

Timothy Frederick Duda

Scientist Emeritus and Emeritus Research Scholar

Applied Ocean Physics and Engineering Department, MS 11

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

Research Interests

Internal gravity waves, internal tides, ocean turbulence and mixing, ocean acoustic propagation, acoustic remote sensing, submerged float technology, 3-D aspects of acoustic fields.

Education

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)

Professional Experience

1986	Postdoctoral research, Ocean Research Division, Scripps Institution of Oceanography, UC San Diego (with Prof. Charles S. Cox)
1986-1988	Postdoctoral 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 (WHOI)
1995-2011	Associate Scientist, WHOI
2011-2023	Senior Scientist, WHOI
11/2023 -	Scientist Emeritus, WHOI
06/2024 -	Emeritus Research Scholar, WHOI
2000-2020	Lab Manager, Ocean Acoustics and Signals Lab, WHOI APOE Dept.

Professional Society Membership

American Geophysical Union, American Meteorological Society, Acoustical Society of America (*Fellow*), Institute of Electrical and Electronics Engineers (IEEE) (*Senior Member*), IEEE Oceanic Engineering Society.

Awards and Honors

- UC Davis President's Scholarship (1975, declined)
- ARCS Scholarship (1977-79)
- ASA Fellow (2010)
- Editors' Citation for Excellence in Refereeing – J. of Geophysical Research Oceans (2014)
- Walter A. and Hope Noyes Smith Chair for Excellence in Oceanography (WHOI) (2019)

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, <https://doi.org/10.1002/jez.1402070208>, 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, <https://doi.org/10.1029/GL014i008p00793>, 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, [https://doi.org/10.1175/1520-0426\(1988\)005%3C0016:TCDASP%3E2.0.CO;2](https://doi.org/10.1175/1520-0426(1988)005%3C0016:TCDASP%3E2.0.CO;2), 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, <https://doi.org/10.1029/JC093iC05p05130>, 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. Niemyer, 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] Duda, T. F., Ocean sound channel ray path perturbations from internal-wave shear and strain, *J. Acoust. Soc. Am.*, 118, 2899-2903, 2005.
- [33] Lynch, J. F., J. A. Colosi, G. Gawarkiewicz, T. F. Duda, A. D. Pierce, M. Badiey, B. G. Katsnelson, J. H. 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 Eng.*, 31, 33-48, 2006.
- [34] Duda, T. F., Comparison of deep-ocean finescale 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.
- [36] Heaney, K. D., G. Gawarkiewicz, T. F. Duda and P. F. J. Lermusiaux, Non-linear optimization of autonomous undersea vehicle sampling strategies for oceanographic data assimilation, *J. Field Robotics*, 24, 437-448, 2007.
- [37] Tang, D. J., J. N. Moum, J. F. Lynch, P. Abbot, R. Chapman, P. Dahl, T. Duda, G. Gawarkiewicz, S. Glenn, J. A. Goff, H. Graber, J. Kemp, A. Maffei, J. Nash and A. Newhall, Shallow Water 2006: a joint acoustic propagation/nonlinear internal wave physics experiment, *Oceanography*, 20(4), 156-167, 2007.
- [38] Duda, T. F. and L. Rainville, Diurnal and semidiurnal internal tide energy flux at a continental slope in the South China Sea, *J. Geophys. Res. C (Oceans)*, 113, C03025, 2008.
- [39] Collis, J. M., T. F. Duda, J. F. Lynch, and H. A. Deferrari, Observed limiting cases of horizontal field coherence and array performance in a time-varying internal wavefield, *J. Acoust. Soc. Am.*, 124, EL97-EL103, 2008.
- [40] Duda, T. F., Revisiting experimental methods for studies of acidity-dependent ocean sound absorption, *J. Acoust. Soc. Am.*, 125, 1971-1981, 2009.
- [41] Li, Q., D. M. Farmer, T. F. Duda, and S. Ramp, Acoustical measurement of nonlinear internal waves using the inverted echo sounder, *J. Atmos. Oceanic Technol.*, 26, 2228-2242, 2009.
- [42] Lin, Y.-T., T. F. Duda, and J. F. Lynch, Acoustic mode radiation from the termination of a truncated nonlinear internal gravity wave duct in a shallow ocean area, *J. Acoust. Soc. Am.*, 126, 1752-1765, 2009.
- [43] Lynch, J. F., Y.-T. Lin, T. F. Duda and A. E. Newhall, Acoustic ducting, reflection, refraction, and dispersion by curved nonlinear internal waves in shallow water, *IEEE J. Oceanic Eng.*, 35, 12-27, 2010.
- [44] Udovydchenkov, I. A., T. F. Duda, S. C. Doney and I. D. Lima, Modeling deep ocean shipping noise in varying acidity conditions, *J. Acoust. Soc. Am.*, 128, EL130-136, 2010.
- [45] Lin, Y.-T., A. E. Newhall, T. F. Duda, P. F. J. Lermusiaux and P. J. Haley, Merging multiple partial-depth data time series using objective empirical orthogonal function fitting, *IEEE J. Oceanic Eng.*, 35, 710-721, doi: 10.1109/JOE.2010.2052875, 2010.

