

James H. Miller, LLC
15 Bean Farm Drive
Kingston, RI 02881

March 14, 2019

To: Andy Teitz

Cost Estimate

Dear Andy,

As we discussed in the phone conversation on March 13, 2019, I will provide the following services concerning the noise issues associated with the East Greenwich waterfront. These services include the following:

- 1) Site visit to the East Greenwich waterfront (1 hour + 1 hour of travel to and from the site)
- 2) Development of a measurement and data analysis plan. (1 hour)
- 3) Measurements and analysis of the received levels in the East Greenwich waterfront activities using an advanced sound level meter. (3 hours + 1 hour of travel to and from the site)
- 4) Estimate the effects of distance, nearby topography and structures on the sound levels at residences based on accepted acoustic modeling paradigms, past experience and engineering judgment. (3 hours)
- 5) Preparation of a report documenting the results of this study and recommendations for possible sound mitigation measures. (4 hours)
- 6) Attendance and testimony at various Town Council, Zoning Board and other meetings and hearings. (2 hours + 1 hour of travel per meeting, initially estimating 2 meetings)
- 7) Any additional testimony, analysis or measurements you request. (as needed)

Based on the above, I estimate a total of 20 hours (4 of which are travel). My hourly rates are \$250 for site visits, measurements, analysis, report writing, and testimony and \$125 for travel. There is also a \$150 equipment charge. The total cost estimate is \$4650. I bill for the hours I spend on the project at the end of each month, and request payment by the 15th of the next month. Attached is my CV as requested.



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SUMMARY

Dr. Miller has consulted on and provided expert testimony at town councils, planning boards and other government agencies for a number of projects involving the modeling, measurement and mitigation of noise from sports facilities, auto racetracks, construction activities on land, rivers and at sea, wedding venues, restaurants and bars, and animal care facilities. He has also provided expert witness testimony in a number of patent infringement cases in the US Patent and Trademark Office, Federal court proceedings, and the US International Trade Commission. Dr. Miller is a Fellow of the Acoustical Society of America (ASA) and was President of the ASA for 2013-2014. In addition to 63 refereed publications in the area of acoustics, sonar and bioacoustics, Dr. Miller has more than 140 other publications and 5 patents. In 2004, URI presented Dr. Miller with the Albert E. Carlotti Faculty Excellence Award for Research. In 1999, he was awarded the URI Marshall Award for Faculty Excellence in Engineering. He won the Naval Postgraduate School Menneken Faculty Award for Excellence in Scientific Research in 1993. He been Principal Investigator on more than 30 extramural research projects in fields of acoustics in air and water, bioacoustics, signal processing and other areas funded by the Office of Naval Research, National Oceanographic and Atmospheric Administration, National Science Foundation and Naval Undersea Warfare Center. Besides the ASA, he is a member of Sigma Xi, Tau Beta Pi, Eta Kappa Nu, IEEE, SNAME and MTS. He is a registered Professional Engineer (Electrical) in the State of Rhode Island, License #9595.

EXPERIENCE

8/95 - present	UNIVERSITY OF RHODE ISLAND Narragansett, Rhode Island
1/06 - present	Professor of Ocean Engineering
7/08 - 6/11	Chair of Ocean Engineering
7/00 -12/05	Professor of Ocean Engineering
8/95 - 6/00	Associate Professor of Ocean Engineering
6/11 – 8/13	NATO Center for Maritime Research and Experimentation La Spezia, Italy
7/12 – 8/13	Deputy Chief Scientist and Head, Strategic Development
6/11 - 6/12	Head, Department of Applied Research
8/87 - 8/95	NAVAL POSTGRADUATE SCHOOL Monterey, California
7/92 - 8/95	Associate Professor of Electrical and Computer Engineering
8/87 - 7/92	Assistant Professor of Electrical and Computer Engineering

EDUCATION

6/83 - 8/87	MASSACHUSETTS INSTITUTE OF TECHNOLOGY WOODS HOLE OCEANOGRAPHIC INSTITUTION, Cambridge and Woods Hole, Massachusetts Joint Program in Oceanographic Engineering Doctor of Science.
9/79 - 3/81	STANFORD UNIVERSITY Stanford, California Master of Science in Electrical Engineering.
9/75 - 6/79	WORCESTER POLYTECHNIC INSTITUTE Worcester, Massachusetts Bachelor of Science in Electrical Engineering with Distinction.

