Shearwater abyssal drifting floats in the Guiana Basin. (14 days)
- April 2001: *RV Ocean Researcher 1*, Kaohsiung, Taiwan, Chief Scientist Y. J. Yang. ASIAEX South China Sea mooring deployment cruise, instruments deployed at 31 sites, CTD's. (7 days)
- May 2001: *RV Ocean Researcher 1*, Kaohsiung, Taiwan, Chief Scientist Y. J. Yang. ASIAEX South China Sea mooring recovery cruise. Mooring recoveries, CTD casts, compromised mooring search and salvage. (8 days)

August 2004: *RV Endeavor*, Narragansett, RI, Chief Scientist T. Duda. Towed instrument study of continental shelf turbulent mixing. (7 Days)

Workshops and Panels

WOCE *Ad Hoc* Motional Electromagnetic Measurements Group, UW-APL, February 1989.

Office of Naval Research Acoustic Tomography Review, Arlington VA, November 1989.

ASA Meeting, Acoustical Oceanography Section, Internal waves and turbulence lecture session and panel discussion, May 1990.

ASA Meeting, Acoustical Oceanography Section, Acoustical measurement of ocean mesoscale and gyre-scale variability lecture session and panel discussion, November 1990.

North Atlantic Current Workshop, University of Rhode Island, March 1992.

ONR Shallow-Water Acoustics Workshop, Naval Research Lab, Stennis Space Center, October 1996.

ONR Long-Range Acoustics Workshop, Lake Arrowhead, CA, March 1997.

ONR/IOS/WHOI Internal Solitary Wave Workshop, October 1998 (See "Other Professional Activities").

ONR ASIAEX program workshops (4), June 2000, Oct. 2001, Oct. 2002, and March 2004.

ONR Capturing Uncertainty workshops (3), June 2001, June 2003, June 2004.

ONR Acoustic Observatory/Robust Passive Sensor (AO/RPS) Testbed Workshop, Newport, RI, June 2002.

ONR Internal Solitary Wave Workshop, Williamsburg, VA, July 2003.

ONR 2006 Shallow-Water Experiment Planning Workshop, Monterey, CA, February 2004.

ONR Nonlinear Littoral Internal Wave and Assessing the Effectiveness of Parameterizations Workshops, Herndon, VA, May 2004.

ONR 2006 Shallow-Water Expt. Planning Workshops, Alexandria, VA, March 2005; Minnea. MN, Oct. 2005.

ONR Nonlinear Littoral Internal Wave Initiative Workshop, San Francisco, CA, August 2005.

Reviewer

Journal of Geophysical Research

Journal of Atmospheric and Oceanic Technology

Journal of Marine Research

IEEE Journal of Oceanic Engineering

Cambridge University Press

Marine and Freshwater Research

U.S. National Science Foundation (Physical Oceanography, Ocean Instrumentation, Arctic Programs, Engineering SBIR)

Journal of the Acoustical Society of America

Journal of Physical Oceanography

Deep-Sea Research

Continental Shelf Research

Geophysical Research Letters

Natural Environment Research Council-UK

Nat. Sci. and Eng. Research Council-Canada

WHOI Institutional and Departmental Activities

Applied Ocean Physics and Engineering Department seminar organizer, 9/91—12/1992

Ad Hoc Search Committee for AOPE Department Chair (two times)

WHOI Staff Committee (Chair 1996-1997)

Ad Hoc Internal Promotion Committee, Assistant to Associate Scientist (1996)

Ad Hoc Committee for Independent Study Awards (1995)

Ad Hoc Committee for Vetlesen and Penzance Awards (1996)

Tenured Scientist Executive Committee (Changed to Scientific Staff E.C.) (2003-2006; Chair, 2006)

AOPE Ocean Acoustics Laboratory Lab Head (2000 -)

AOPE Staff Recruitment Committee (2006. Chair)

AOPE Department softball team

MIT/WHOI Joint Program Educational Activities

WHOI Postdoctoral Scholar Fellowship Award Committee (Five times)

Principal Advisor, Suzanne W. Wetzel (one year)

Chair, ScD Thesis defense of D. Andrew Trivett, 1991

Ocean Engineering candidacy research oral exams, 1993

Ocean Engineering candidacy course material oral exams, 1994

Chair, PhD Thesis defense of Richard A. Pawlowicz, 1994

ScD Thesis Committee memberships (2): Robert Headrick, Brian Sperry

Postdoctoral Scholar Advisor (Chris Rehmann)

Other Professional Activities

Ad Hoc Student Paper Award Judgment Committees: Oceans'97 Conference; Fall 1998, Fall 1999, and Fall 2003 ASA meetings.

Scientific Judge, Boston Regional Competition, 1998 and 2000 National Ocean Science Bowl.

Thesis reader, two Australian universities.

ONR/IOS/WHOI Workshop: Internal Solitary Waves in the Ocean: Their Physics and Implications for Acoustics, Biology and Geology, October 1998. Co-organizer with Dr. David Farmer of IOS.

ASA Meeting Technical Program Organizer, Fall 1999 and Fall 2002.

Member, Technical Committee on Acoustical Oceanography, Acoustical Society of America,

Chair, IEEE-OES Technical Committee on Environmental Acoustics, 2005- .