- [46] Du, T., X. Yan and T. Duda, A numerical study on the generation of a distinct type of nonlinear internal wave packet in the South China Sea, *Chinese Journal of Oceanology and Limnology*, 28, 658-666, 2010.
- [47] Chiu, L. Y. S., Y.-T. Lin, C.-F. Chen, T. F. Duda and B. Calder, Focused sound from three-dimensional sound propagation effects over a submarine canyon, *J. Acoust. Soc. Am.*, 129, EL260-EL266, 2011.
- [48] Duda, T. F., Y.-T. Lin and D. B. Reeder, Observationally constrained modeling of sound in curved ocean internal waves: Examination of deep ducting and surface ducting at short range, *J. Acoust. Soc. Am.*, 130, 1173-1187, 2011.
- [49] Gawarkiewicz, G., S. Jan, P. F. J. Lermusiaux, J. L. McClean, L. Centurioni, K. Taylor, B. Cornuelle, T. F. Duda, J. Wang, Y. J. Yang, T. Sanford, R.-C. Lien, C. Lee, M.-A. Lee, W. Leslie, P. J. Haley Jr., P. P. Niiler, G. Gopalakrishnan, P. Velez-Belchi, D.-K. Lee, and Y. Y. Kim, Circulation and intrusions northeast of Taiwan: Chasing and predicting uncertainty in the cold dome, *Oceanography*, 24, 110-121, doi: 10.5670/oceanog.2011.99, 2011.
- [50] McMahon, K. G., L. K. Reilly-Raska, W. L. Siegmann, J. F. Lynch, and T. F. Duda, Horizontal Lloyd mirror patterns from straight and curved nonlinear internal waves, *J. Acoust. Soc. Am.*, 131, 1689-1700, 2012.
- [51] Colosi, J. A., T. F. Duda, Y.-T. Lin, J. F. Lynch, A. E. Newhall, and Bruce D. Cornuelle, Observations of sound-speed fluctuations on the New Jersey continental shelf in the summer of 2006, *J. Acoust. Soc. Am.*, 131, 1733-1748, 2012.
- [52] Colosi, J. A., T. F. Duda, and A. K. Morozov, Statistics of low-frequency normal-mode amplitudes in an ocean with random sound-speed perturbations: Shallow water environments, *J. Acoust. Soc. Am.*, 131, 1749-1761, 2012.
- [53] Lynch, J. F., C. Emerson, P. A. Abbot, G. G. Gawarkiewicz, A. E. Newhall, Y.-T. Lin, and T. F. Duda, On whether azimuthal isotropy and alongshore translational invariance are present in low-frequency acoustic propagation along the New Jersey shelfbreak, *J. Acoust. Soc. Am.*, 131, 1762-1781, 2012.
- [54] Duda, T. F., J. M. Collis, Y.-T. Lin, A. E. Newhall, J. F. Lynch and H. A. DeFerrari, Horizontal coherence of low-frequency fixed-path sound in a continental shelf region with internal-wave activity, *J. Acoust. Soc. Am.*, 131, 1782-1797, 2012.
- [55] Udovychenkov, I. A., M. G. Brown, and T. F. Duda, Piecewise coherent mode processing of acoustic data recorded on two horizontally separated vertical line arrays, *J. Acoust. Soc. Am.*, 131, EL492-498, 2012.
- [56] Udovychenkov, I. A., M. G. Brown, T. F. Duda, J. A. Mercer, R. K. Andrew, P. F. Worcester, M. A. Dzieciuch, B. M. Howe, and J. A. Colosi, Modal analysis of the range evolution of broadband wavefields in the North Pacific Ocean: Low mode numbers, *J. Acoust. Soc. Am.*, 131, 4409-4427, 2012.
- [57] Nash, J. D., E. L. Shroyer, S. M. Kelly, M. E. Inall, T. F. Duda, M. D. Levine, N. L. Jones, and R. C. Musgrave, Are any coastal internal tides predictable? *Oceanography*, 25, 80-95, <http://dx.doi.org/10.5670/oceanog.2012.44>, 2012.
- [58] Lin, Y.-T. and T. F. Duda, A higher-order split-step Fourier parabolic-equation sound propagation solution scheme, *J. Acoust. Soc. Am.*, 132, EL61-EL67, 2012.

- [59] Udovydchenkov, I. A., R. A. Stephen, T. F. Duda, S. T. Bolmer, P. F. Worcester, M. A. Dzieciuch, J. A. Mercer, R. K. Andrew and B. M. Howe, Bottom interacting sound at 50 km range in a deep ocean environment, *J. Acoust. Soc. Am.*, 132, 2224-2231, 2012.
- [60] Lin, Y.-T., J. M. Collis, and T. F. Duda, A three-dimensional parabolic equation model of sound propagation using higher-order operator splitting and Padé approximants, *J. Acoust. Soc. Am.*, 132, EL364-370, 2012.
- [61] Nash, J. D., S. M. Kelly, E. L. Shroyer, J. N. Moum and T. F. Duda, The unpredictable nature of internal tides on continental shelves, *J. Phys. Oceanogr.*, 42, 1981-2000, doi: <http://dx.doi.org/10.1175/JPO-D-12-028.1>, 2012.
- [62] Lin, Y.-T., T. F. Duda and A. E. Newhall, Three-dimensional sound propagation models using the parabolic-equation approximation and the split-step Fourier method, *J. Comput. Acoust.*, 21, 1250018, doi: 10.1142/S0218396X1250018X, 2013.
- [63] Duda, T. F., A. E. Newhall, G. Gawarkiewicz, M. J. Caruso, H. C. Graber, Y. J. Yang and S. Jan, Significant internal waves and internal tides measured northeast of Taiwan, *J. Mar. Res.*, 71, 47-81, 2013.
- [64] Udovydchenkov, I. A., M. G. Brown, T. F. Duda, P. F. Worcester, M. A. Dzieciuch, J. A. Mercer, R. K. Andrew, B. M. Howe, and J. A. Colosi, Weakly dispersive modal pulse propagation in the North Pacific Ocean, *J. Acoust. Soc. Am.*, 134, 3386-3394, 2013.
- [65] Zhang, W. G. and T. F. Duda, Intrinsic nonlinearity and spectral structure of internal tides at an idealized Mid-Atlantic Bight shelfbreak, *J. Phys. Oceanogr.*, 43, 2641-2660, 2013.
- [66] Zhang, W. G., T. F. Duda and I. A. Udovydchenkov, Modeling and analysis of internal-tide generation and beamlike onshore propagation in the vicinity of shelfbreak canyons, *J. Phys. Oceanogr.*, 44, 834-849, <http://dx.doi.org/10.1175/JPO-D-13-0179.1>, 2014.
- [67] Lin, Y.-T., T. F. Duda, C. Emerson, G. Gawarkiewicz, A. E. Newhall, B. Calder, J. F. Lynch, P. Abbot, Y.-J. Yang and S. Jan, Experimental and numerical studies of sound propagation over a submarine canyon northeast of Taiwan, *IEEE J. Oceanic Eng.*, 40, 237-249, <http://dx.doi.org/10.1109/JOE.2013.2294291>, 2015.
- [68] Emerson, C., J. F. Lynch, P. Abbot, Y.-T. Lin, T. F. Duda, G. G. Gawarkiewicz, and C.-F. Chen, Acoustic propagation uncertainty and probabilistic prediction of sonar system performance in the southern East China Sea continental shelf and shelfbreak environments, *IEEE J. Oceanic Eng.*, 40, 1003-1017, <http://dx.doi.org/10.1109/JOE.2014.2362820>, 2015.
- [69] Mikhalevsky, P. N., H. Sagen, P. F. Worcester, A. B. Baggeroer, J. Orcutt, S. E. Moore, C. M. Lee, K. J. Vigness-Raposa, L. Freitag, M. Arrott, K. Atakan, A. Beszczynska-Moeller, T. F. Duda, B. D. Dushaw, J. C. Gascard, A. N. Gavrilov, H. Keers, A. K. Morozov, W. H. Munk, M. Rixen, S. Sandven, E. Skarsoulis, K. M. Stafford, F. Vernon, and M. Y. Yuen, Multipurpose acoustic networks in the Integrated Arctic Ocean Observing System, *Arctic*, 68:5 (Supplement 1), <http://dx.doi.org/10.14430/arctic4449>, 2015.
- [70] Heaney, K. D., P. F. J. Lermusiaux, T. F. Duda and P. J. Haley, Validation of genetic algorithm based optimal sampling for ocean data assimilation, *Ocean Dynamics*, 66, 1209-1229, [10.1007/s10236-016-0976-5](http://dx.doi.org/10.1007/s10236-016-0976-5), 2016.
- [71] Duda, T. F., A. C. Lavery and C. J. Sellers, Evaluation of an acoustic remote sensing method for frontal-zone studies using double-diffusive instability microstructure data and density interface data from intrusions, *Methods in Oceanography*, 17, 264-281, [10.1016/j.mio.2016.09.004](http://dx.doi.org/10.1016/j.mio.2016.09.004), 2016.