GOOGLE SCHOLAR PAGE

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PATENTS

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2. M. J. Zimmerman and **J. H. Miller**, "3-D Forward Looking Sonar with Fixed Frame of Reference," US Patent No. 7,035,166, April 25, 2006.
3. M. J. Zimmerman and **J. H. Miller**, "High resolution obstacle avoidance and bottom mapping array processing technique," US Patent No. 7,173,879, February 6, 2007.
4. M. J. Zimmerman and **J. H. Miller**, "3-D Forward Looking Sonar with Fixed Frame of Reference for Navigation," US Patent No. 7,355,924, April 8, 2008.
5. J. H. Rooney III, J. T. Gratke, R. J. Lewis, M. F. Janik, T. B. Pederson, W. C. Zurawski, **J. H. Miller**. "Sonar system and method providing low probability of impact on marine mammals," U.S. Patent No. 7486591, February 3, 2009.

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4. **J. H. Miller**, J. F. Lynch, and C.-S. Chiu, "Estimation of sea surface spectra using acoustic tomography," *J. Acoust. Soc. Am.* 86(1), 326-345, (1989).
5. R. C. Dees, **J. H. Miller**, K. P. Schaaff, S. Paulsen, C.-S. Chiu, L. L. Ehret and J. F. Lynch, "Signal Processing in the 1988 Monterey Bay Acoustic Tomography Experiment," in *Acoustical Imaging*, Volume 18, eds. H. Lee and G. Wade, 441-454, Plenum, (1990).
6. R. Hippenstiel, E. Chaulk, and **J. H. Miller**, "Arrival time tracking of partially resolved acoustic rays with application to ocean acoustic tomography," *J. Acoust. Soc. Am.* 92(3), 1759-1762, (1992).
7. **J. H. Miller** and C.-S. Chiu, "Localization of the sources of short duration acoustic signals," *J. Acoust. Soc. Am.* 92(5), 2997-2999, (1992).
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10. J. F. Lynch, A. E. Newhall, C.-S. Chiu, and **J. H. Miller**, "Three-dimensional ray acoustics in a realistic ocean" in *Oceanography and Acoustics: Prediction and Propagation Models*, eds. A. Robinson and D. Lee, AIP Press, 198-232, (1994).
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OTHER PUBLICATIONS & PRESENTATIONS

