Eric J. Terrill, Ph.D.

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Professional Interests

- Applied ocean sciences and technology development: coastal and ocean measurement systems, naval hydrodynamics, sensor development, underwater acoustic sensors including Doppler-based high frequency sonar, EM (radar) and EO (lidar, imaging) sensing of the air-sea interface, ocean measurement platforms (HF radar, moorings, buoys, autonomous and towed vehicles, fixed platforms), coastal and ocean engineering. Marine hydrodynamics. Development of, and analysis of data from X-band and HF radar. Use of radar to sense the marine environment. Development of algorithms for interpretation of radar signals. Natural and man made marine signatures.
- Operational Oceanography: Use of environmental data for decision making – realtime data systems, sensor networks, development of products, and validation of forecast models.
- Air-sea and air-sea-land interaction processes: surface waves, wave breaking, near-surface turbulence and bubbles, coastal oceanography, riverine dynamics, extreme forcing events (hurricanes)
- Acoustical oceanography: application of high-frequency acoustics to nearshore, coastal, upper ocean studies, and large scale vessel flows; sound propagation through bubbly flows, acoustic signatures of natural and man made sources.
- Naval Hydromechanics: Flow fields around and near at-sea platforms. Model validation. Full-scale trials.

Project Experience:
Founder and director of the Coastal Observing R&D Center (CORDC) at Marine Physical Laboratory, Scripps Institution of Oceanography. CORDC presently employs a 15-person technical staff of programmers, scientists, and engineers. CORDC presently has funding and contract/grant commitments of approximately $9M, has installed and operates an array of HF radar stations in California (valued at $11.4M), and is the technical lead and manager of a NOAA-funded operational ocean observing system (SCCOOS). The Center's annual budget is in excess of $2M. Terrill serves as principal investigator for funded research projects in a diverse set of applied and technical disciplines with sponsorship from the Office of Naval Research (ONR), National Science Foundation (NSF), National Oceans and Atmospheric Administration (NOAA), USN-Carderock, International Boundary Water Commission, City of Imperial Beach, County of San Diego, State of California, as well as contracts with private industry. Joint research programs are conducted with various DOD agencies and federal laboratories.

Employment History

Director of CORDC	Scripps Institution of Oceanography, UCSD	2003-present
Assistant Research Oceanographer	Scripps Institution of Oceanography, UCSD	2003
Assistant Project Scientist (50%)	Scripps Institution of Oceanography, UCSD	1999-2003
Principal Development Engineer (50%)	Scripps Institution of Oceanography, UCSD	1999-2003
Postgraduate Researcher	Scripps Institution of Oceanography, UCSD	1998-1999
Graduate Student Researcher	Scripps Institution of Oceanography, UCSD	1992-1998
casual consultant	Coastal Environments	1992-1998
intern and technician	University of Hawaii	1990

Education

- Ph.D. Physical Oceanography - Applied Ocean Sciences

Scripps Institution of Oceanography, University of California, San Diego. February 1998.

- B.S. Applied Mechanics and Engineering Science (*magna cum laude*),

University of California, San Diego, March 1993.

- graduate coursework in coastal and ocean engineering , University of New South Wales, Sydney Australia. 1991.

Synergistic Activities
NSF Ocean Research Interactive Observatory Networks workshop steering committee member. State of California Coastal Ocean Currents Monitoring Program, executive committee. Technical Director and co-Principal Investigator of the Southern California Coastal Ocean Observing System (www.sccoos.org) Scientific liaison to local agencies and conservancies in assisting with local coastal environmental issues. Acoustical Oceanography Technical committee for the Acoustical Society of America, grant reviewer for ocean energy related proposals to the California Energy Small Grant Program. Nearshore Oceanography support for Naval Special Warfare. Task member for several State of California working groups for oceanography and coastal water quality issues. Federal Advisory Committee member for NOAA Integrated Ocean Observing System (IOOS). Office of Naval Research Young Investigator Award (1998).