- [72] Kelly, S. M., P. F. J. Lermusiaux, T. F. Duda and P. J. Haley, A Coupled-mode Shallow Water model for tidal analysis: Internal-tide reflection and refraction by the Gulf Stream, *J. Phys. Oceanogr.*, 46, 3661-3679, <http://dx.doi.org/10.1175/JPO-D-16-0018.1>, 2016.
- [73] Cox, C. S., X. Zhang and T. F. Duda, Suppressing breakers with polar oil films: Using an epic sea rescue to model wave energy budgets, *Geophys. Res. Lett.*, 44, 1414-1421, <http://dx.doi.org/10.1002/2016GL071505>, 2017.
- [74] Duda, T. F., Modeling and forecasting ocean acoustic conditions, for *The Sea, Ideas and Observations on Progress in the Study of the Seas. v 17. The Science of Ocean Prediction*. Editors N. Pinardi, P. Lermusiaux and K. Brink. Sears Foundation for Marine Research, *J. Mar. Res.*, 75(3), 435-457, <https://doi.org/10.1357/002224017821836734>, 2017.
- [75] Duda, T. F., Acoustic signal and noise changes in the Beaufort Sea Pacific Water duct under anticipated future acidification of Arctic Ocean waters, *J. Acoust. Soc. Am.*, 142, 1926, <https://doi.org/10.1121/1.5006184>, 2017.
- [76] Duda, T. F., Y.-T. Lin, M. Buijsman and A. E. Newhall, Internal tidal modal ray refraction and energy ducting in baroclinic Gulf Stream currents, *J. Phys. Oceanogr.*, 48, 1969-1993, <https://doi.org/10.1175/JPO-D-18-0031.1>, 2018.
- [77] Lynch, J. F., G. G. Gawarkiewicz, Y.-T. Lin, T. F. Duda, and A. E. Newhall, Impacts of ocean warming on acoustic propagation over continental shelf and slope regions. *Oceanography* 31(2), 174-181, <https://doi.org/10.5670/oceanog.2018.219>, 2018.
- [78] Duda, T. F., Y.-T. Lin, A. E. Newhall, K. R. Helfrich, J. F. Lynch, W. G. Zhang, P. F. J. Lermusiaux, and J. Wilkin, Multiscale multiphysics data-informed modeling for three-dimensional ocean acoustic simulation and prediction, *J. Acoust. Soc. Am.*, 146, 1996-2015, <https://doi.org/10.1121/1.5126012>, 2019.
- [79] DeCourcy, B. J. and T. F. Duda, A coupled mode model for omnidirectional three-dimensional underwater sound propagation, *J. Acoust. Soc. Am.*, 148:1, 51-62, <https://doi.org/10.1121/10.0001517>, 2020.
- [80] Duda, T. F., W. G. Zhang and Y.-T. Lin, Effects of Pacific Summer Water layer variations and ice cover on Beaufort Sea underwater sound ducting, *J. Acoust. Soc. Am.*, 149, 2117-2136, <https://doi.org/10.1121/10.0003929>, 2021.
- [81] Poulain, P.-M., P. Oddo, G. Pennucci, C. Lewis, J. Sliwka, T. F. Duda and A. Drago, Observations of internal tidal dynamics southwest of Malta in the central Mediterranean Sea, *Cont. Shelf Res.*, 254, 104922, <https://doi.org/10.1016/j.csr.2022.104922>, 2023.
- [82] Kucukosmanoglu, M., J. A. Colosi, P. F. Worcester, M. A. Dzieciuch, H. Sagen, T. F. Duda, W. G. Zhang, C. W. Miller, and E. L. Richards, Observations of the space/time scales of Beaufort Sea acoustic duct variability and their impact on transmission loss via the mode interaction parameter. *J. Acoust. Soc. Am.*, 153 (5): 2659-2676, <https://doi.org/10.1121/10.0019335>, 2023.
- [83] Ballard, M. S., A. Sanchez-Rios, R. T. Taylor, T. F. Duda, J. T. Farrar, H. Simmons, J. D. Sagers, J. Mackinnon, A. J. Lucas, L. Johnson, A. Brakstad and I. Fer, Hydrographic variability and sound-channel dynamics in the Nordic Seas: Implications for predicting acoustic arrival structure. *Journal of Geophysical Research: Oceans*, 131, e2025JC023781. <https://doi.org/10.1029/2025JC023781>, 2026.