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2. J. F. Lynch, **J. H. Miller**, G. V. Frisk and C.-S. Chiu, "Multiple Scattering of Normal Modes from Rough Surfaces with Applications to Shallow Water Acoustics and Ocean Acoustic Tomography," Proceedings of the International Symposium on Multiple Scattering of Waves in Random Media and Random Rough Surfaces, Penn. State U., July 29--Aug. 2, 1985.
3. J. F. Lynch, G. V. Frisk and **J. H. Miller**, "Scattering off rough boundaries in ray and normal mode theory with applications to ocean acoustic tomography and shallow water acoustics," 109th Meeting of the Acoustical Society of America, Syracuse, April 8-12, 1985.
4. **J. H. Miller**, C.-S. Chiu, and J. F. Lynch, "Estimating sea surface spectra with acoustic tomography," 112th Meeting of the Acoustical Society of America, Anaheim, December 8-12, 1986.
5. **J. H. Miller**, "Estimation of sea surface wave spectra using acoustic tomography," Doctoral Dissertation, MIT-WHOI Joint Program in Oceanographic Engineering, WHOI-87-31, September 1987.
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8. F. M. Strohm, **J. H. Miller**, and R. H. Bourke, "A Simulation of Ocean Acoustic Tomography using Matched Field Processing," Sixth IEEE ASSP Workshop on Multidimensional Processing, Monterey, CA, September 6-8, 1989.
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13. R. T. Barock, C.-S. Chiu, **J. H. Miller**, R. M. Clancy, and J. F. Lynch, "Acoustic tomographic measurement of oceanic advective heat flux," 119th Meeting of the Acoustical Society of America, State College, PA, May 21-25, 1990.
14. J. F. Lynch, **J. H. Miller** and P. Worcester, "Determination of sea surface characteristics from acoustic tomography data," 120th Meeting of the Acoustical Society of America, San Diego, CA, November 26-30, 1990.
15. E. Chaulk, R. Hippenstiel, and **J. H. Miller**, "Arrival time tracking of partially resolved acoustic rays with application to ocean acoustic tomography," 120th Meeting of the Acoustical Society of America, San Diego, CA, November 26-30, 1990.
16. D. F. Smith, **J. H. Miller**, C.-S. Chiu, and L. L. Ehret, "Eigenray solutions for cross-shelf propagation," 120th Meeting of the Acoustical Society of America, San Diego, CA, November 26-30, 1990.
17. C.-S. Chiu and **J. H. Miller**, "On the use of ocean dynamics to improve acoustic tomography estimates," 121st Meeting of the Acoustical Society of America, Baltimore, MD, April 29-May 3, 1991.
18. C.-S. Chiu, A. J. Semtner, C. M. Ort, **J. H. Miller**, and L. L. Ehret, "A ray variability analysis of sound transmission from Heard Island to California", 122nd Meeting of the Acoustical Society of America, Houston, November 4-8, 1991.
19. **J. H. Miller**, J. F. Lynch, C.-S. Chiu, R. Hippenstiel, E. Chaulk, J. S. Gerber, "Surface wave tomography in Monterey Bay using mode travel time fluctuations", 122nd Meeting of the Acoustical Society of America, Houston, November 4-8, 1991.
20. A. B. Baggeroer, K. Lashkari, **J. H. Miller**, C.-S. Chiu, G. Frogner, P. N. Mikhalevsky, and K. Von Der Heydt, "Vertical array resolution of the normal modes from the Heard Island signals," 122nd Meeting of the Acoustical Society of America, Houston, November 4-8, 1991.
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135. G. R. Potty, J. L. Giard, **J. H. Miller**, C. D. P. Baxter, M. J. Isakson, and B. M. Goldsberry, "Shear wave inversion in a shallow coastal environment," *J. Acoust. Soc. Am.* 136, 2156-2156 (2014).
136. V. Vinciullo, G. R. Potty, K. Cockrell, and **J. H. Miller**, "Improved modal dispersion estimation using vertical array beamforming," *J. Acoust. Soc. Am.* 135, 2359-2360 (2014).
137. G. R. Potty, **J. H. Miller**, S. E. Dossot, J. Dettmer, and J. Bonnel, "Geoacoustic inversions in the East China Sea for a 3D sediment model," *J. Acoust. Soc. Am.* 140, 3065 (2016).
138. G. R. Potty, **J. H. Miller**, "Acoustic and seismic time series analysis using ensemble empirical mode decomposition," *J. Acoust. Soc. Am.* 140, 3423 (2016).

139. G. R. Potty, **J. H. Miller**, "Estimation of shear wave properties using Scholte wave inversions," *J. Acoust. Soc. Am.* 139, 2113 (2016).
140. J. H. Miller, G. R. Potty, Y.-T. Lin, A. Newhall, K. J. Vigness-Raposa, J. Giard, T. Mason, "Overview of underwater acoustic and seismic measurements of the construction and operation of the Block Island Wind Farm," *J. Acoust. Soc. Am.* 141:5, 3993-3993 (2017).
141. G. R. Potty, **J. H. Miller**, S. E. Dosso, J. Bonnel, Marcia J. Isakson, "Sediment parameter inversions in the East China Sea," *J. Acoust. Soc. Am.* 141, 3487 (2017).
142. **J. H. Miller**, G. R. Potty, A. Tripathy, Makio Tazawa, J. Amaral, K. J. Vigness-Raposa, Y.-T. Lin, and A. Newhall, "Source localization using a compact tetrahedral array," *J. Acoust. Soc. Am.* 144, 1745 (2018).
143. A. Tripathy, **J. H. Miller**, G. R. Potty, J. Amaral, K. J. Vigness-Raposa, Y.-T. Lin, and A. Newhall, "Characteristics of the soundscape before and after the construction of the Block Island Wind Farm," *J. Acoust. Soc. Am.* 144, 1856 (2018).
144. K. Unrein, G. R. Potty, **J. H. Miller**, D. Tollefsen, D. P. Knobles, P. S. Wilson, and Y.-T. Lin, "Measurements of modal attenuation using broadband sources in the New England Mud Patch," *J. Acoust. Soc. Am.* 144, 1948 (2018).
145. G. R. Potty, **J. H. Miller**, J. Bonnel, Y.-T. Lin, A. Newhall, D. P. Knobles, and P. S. Wilson, "Characterization of bottom parameters in the New England Mud Patch using geophone and hydrophone measurements," *J. Acoust. Soc. Am.* 144, 1973 (2018).