Field Experience: Chief Scientist on oceanographic research cruises and field experiments using research vessels, navy boats and platforms, autonomous vehicles, aircraft, towed vehicles, and surface and subsurface moorings. Technical Director for the Southern California Coastal Ocean Observing System. Field campaigns in around the globe.

Collaborators
List available upon request

Thesis and Postdoc students Advised
Genevieve Lada (SIO), Ronan Gray (SIO), Sung Yong Kim (SIO), Edwin Beckinbach (SIO), Peter Rogowski (SIO), John Andrechik (USCG), Jeffrey Campana (SIO), Travis Shramek (SIO)

Selected Publications

- Atkinson, M.J., F.I.M. Thomas, N. Larson, **E.J. Terrill** and H. Horita. A micro-hole potentiostatic oxygen sensor for oceanic CTDS. Deep Sea Res. 42(N5):761-771 (1995).
- **Terrill, E.J.** and W.K. Melville. Sound-speed measurements in the surface-wave layer. J. Acoust. Soc. Am. 102(5):2607-2625 (1997).
- **Terrill, E.J.** and W.K. Melville. A Broadband Acoustic Technique for Measuring Bubble size Distributions: Laboratory and Shallow Water Measurements. J. Atmos. Oceanic Tech. 17(N2):220-239 (2000).
- **Terrill, E.J.**, W.K. Melville, and D. Stramski. Bubble entrainment by breaking waves and their influence on optical scattering in the upper ocean. J. Geophys. Res. 106(C8): 16,815-16,823 (2001).
- **Terrill, E.J.**, G. Lada, and W.K. Melville. Surf zone bubble populations. Acoustical Oceanography, 23(2): 212-219 (2001).
- Piskozub, J., D. Stramski, E. **J.Terrill,** and W.K. Mellvile. Influence of forward and multiple light scatter on the measurement of beam attenuation in highly scattering marine environments. Optical Society of America, Vol 43(24): 4723-4731 (August 2004).
- Anderson, K., B., Brooks, P. Caffrey, A. Clarke, L. Cohen, K. Crahan, K. Davidson, A. De Jong, G. De Leeuw, D. Dion, S. Doss-Hammel, P. Frederickson, C. Friehe, T. Hristov, D. Khelif, M. Moerman, J.S. Reid, S. Reising, M. Smith, **E.J. Terrill**, and D. Tsintikidis. The Red Experiment: An Assessment of Boundary Layer Effects in a Trade Winds Regime on Microwave and Infrared Propagation over the Sea Bulletin of the American Met. Society, Vol 85 (9): 1355-1365 (September 2004).
- Roughan, M., **E. J. Terrill**, J. Largier, and M, Otero. Observations of Divergence and Upwelling around Pt. Loma, California. Journal of Geophysical Research, Vol 110, C04011, doi:10.1029/2004JC00262 (2005).
- D'Spain, G. L., E. **J. Terrill**, C. D. Chadwell, J. A. Smith, and S. Lynch. Frequency-only/passive synthetic aperture beamforming with an AUV-mounted hydrophone. J. Acoust. Soc. Am., 120 (6): 3635-3654 (December 2006).
- **Terrill, E.,** M. Otero, L. Hazard, D. Conlee, J. Harlan, J. Kohut, P. Reuter, T. Cook, T. Harriss, K. Lindquist. Data Management and Real-Time Distribution in the HF-Radar National Network. Oceans 2006: 1-6, 10.1109/OCEANS.2006.306883 (September 2006).
- Lipa, B.J., B. Nyden, D. Ullman, **E. Terrill**. SeaSonde radial velocities: derivation and internal consistency, IEEE Journal of Oceanic Engineering, Vol. 31(4):850-861 (October, 2006).
- De Paolo, T., and **E. Terrill**. Skill assessment of resolving ocean surface current structure using Compact-Antenna style HF RADAR and the MUSIC direction finding. Journal of Atmospheric and Oceanic Technology, Vol. 24 (7):1277-1300 (July 2007).