- [84] Duda, T. F., P.-M. Poulain, S. Falchetti, G. Pennucci, P. Oddo and G. Giorli, Temporally stable bottom-interacting upslope sound propagation South of Malta, *J. Acoust. Soc. Am.*, 159, 5476-5490, <https://doi.org/10.1121/10.0043949>, 2026.

Other Publications

- [*1] 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.
- [*2] 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.
- [*3] 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.
- [*4] 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.
- [*5] 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.
- [*6] 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.
- [*7] 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. Ref. Ser.* 92-17, 44 pp, 1992.
- [*8] 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
- [*9] 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.
- [*10] Duda, T. F., and D. C. Webb, The drifting, rotating deep-ocean Shearmeter, in *Oceans '97 Conference Proceedings*, MTS/IEEE, pp. 794-799, 1997.
- [*11] 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.
- [*12] 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.
- [*13] 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.

- [*14] Lord, J., J. Irish, T. Duda and J. Kemp, LOCOMOOR: A Low-cost mooring for the measurement of internal solitary waves, in *Proc. ONR/MTS Buoy Workshop 2000, Woods Hole*, 2000.
- [*15] 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.
- [*16] 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.
- [*17] 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.
- [*18] 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.
- [*19] Heaney, K. D., and T. F. Duda, Non-linear optimization of multi-vehicle ocean sampling networks for cost-effective ocean prediction studies, in *Oceans '06 (Singapore) Conference proceedings*, IEEE/MTS, May 2006.
- [*20] Duda, T. F., A. K. Morozov, B. M. Howe, M. G. Brown, K. Speer, P. Lazarevich, P. F. Worcester, and B. D. Cornuelle, Evaluation of a long-range joint acoustic navigation/thermometry system, in *Oceans '06 (Boston) Conference proceedings*, IEEE/MTS, Sept 2006. (6 pp.)
- [*21] Duda, T. F., B. M. Howe and B. D. Cornuelle, Acoustic systems for global observatory studies, in *Oceans '06 (Boston) Conference proceedings*, IEEE/MTS, Sept 2006. (6 pp.)
- [*22] Duda, T. F., Initial results from a Cartesian three-dimensional parabolic equation acoustical propagation code, WHOI Tech. Rept., WHOI-2006-14, 2006. (20 pp.)
- [*23] Duda, T. F., B. M. Howe and J. H. Miller, Acoustics in global process ocean observatories, *Sea Technology*, 48, 35-38, 2007.
- [*24] Duda, T. F., Examining the validity of approximations to fully three-dimensional shallow-water acoustic propagation through nonlinear gravity waves, in *Oceans '07 (Aberdeen) Conference proceedings*, IEEE, June 2007. (5 pp.)
- [*25] Duda, T. F., and J. Collis, Acoustic field coherence in four-dimensionally variable shallow water environments: Estimation using co-located horizontal and vertical line arrays, in *Proceedings of 2nd International Conference on Underwater Acoustic Measurements: Technologies and Results*, J. S. Papadakis and L. Bjorno, Eds., 2007 (8 pp.)
- [*26] Irish, J. D., J. F. Lynch, J. N. Kemp, T. F. Duda and A. E. Newhall, A moored array for measuring internal solitary waves during Shallow Water 06, Oceans 2007 Vancouver Conference Proceedings, doi 10.1109/OCEANS.2007.4449170, 2007 (6 pp.)