RESEARCH GRANTS AND CONTRACTS AWARDED

1. Naval Postgraduate School Foundation Research Program, "Engineering Development and Test of Surface and Internal Wave Tomography," \$58,000, FY88.
2. Naval Postgraduate School Foundation Research Program, "Engineering Development and Test of Surface and Internal Wave Tomography," \$46,000, FY89.
3. Monterey Bay Aquarium Research Institute, "Monterey Bay Acoustic Tomography" \$75,000, FY89, with L. J. Ziomek, T. K. Stanton, and E. B. Thornton.
4. Naval Postgraduate School Direct Funding, "Feasibility Study for a Norwegian Sea/Barents Sea Acoustic Tomography Experiment," \$95,000 for FY90, \$55,000 for FY 1991, with C.-S. Chiu.
5. Naval Postgraduate School Direct Funding, "Monitoring Global Acoustic Transmissions," \$45,000, FY91, with C.-S. Chiu and R. Bourke.
6. Office of Naval Research, "Barents Sea Transmission Test: Shallow Water Vertical Array Component," FY92, \$67,000, with C.-S. Chiu and R. Bourke.
7. Office of Naval Research, "Global acoustic path variability study," FY92, \$30,000, with C.-S. Chiu and A. J. Semtner.
8. Naval Undersea Warfare Center, "Localization of time domain signals," FY92, \$40,000, with C.-S. Chiu.
9. Office of Naval Research, "Barents Sea Transmission Test: Shallow Water Vertical Array Component," FY93, \$130,000, with C.-S. Chiu and R. Bourke.
10. Advanced Research Projects Agency, "Global acoustic path variability study," FY93, \$80,000, with C.-S. Chiu and A. J. Semtner.
11. Naval Undersea Weapons Center, "Localization of time domain signals," FY93, \$80,000, with C.-S. Chiu.
12. Naval Research Laboratory, "Shallow water classification," FY93, \$30,000, with C.-S. Chiu.
13. Advanced Research Projects Agency, "Global acoustic path variability study," FY94, \$120,000, with C.-S. Chiu and A. J. Semtner.
14. Naval Undersea Weapons Center, "Localization of time domain signals," FY94, \$65,000, with C.-S. Chiu.
15. Office of Naval Research, "Barents Sea Polar Front Experiment: Data Analysis," FY94, \$55,000, with C.-S. Chiu and R. Bourke.
16. Office of Naval Research, "Middle Atlantic Bight Field Study," FY95- 96, \$40,000.
17. Office of Naval Research, "Middle Atlantic Bight Field Study: SUS Component," FY96-99, \$120,000.
18. National Marine Fisheries Service, "Development of an Acoustic Tracking System for Harbor *Porpoises* (*Phocoena phocoena*) in the Vicinity of Gill Nets," FY96-98, \$101,188.
19. National Science Foundation, "Development of Low Cost RAFOS and Telemetry Sound Source," FY98-01, \$160,507, with T. R. Rossby.
20. National Marine Fisheries Service, "Observational Technologies for Marine Mammals," FY99, \$10,000.
21. Naval Undersea Warfare Center, "Tomography and Matched Field Processing for NUWC Ranges," FY99, \$25,000.
22. Office of Naval Research, "Long Range Sediment Tomography," FY00-03, \$452,000.