- Ohlmann, C., White, P., Washburn, L., **Terrill, E.**, Emergy, B., and M. Otero. Interpretation of coastal HF radar derived surface currents with high Resolution drifter data. Journal of Atmospheric and Oceanic Technology, Vol. 24 (4): 666-680 (April 2007).
- Kim, S.Y., **Terrill, E.,** and B. Cornuelle. Objectively mapping HF radar-derived surface current data using measured and idealized data covariance matrices. Journal of Geophysical Research, Vol 112, C06021, doi: 10 1029/2006JC003756 (June 2007).
- Warrick, A., P.M. DiGiacomob, S.B. Weisberg, N.P. Nezlinc, M. Mengeld, B.H. Jonese, J.C. Ohlmann, L. Washburn, **E.J. Terrill** and K.L. Farnsworth. River plume patterns and dynamics within the Southern California Bight. Continental Shelf Research, Vol. 27(19): 2427-2448 (November 2007).
- D'Asaro, E, Sanford, T. B., P. P. Niiler, and **E. J. Terrill**. Cold wake of Hurricane Frances. Geophysical Research Letters, Vol 34, L15609, Dol: 10 1029/2007GL030160 (August 2007).
- Beckenbach, E. and **E. J. Terrill**. Internal tides over abrupt topography in the Southern California Bight: Observations of diurnal waves poleward of the critical latitude. Journal of Geophysical Research, Vol 113, C02001, Dol: 10 1029/2006JC003095 (February 2008).
- Kim, S., K., **Terrill, E.,** and B. Cornuelle. Mapping surface currents from HF radar radial velocity measurements using optimal interpolation. Journal of Geophysical Research, 2008. 113, C10023, doi:10.1029/2007JC004244
- Moline, M., Blackwell, S.M., Casse, J.F., Haddock, S. H. D., Herren, C.M., Orrico, C.M., and **E. J. Terrill**. Bioluminescence to Reveal Structure and Interaction of Coastal Planktonic Communities, Deep Sea Research II, February 2009, 232-245 .
- Hoteit, I., B. D. Cornuelle, S. Y. Kim, G. Forget, A. K" ohl, and **E. J. Terrill**, 2008: Assessing 4D-VAR for dynamical mapping of coastal high-frequency radar in San Diego. Dynam. Atmos. Oceans, doi:10.1016/j.dynatmoce.2008.11.005
- Kim, S. Y., B. D. Cornuelle, and **E. J. Terrill**, 2009: Anisotropic response of surface currents to the wind in a coastal region. J. Phys. Oceanogr., 39, 1512–1533, doi: 10.1175/2009JPO4013.1
- Piskozub, J., D. Stramski, **E. Terrill**, W.K. Melville. 2009 Small-scale effects of underwater bubble clouds on ocean reflectance: 3-D modeling results. Optics Express, Vol. 17, Issue 14, pp. 11747-11752 doi:10.1364/OE.17.011747
- Kim, S. Y., **E. J. Terrill**, and B. D. Cornuelle, 2009: Assessing coastal plumes in a region of multiple discharges: the U.S.–Mexico border, Environ. Sci. Tech., 43(19), 7450-7457, doi:10.1021/es900775p
- Zedler, S. E., P. P. Niiler, D. Stammer, **E. Terrill**, and J. Morzel (2009), Ocean's response to Hurricane Frances and its implications for drag coefficient parameterization at high wind speeds, J. Geophys. Res., 114, C04016, doi:10.1029/2008JC005205.
- Wyatt, D.C., Fu, T.C., Taylor, G.L., **Terrill, E.J.,** Xing, T., Bhushan, S., O'Shea, T.T., Dommermuth, D.G. "A Comparison of Full-Scale Experimental Measurements and Computational Predictions of the Transom-Stern Wave of the R/V Athena I," Proceedings of the 27th Symposium on Naval Hydrodynamics, Seoul, KOREA, October 5 – 10 2008.