- [*27] Newhall, A. E., T. F. Duda, K. von der Heydt, J. D. Irish, J. N. Kemp, S. A. Lerner, S. P. Liberatore, Y.-T. Lin, J. F. Lynch, A. R. Maffei, A. K. Morozov, A. Shmelev, C. J. Sellers, W. E. Witzell, Acoustic and oceanographic observations and configuration information for the WHOI moorings from the SW06 experiment, Woods Hole Oceanog. Inst. Tech. Rept., WHOI-2007-04, 2007.
- [*28] Reeder, D. B., T. F. Duda and B. Ma, Short-range acoustic propagation variability on a shelf area with strong nonlinear internal waves, in *Oceans '08 Kobe Conference Proceedings*, IEEE, April 2008 (8 pp.)
- [*29] Duda, T. F. and A. D. Pierce, History of environmental acoustics, 1960's to 2000's, in *Oceans '08 Quebec Conference Proceedings*, IEEE/MTS, September 2008 (7 pp.)
- [*30] Duda, T. F., S. M. Faluotico, E. M. Hobart, J. Ware, and S. Lelievre, The variable-buoyancy drifting DIMES shearmeter instrument, in *Oceans '09 Bremen Conf. Proceedings*, IEEE, May 2009 (5 pp.)
- [*31] Dushaw, B., W. Au, A. Beszczynska-Moeller, R. Brainard, B. Cornuelle, T. Duda, M. Dzieciuch, E. Fahrbach, A. Forbes, L. Freitag, J.-C. Gascard, A. Gavrilov, J. Gould, B. Howe, S. Jayne, O. M. Johannessen, J. Lynch, D. Martin, D. Menemenlis, P. Mikhalevsky, J. H. Miller, W. H. Munk, J. Nystuen, R. Odom, J. Orcutt, T. Rossby, H. Sagen, S. Sandven, J. Simmen, E. Skarsoulis, R. Stephen, S. Vinogradov, K. B. Wong, P. F. Worcester, and C. Wunsch, A Global Ocean Acoustic Observing Network, Community white paper, in *Proceedings of "Ocean Information for Society: Sustaining the Benefits, Realizing the Potential, OceanObs '09"*, September 21-25, 2009, Venice, Italy, 2009.
- [*32] Sagen, H., S. Sandven, A. Beszczynska-Moeller, O. Boebel, T. F. Duda, L. Freitag, J. C. Gascard, A. Gavrilov, C. M. Lee, D. K. Mellinger, P. Mikhalevsky, S. Moore, A. K. Morozov, M. Rixen, E. Skarsoulis, K. Stafford, E. Tveit, and P. F. Worcester, Acoustic technologies for observing the interior of the Arctic Ocean, in *Proceedings of "Ocean Information for Society: Sustaining the Benefits, Realizing the Potential, OceanObs '09"*, September 21-25, 2009, Venice, Italy, 2009.
- [*33] Lynch, J. F., T. F. Duda, Y.-T. Lin and A. E. Newhall, Nonlinear internal wave interactions with low frequency shallow water sound -- What is left to do?, in *Proceedings of the 2nd International Conference on Shallow Water Acoustics*, Sept. 16-20, 2009, Shanghai, China, 2009.
- [*34] Duda, T. F., Y.-T. Lin, A. E. Newhall, W. Zhang and J. F. Lynch, Computational studies of time-varying three-dimensional acoustic propagation in canyon and slope regions, in *Oceans 2010 Seattle Conference Proceedings*, IEEE/MTS, Sept 2010 (6 pp.)
- [*35] Newhall, A. E., G. G. Gawarkiewicz, J. F. Lynch, T. F. Duda, N. M. McPhee, F. B. Bahr, C. D. Marquette, Y.-T. Lin, S. Jan, J. Wang, C.-F. Chen, L. Y. S. Chiu, Y. J. Yang, R.-C. Wei, C. Emerson, D. Morton, T. Abbot, P. Abbot, B. Calder, L. Mayer, P. F. J. Lermusiaux, Acoustics and oceanographic observations collected during the QPE Experiment by Research Vessels OR1, OR2 and OR3 in the East China Sea in the summer of 2009, WHOI Technical Report WHOI -2010-06, 2010.
- [*36] Duda, T. F., Y.-T. Lin, W. Zhang, B. D. Cornuelle, P. F. J. Lermusiaux, Computational studies of three-dimensional ocean sound fields in areas of complex seafloor topography and active ocean dynamics, in *Proceedings of 10th International Conference on Theoretical and Computational Acoustics, ICTCA 2011*, Taipei, World Scientific Publishing, 2011.

- [*37] Lin, Y.-T., A. E. Newhall, T. F. Duda and C.-F. Chen, Numerical considerations for three-dimensional sound propagation modeling: Coordinate systems and grid sizes, in *Proceedings of 10th International Conference on Theoretical and Computational Acoustics, ICTCA 2011*, Taipei, Taiwan, World Scientific Publishing, 2011.
- [*38] Duda, T. F., Theory and observation of anisotropic and episodic internal wave effects on 100-400 Hz sound, in *Proceedings of 4th International Conference on Underwater Acoustic Measurements: Technologies and Results*, J. S. Papadakis and L. Bjorno, Eds., 999-1006, 2011.
- [*39] Duda, T. F., W. G. Zhang and Y.-T. Lin, Studies of internal tide generation at a slope with nonlinear and linearized simulations: Dynamics and implications for ocean acoustics, in *Oceans 2012 Hampton Roads Conference Proceedings*, IEEE/MTS, Oct. 2012 (6 pp.)
- [*40] Mikhalevsky, P. N., H. Sagen, P. F. Worcester, A. B. Baggeroer, S. E. Moore, C. M. Lee, K. J. Vigness-Raposa, L. Freitag, A. Beszczynska-Moeller, T. F. Duda, B. D. Dushaw, J. C. Gascard, A. N. Gavrilov, A. K. Morozov, W. H. Munk, M. Rixen, S. Sandven, E. Skarsoulis, K. M. Stafford and E. E. Tveit, Multipurpose acoustic networks in the integrated Arctic Ocean Observing System, Community White Paper for the Arctic Observing Summit, 2013.
- [*41] Duda, T. F., Y.-T. Lin and B. D. Cornuelle, Scales of time and space variability of sound fields reflected obliquely from underwater slopes, *Proc. Meet. Acoust.*, 19, 070025, 2013.
- [*42] Colin, M. E. G. D., T. F. Duda, L. A. te Raa, T. van Zon, P. J. Haley Jr., P. F. J. Lermusiaux, W. G. Leslie, C. Mirabito, F. P. A. Lam, A. E. Newhall, Y.-T. Lin, and J. F. Lynch, Time-evolving acoustic propagation modeling in a complex ocean environment, in *Oceans '13, Bergen Conference Proceedings*, IEEE/MTS, 2013.
- [*43] Lynch, J. F., T. F. Duda, W. L. Siegmann, J. Holmes and A. E. Newhall, The Carey Number in shallow water acoustics, in *Proceedings of the 1st International Underwater Acoustics Conference*, Corfu, Greece, 2013.
- [*44] Lynch, J. F., Y.-T. Lin, T. F. Duda and A. E. Newhall, Characteristics of acoustic propagation and scattering in marine canyons, in *Proceedings of the 1st International Underwater Acoustics Conference*, Corfu, Greece, 2013.
- [*45] Duda, T. F., Plenary presentation: Identifying and meeting new challenges in shallow-water acoustics, in *Proceedings of Acoustics 2013 (AAS2013)*, *Science, Technology and Amenity*, Australian Acoustical Society, 2013.
- [*46] Lynch, J. F., T. F. Duda and J. A. Colosi, Acoustical horizontal array coherence lengths and the “Carey Number”, *Acoustics Today*, 10, 10-19, <http://dx.doi.org/10.1121/1.4870172>, 2014.
- [*47] Duda, T. F., Y.-T. Lin, A. E. Newhall, K. R. Helfrich, W. G. Zhang, M. Badiey, P. F. J. Lermusiaux, J. A. Colosi and J. F. Lynch, The “Integrated Ocean Dynamics and Acoustics” (IODA) hybrid modeling effort, in *Proceedings of the 2nd Underwater Acoustics Conference and Exhibition, Rhodes, Greece*, Eds. J. S. Papadakis and L. Bjørnø, 621-628, http://www.uaconferences.org/docs/Past_Proceedings/UACE2014_Proceedings.pdf, 2014.
- [*48] Duda, T. F., W. G. Zhang, K. R. Helfrich, A. E. Newhall, Y.-T. Lin, J. F. Lynch, P. F. J. Lermusiaux, P. J. Haley Jr., and J. Wilkin, Issues and progress in the prediction of ocean submesoscale features and internal waves, in *Oceans '14 St. John's Conference Proceedings*, IEEE/MTS, 2014. (9 pp.)