23. Office of Naval Research, "REMUS Autonomous Underwater Vehicle for Chemical and Acoustic Sensing," FY01, \$250,000, with A. Hanson.
24. Office of Naval Research, "Effects of Sound on the Marine Environment," FY00-04, \$143,000, with G. R. Potty.
25. Office of Naval Research, "Long Range Sediment Tomography: Developing Advanced Experimental Designs," FY04-07, \$679,570, with G. R. Potty.
26. URI Transportation Center, "Calibration of Scour Models using Advanced Sonar Technology for Bridge Safety," FY04, \$142,000, with C. Baxter.
27. URI Partnership for Ocean Instrumentation, "Ocean Elevators for Deep Ocean Science and Exploration," FY05, \$30,000, with D. Coleman, P. Donaghay, R. Tyce, and G. Fischer.
28. URI Transportation Center, "Acoustic detection and monitoring for transportation infrastructure security," FY05, \$110,600, with G. R. Potty.
29. Office of Naval Research, "Acoustic Propagation Physics of Ocean Fronts and Internal Waves using Collaborative Autonomous Underwater Vehicles, FY05-06, \$135,000, with G. R. Potty.
30. Office of Naval Research, "Variability in Geoacoustic Parameters and their Influence on Acoustics in the Context of ESME," FY05-07, \$75,000, with G. R. Potty.
31. Office of Naval Research, "Variability in 3D Acoustic Propagation in Shallow Water near Ocean Fronts," FY07-09, \$750,000, with G. R. Potty.
32. Office of Naval Research, "Estimation of Ocean and Seabed Parameters and Processes using Low Frequency Acoustic Signals," FY10-12, \$540,000 with G. R. Potty.
33. Office of Naval Research, "Seafloor Shear Measurement Using Interface Waves," FY10 DURIP, \$125,000 with G. R. Potty.
34. Office of Naval Research, "The Effects of Sediment Properties on Low Frequency Acoustic Propagation," FY13-15, \$500,000 with G. R. Potty.
35. Office of Naval Research, "A Low-Frequency Source for Interface Wave Generation," FY15-17, \$164,000 with G. R. Potty.
35. Office of Naval Research, "Low Frequency Acoustic Propagation: The Effects of Sediment Properties," FY16-18, \$679,000 with G. R. Potty.
36. Bureau of Ocean Energy Management (HDR, Inc.), "Underwater Acoustic Data Analysis and Measurements for the Block Island Wind Farm," FY15-19, \$236,000 (to date) with G. R. Potty.
37. Army Research Laboratory, "High Resolution Profiling of Ground Properties using Rayleigh Waves," FY16-17, \$86,000, with G. R. Potty, C. Baxter and A. Bradshaw.
38. NASA (Brown University), "Remote Sensing of Sub-Surface Structure of Extraterrestrial Bodies using Laser Doppler Velocimetry Measurements of Rayleigh Waves, FY16-18, \$190,000, with G. R. Potty.
39. Bureau of Ocean Energy Management (HDR, Inc.), "Gulf of Mexico Passive Acoustic Monitoring," FY18-22, \$125,000 (to date) with G. R. Potty.
40. Office of Naval Research, "Southeast New England Navy STEM Coalition, FY18-20, \$1.3M, UCONN and URI (with D. Taggart and A. Shukla)