- **Terrill, E.J.**, Fu, T.C. "At-sea Measurements for Ship Hydromechanics," Proceedings of the 27th Symposium on Naval Hydrodynamics, Seoul, KOREA, October 5 – 10 2008.
- **Terrill, E.J.** and W.K. Melville. Bubbles and surf-zone oceanography. Proceedings of the 16th International Congress on Acoustics and 135th Meeting of the Acoustical Soc. of America. June 22-26, 1998. Seattle, WA. pp. 703-704. (1998)
- **Terrill, E.J.**, W.K. Melville and D. Stramski. Bubble entrainment by breaking waves and their effects on the inherent optical properties of the upper ocean. Proceedings of the SPIE Ocean Optics 00XIV. 1998. Kona, HI. (1998)
- **Terrill, E.J.** and W.K. Melville. Field measurements of bubble size distributions in the upper mixed layer. Proceedings of the Air-Sea Interface Symposium, Sydney, Australia (1999).
- **Terrill, E.J.** and W.K. Melville. Bubbles and surf-zone oceanography. Proceedings of the 16th International Congress on Acoustics and 135th Meeting of the Acoustical Soc. of America. June 22-26, 1998. Seattle, WA. pp. 703-704. (1998)
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- **E. Terrill**, W. K. Melville. Characterizing Bubble and Surface Wave Processes During the Rough Evaporation Duct Experiment, 12th Conference on Interactions of the Sea and Atmosphere. American Meteorology Society Annual meeting (2003).
- **Terrill, E.**, Lewis, M., Tiny Bubbles. An Overlooked Optical Constituent Oceanography. Special Issue on Coastal Ocean Optics and Dynamics, TOS, Vol 17, #2, p.11, June 2004.
- **E. Terrill**, M. Otero, L. Hazard, D. Conlee, J. Harlan, J. Kohut, P. Reuter, T. Cook, T. Harris, K. Lindquist. Data Management and Real-time Distribution in the HF-Radar National Network. IEEE Oceans 2006.
- Black, P. G., D'Asaro, E. A., Drennan, W. M., French, J. R., Niller, P. P., Sanford, T. B, **Terrill, E. J.**, Walsh, E. J., Zhang, J. A. Bulletin of the American Meteorology Society. Air–sea exchange in hurricanes: synthesis of observations from the coupled boundary layer air -sea transfer experiment, March 2007.
- **Terrill, EJ**, Taylor, Genevieve. Measuring Waves at Sea for the validation of wave generation and seakeeping codes. 9th International Conference in Numerical Ship Hydrodynamics 2007.
- Fu, T.C., Fullerton, A.M., **Terrill, E.**, and Lada, G. Measurements of the Wave Field Around the R/V Athena I. Proceedings of the 26th Symposium on Naval Hydrodynamics, Rome, Italy, September 17-22, 2006.
- Fu, T.C., Rice, J.R. Rice, **Terrill, E.**, Walker, D.C. & Lada, G. Measurement and Characterization of Full-Scale Ship Waves. ASNE Ships & Ship Systems Technology Symposium (S3TS), Carderock, MD, November 13-14, 2006.
- T. Cook, T. de Paolo, **E.J. Terrill**. Estimates of Radial Current Error from High Frequency Radar Using MUSIC for Bearing Determination. Proceedings of MTS/IEEE Oceans October 2007, DOI 10.1109/OCEANS.2007.4449257.
- Tony de Paolo, Tom Cook, **Eric Terrill**. Properties of HF RADAR Compact Antenna Arrays and Their Relation to the Quality of Music Algorithm Results. Proceedings of MTS/IEEE Oceans October 2007, DOI 10.1109/OCEANS.2007.4449265.
- J.Harlan, **E. Terrill**. NATIONAL HIGH FREQUENCY RADAR NETWORK: UPDATE (090528-019) Oceans 2009, Biloxi MS. 10 pp.
- de Paolo, Tony, & **Terrill, Eric.** (2007). Properties of HF RADAR Compact Antenna Arrays and Their Effect on the MUSIC Algorithm. UC San Diego: Scripps Institution of Oceanography. http://escholarship.org/uc/item/5bw303tj