- [*49] Duda, T. F., and C. J. Sellers, Microscale, finescale, and mesoscale measurements made during the 2004 Structured Mixing Project (Micro-Tow 04) cruise, WHOI Technical Report WHOI-2016-02, 2016.
- [*50] Duda, T. F., W. G. Zhang, K. R. Helfrich, Y.-T. Lin and A. E. Newhall, Modeling internal solitary wave development at the head of a submarine canyon, for 8th International Symposium on Stratified Flows (ISSF), San Diego, CA, USA, 2016.
<https://escholarship.org/uc/item/2xm7j16t>
- [*51] Duda, T. F., B. D. Cornuelle and Y.-T. Lin, Quantifying acoustic field horizontal variability and acoustic system performance in a canyon with internal tides, in *Acoustic & Environmental Variability, Fluctuations and Coherence Conference Proceedings*, Cambridge, UK, Institute of Acoustics, 2016.
- [*52] Dushaw, B., J. Colosi, T. Duda, M. Dzieciuch, B. Howe, A. Kaneko, H. Sagen, E. Skarsoulis, and X. Zhuh, Ocean acoustic tomography: A missing element of the ocean observing system, in *Proceedings of UACE2017, the 4th Underwater Acoustics Conference and Exhibition*, J. S. Papadakis, Editor, Skiathos, Greece, ISSN: 2408-0195, 2017.
- [*53] Duda, T. F., A. E. Newhall, K.R. Helfrich, W. G. Zhang, Y.-T. Lin, and P. F. J. Lermusiaux, Predicting internal wave packet characteristics and acoustic signal coherence, in *Proceedings of the 5th International Conference and Exhibition on Underwater Acoustics*, Hersonissos, Crete, 2019.
- [*54] Duda, T. F., W. G. Zhang, Y.-T. Lin and A. E. Newhall, Long-range sound propagation in the Canada Basin, in *Proceedings of the 5th International Conference and Exhibition on Underwater Acoustics*, Hersonissos, Crete, 2019.
- [*55] Duda, T. F., J. Bonnel, E. Coelho, and K. D. Heaney, Computational acoustics in oceanography: The research roles of sound field simulations, *Acoustics Today*, 15(3), 28-37, 2019.
- [*56] Duda, T. F., K. Manganini, A. E. Newhall, J. C. Peterson. M. B. Porter, and P.A. Traykovski, Measurements of harbor features and acoustic properties, in *Proceedings of Oceans Virtual Conference, 2020, Singapore and Gulf Coast*, IEEE, 2020.
- [*57] Miller, J. H., J. A. Colosi, T. F. Duda, and J. F. Lynch: A Conversation with ASA Publications Editor-in-Chief Jim Lynch, *Acoustics Today*, 17, 57-65, 2021.
- [*58] Duda, T. F. and B. D. Cornuelle, Summary of Acoustics-in-Focus panel discussion special session “Underwater sound modeling: Comprehensive environmental descriptions”, *Proc. Mtgs. Acoust.* **43**, 00200, <https://doi.org/10.1121/2.0001469>, 2021.
- [*59] Duda, T. F., P. A. Traykovski, J. J. Johnson, S. Singh, K. Manganini and M. B. Porter, Measurements of harbor features and underwater acoustic data transmission performance, *OCEANS 2022, Hampton Roads*, Hampton Roads, VA, USA, pp. 1-10, doi: 10.1109/OCEANS47191.2022.9976996, 2022.
- [*60] Ballard, M, *et al.*, Northern Ocean Rapid Surface Evolution (NORSE): Science and Experiment Plan. U. Washington Applied Physics Lab., Technical Report APL-UW TR 2102, 2022.

[*61] Singh, S., J. J. Johnson, P. A. Traykovski, T. F. Duda, M. B. Porter and L. Freitag, Performance of the WHOI Acoustic Modem in Shallow Water Constrained Environments," *OCEANS 2025 Brest*, Brest, France, pp. 1-5, doi: 10.1109/OCEANS58557.2025.11104684, 2025.

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.

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").

ASIAEX project workshops. October 2001, Maui; October 2002, Chengdu, March 2003, Taipei.

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

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

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

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

ORION Observatory OOI Design and Implementation Workshop, Salt Lake City, March 2006.

NRL-sponsored Littoral Battlespace Sensor Fusion and Integration Meeting, Stennis Space Center, December 2006.

NSF Workshop on Strongly Nonlinear Internal Waves, New Jersey Institute of Technology, March 2007

Five ONR Shallow-Water'06/Nonlinear Internal Wave Workshops, 2007, 2008(2), 2009 and '10.

DIMES Southern Ocean Workshop, 2008.

Naval Research Lab. Technical Metrics Workshop, 2008.

ONR Underwater Signal Processing Program Review, Seattle, WA August 2010

ONR Quantifying, Predicting and Exploiting Uncertainty Workshop, Taipei, Nov. 2010.

Ocean Integration in Earth System Prediction Capability (ESPC) Workshop: Data Assimilation, U. of Maryland, Sept. 2011.

Fram Strait/ACOBAR workshop, Scripps Inst, UCSD, April 2012

Oceanography of the Continental Shelf and Slope: Pioneer Array Science Workshop. U. Mass. Dartmouth, June 2012.

ONR Ocean Acoustics Program Review, Stennis Space Center, MS April 2013

ONR International Workshop on Arctic Ocean Tomography, Arlington, VA January 2014.

ONR Seabed Characterization Experiment Workshop, December 2014.

Underwater Acoustics Signal Processing Workshop (UASP 2015). Oct. 2015.

ONR Canada Basin Acoustic Propag. Expt. (CANAPE) planning workshop, UCSD, Jan. 2016

ONR Ocean Acoustics Program Review, Stennis Space Center, MS, April 2016

ONR Seabed Characterization Experiment Workshop. 15-17 Aug. 2017. At URI Bay Campus and USGS Woods Hole.

Navy Task Force Ocean Working Group 2: Understanding Modeling and Prediction, Sept. 2017.

Navy Task Force Ocean Working Group 3: Naval Applications and Decision Aids., Sept. 2017.

ONR Canada Basin Acoustic Propagation Expt. (CANAPE) workshop, UCSD, March 2019.

ONR Ocean Acoustics Program Review, Stennis Space Center, MS, April 2019

Navy Task Force Ocean Tactical Oceanography Symposium 2, Environmental Support to Theater ASW, June 4-6, 2019, NAVO, Stennis Space Center.

US Navy Scientist to Sea workshops, August 2019.

NATO (CMRE) Workshop on *Developing Rapid Environmental Assessment Requirement and Capabilities for Anti-Submarine Warfare in a Rapidly Thawing Arctic Ocean*, 8-12 March 2021.

Workshop Participant: *Antarctic Subsea Cable Workshop: High-Speed Connectivity Needs to Advance US Antarctic Science*. June 29-July 1, 2021. Online.

ARPA-E Marine Carbon Sensing Workshop: *Measurement, Reporting, and Verification (MRV) Technologies for Ocean Carbon Dioxide Removal*, June 15-16, 2022.

Task Force Ocean Technical Exchange Meeting (TOTEM), NUWC, Newport RI. September 20-22, 2022.

ONR Ocean Acoustics program review, Naval Postgraduate School (Monterey, CA), Sept. 2023.

ICE_PPR 2025 Arctic Experiment workshop, Newport, RI, October 2023.

Tactical Oceanography Technical Exchange Meeting (TOTEM), MIT Lincoln Laboratory, Lexington, MA, Dec. 12-13, 2024.

Tactical Oceanography Technical Exchange Meeting (TOTEM), MIT Lincoln Laboratory, Lexington, MA, Mar. 26-27, 2026.

Oceanographic Cruises and Field Work

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.

July 1980: *RV Ellen B. Scripps*, San Diego, CA, Chief Scientist C. Cox. Cartesian Diver velocity and microstructure profiler testing.

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, 6 days).
- September 1995: Shearmeter testing at Seneca Lake, New York, with Douglas Webb (Webb Research Corp.). Small boats.
- June 1996: Shearmeter 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 Sci. 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 Shearmeter abyssal drifting floats in the Guiana Basin. (14 days)
- April 2001: *RV Ocean Researcher I*, 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 I*, Kaohsiung, Taiwan, Chief Scientist Y. J. Yang. ASIAEX South China Sea mooring recovery cruise. Mooring recoveries, CTD casts, compromised mooring search, drag, and salvage. (8 days)

- August 2004: *RV Endeavor*, Narragansett, RI, Chief Scientist T. Duda. Towed instrument study of continental shelf turbulent mixing. (7 Days)
- July-Sept. 2006: *RV Knorr*, Woods Hole, MA, Chief Scientist J. Lynch. ONR SW06 mooring cruises. Environmental and acoustic mooring deployment and recovery. (2 cruises 17 days)
- May 2008: *RV Robert Gordon Sproul*, San Diego, CA. Chief Scientist T. Duda. DIMES Shearwater testing in San Diego Trough. (3 days)
- Sept. 2009: *RV Ocean Researcher I*, Keelung, Taiwan, Chief Scientist Y.-J. Yang. ONR QPE program adaptive acoustic and environmental sampling NE of Taiwan. (8 days)
- June 2016: *RV Neil Armstrong*, Woods Hole, MA, Chief Scientist G. Lawson. Science Verification Cruise VI: Biophysical interactions at the New England shelf break and slope. Scientific echo sounder operation, analysis of physical fields. (6 work days)
- March 3-10, 2017: *R/V Neil Armstrong* Cruise No. AR10, Chief Scientist P. Wilson, South New England Shelf area ONR Seabed Characterization 2017 field study. Manage deployment of 5 acoustic/PO mooring and 3 PO moorings, verification of acoustics, localization of moorings. Map shelf/slope water with EK80 sonar and CTD.
- March 23-April 4, 2017: *R/V Neil Armstrong* Cruise No. AR13, Chief Scientist C. Holland. South New England Shelf area ONR Seabed Characterization 2017 field study. Map shelf/slope water front physical features and biology with EK80 sonar, CTD, underway CTD and XBTs. Make measurements in support of acoustics north of the front in the mooring area.
- May 30-June 3, 2017: *R/V Neil Armstrong* Cruise No. AR18a, Chief Scientist A. Plueddemann. Coastal Pioneer 8 deployment (OOI). Map shelf/slope water front physical features and biology with EK80 sonar and CTD.
- Oct 22-25, 2017. *R/V Neil Armstrong* Cruise No. AR24a, Coastal Pioneer 9 service (OOI). Map and study shelf/slope water front physical feature and biology with EK80 sonar, CTD, and rosette mounted ADCP.
- 20 November 2017. Bathymetric survey of the Fore River Shipyard section of Weymouth Fore River with Jetyak system.
- 24 May 2018. *MV Dawn Treader*. Acoustic propagation study of the Fore River Shipyard section of Weymouth Fore River with Jetyak source system, moorings and boat deployed source. Chief Scientist T. Duda.
- 12 June 2019. *MV Dawn Treader*. Acoustic propagation study of the Fore River Shipyard section of Weymouth Fore River with Jetyak source system, moorings, and boat deployed source. Chief Scientist T. Duda.
- 10 Nov 2021. Bathymetric survey of the Fall River Harbor section of Taunton River with autonomous platform
- 27 April 2022. *MV Catapult*. Acoustic propagation study in Fall River Harbor with Jetyak source system, moorings, and boat deployed source. Chief Scientist T. Duda.
- 23 April 2025. *MV Integrity*. Acoustic survey of Fall River Harbor with autonomous surface vehicle.

Journal and Book Reviews

Advances in Meteorology
Atmosphere-Ocean
 Cambridge University Press

Chinese Journal of Oceanology and Limnology
Continental Shelf Research
Deep-Sea Research
Dynamics of Atmospheres and Oceans
Earth and Space Science
Geophysical Research Letters
IEEE Journal of Oceanic Engineering
IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control
Journal of Atmospheric and Oceanic Technology
Journal of Geophysical Research
Journal of Marine Research
Journal of Marine Systems
Journal of Ocean Technology
Journal of Physical Oceanography
Journal of the Acoustical Society of America
Marine and Freshwater Research
Nature Geoscience
Nature Scientific Reports
Nonlinear Processes in Geophysics
Ocean Dynamics
Ocean Modelling
PLOS ONE
Progress in Oceanography
Sensors
 Springer (Physics)
Surveys in Geophysics
Texas National Security Review
U.S. Navy Journal of Underwater Acoustics

Government Agency/NGO Service

- Natural Environment Research Council-UK: Reviewer
- Natural Sciences and Engineering Research Council of Canada: Reviewer
- US National Oceanic and Atmospheric Administration Office of Ocean Exploration: Reviewer
- US National Science Foundation Reviewer (Physical Oceanography, Polar Programs, Ocean Instrumentation, Biological Oceanography)
- US National Science Foundation Panel (Geoscience Instrumentation SBIR, twice)
- Research Council of Norway: Reviewer
- Israel Science Foundation: Reviewer
- Royal Society of New Zealand: Marsden Fund: Reviewer
- Schmidt Ocean Institute: Reviewer
- Geschäftsstelle des Gutachterpanels Forschungsschiffe (GPF, Germany): Reviewer
- Chilean National Commission for Scientific and Technological Research: Reviewer

Other Professional Activities

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.

Woods Hole Oceanographic Inst. Service

- Member and Chair, WHOI Scientific Staff Executive Committee (3 yr term)
- Member and Chair, WHOI Staff Committee (3 yr term)
- Member, WHOI Postdoc Selection Committee
- Member, AOPE Postdoc Mentoring Committee
- Member, WHOI Library Committee
- Internal funding review panels

Professional Society Service

- Member, Technical Committee on Acoustical Oceanography (AO), Acoustical Society of America (ASA; Seven 3-yr terms)
- Member, ASA-AO Subcommittee on Integrated Acoustics Systems for Ocean Observatories (IASOO)
- Associate Editor, Journal of the Acoustical Society of America (2012 - present)
- ASA meeting technical program organizer (TPOM). Three meetings.
- Chair, IEEE-OES Technical Committee on Environmental Acoustics, 2005 - 2016
- Oceans '08 Kobe meeting: "Asian Seas Acoustics" session organizer
- Spring 2009 ASA meeting: "Coherence and Acoustical Sensing" session organizer
- Fall 2009 ASA meeting: "Ocean Acidity and Acoustics" session organizer; Stanley Flatté Memorial session co-organizer
- Spring 2011 ASA meeting: "Ocean Observatories and Acoustic Observations" session co-organizer
- Fall 2014 ASA meeting: "Parameter Estimation in Environments that Include Out-of-plane Propagation Effects" session co-organizer
- Spring 2016 ASA meeting: "Acoustic Consistency of Ocean Models" session co-organizer
- Spring 2019 ASA meeting: "Future Directions in Acoustical Oceanography" session co-organizer
- Spring 2021 ASA meeting: "Underwater sound modeling, Comprehensive Environmental Descriptions" session co-organizer.
- ASA Medals and Awards Committee (2013-2015, 2017-2018)
- ASA Publication Policy Committee (2013 -)
- ASA Books /Books+ Committees (2014 -, Chair 2014-2016)
- ASA Press Editorial Board (2016 - present)
- IEEE Oceanic Engineering Society Administrative Committee (2020-2022)

Education

Advisor

Chris Rehmann, WHOI Postdoctoral Fellow
Ngoc Tran, WHOI Summer Student Fellow
Anne-Sophie Corbeau, WHOI summer guest student
Odile Hebert, WHOI summer guest student
Suzanne Wetzel, WHOI/MIT Joint Program PhD student (transferred to another advisor)
Ilya Udovydchenkov, ONR Ocean Acoustics Postdoctoral Fellowship
Jinshan Xu, WHOI/MIT Joint Program PhD student
Brendan DeCourcy, ONR Ocean Acoustics Postdoctoral Fellowship

PhD thesis committee member

Four WHOI/MIT joint program PhD students:
R. Headrick, B. Sperry, M. Sundermeyer, P. Echeverri
One URI student: Q. Li
One Northeastern University student: M. Andrews

Thesis Reader

Two University of New South Wales students:
M. DeGabriele (Masters), G. Buckley (PhD)