MAJOR OCEAN RESEARCH CRUISES

1. December 1989, "Monterey Bay Acoustic Tomography Experiment," R/V Point Sur, Co-Chief Scientist.
2. January 1991, "Heard Island Experiment: Monterey Vertical Array Component," R/V Point Sur, Chief Scientist.
3. August 1992, "Barents Sea Polar Front Experiment," USNS Bartlett, Principal Investigator.
4. July 1996, "Middle Atlantic Bight Field Study," R/V Endeavor, Principal Investigator.
5. February 1997, "Middle Atlantic Bight Field Study," R/V Endeavor, Principal Investigator.
6. May/December 1998, "Whale Detection Study using Sonar in Cape Cod Bay," R/V CT-1, Chief Scientist.
7. March 2000, "Asian Seas International Acoustics Experiment (ASIAEX)," R/V Reville, Principal Investigator.
8. June 2001, "Asian Seas International Acoustics Experiment (ASIAEX)," R/V Melville, Principal Investigator.
9. June 2001, "Asian Seas International Acoustics Experiment (ASIAEX)," R/V Shi Yan 2, Principal Investigator.
10. August 2001, "Asian Seas International Acoustics Experiment (ASIAEX)," R/V OR2, Principal Investigator.
11. May 2004, "Mountains in the Sea," NOAA Ship Ronald H. Brown, Scientist and ROV Hercules Navigator.
12. August-September 2006, "Shallow Water 06 Experiment," R/V Knorr, Principal Investigator.
13. July 2012, "Glider Acoustic Sensing of Sediments Cruise (GLASS)," NRV Alliance, Chief Scientist.
14. September 2015, "Block Island Wind Farm Construction Monitoring," R/V Shanna Rose, Co-Chief Scientist.
15. December 2016, "Block Island Wind Farm Operations Monitoring," R/V Tioga, Co-Chief Scientist.
16. March 2017, "Seafloor Characterization Experiment," R/V Sharp, Principal Investigator.
17. March 2019, "Marine Mammal Monitoring at Block Island using Acoustics," R/V Endeavor, Scientist

TEACHING ACCOMPLISHMENTS

Courses Taught (NPS)

1. EC/OC 4490, Ocean Acoustic Tomography (with C.-S. Chiu)
2. EC 4450, Sonar Systems Engineering
3. EC 3500, Analysis of Random Signals
4. EC 3400, Digital Signal Processing
5. EC 2500, Communications Systems Engineering
6. EC 2410, Fourier Analysis of Signals and Systems
7. EC 2400, Discrete Signals and Systems

Course Taught (URI)

1. EGR 105, Foundations of Engineering I
2. EGR 106, Foundations of Engineering II
3. EGR 325, Engineering Entrepreneurship I (w. J. Andries)
4. EGR 326, Engineering Entrepreneurship II (w. R. Nair)
5. OCE 205, Ocean Engineering Design Tools (with R. Tyce, S. Grilli, T. Gregory, and J. Hu)
6. OCE 215, Ocean Engineering Design Laboratory I (with R. Tyce)
7. OCE 216, Ocean Engineering Design Laboratory II (with R. Tyce)
8. OCE 416, Ocean Engineering Professional Practice
9. OCE 471, Underwater Acoustics and Data Analysis
10. OCE 472, Sonar Systems Design
11. OCE 560, Ocean Data Collection
12. OCE 561, Introduction to Oceanographic Data Analysis
13. OCE/ELE 571, Underwater Acoustics I
14. OCE 575, Marine Bioacoustics (with P. Scheifele, K. Vigness Raposa, and G. R. Potty)
15. OCE 661, Analysis of Oceanographic Data (Inverse Techniques) (with Y. Shen and G. R. Potty)
16. OCE 560, Ocean Data Collection Systems
17. OCE 592/OCG594, Exploring Europa's Oceans (with S. D'Hondt)
18. OCE/OCG 506, Num. Models and Data Analysis in Ocean Sci. (with J. Collie, B. Heikes, and C. Kincaid)
19. OCE/ELE 672, Underwater Acoustics II (with G. R. Potty)

Doctoral Dissertation Supervision (URI)

1. G. R. Potty, " Broadband nonlinear inversion for geoacoustic parameters in shallow water," Ph.D. in Ocean Engineering, 5/00.
2. D. Cousins, " A model-based algorithm for environmentally adaptive bathymetry and sound velocity profile estimation," Ph.D. in Ocean Engineering, 5/05.
3. J. Miksis-Olds, "Manatee response to environmental noise," Ph.D. in Oceanography, 5/06, Co-advised with Prof. P. Donaghay.
4. S. Crocker, "Geoacoustic inversion using the vector field," Ph.D. in Ocean Engineering, 8/11, Co-advised with Prof. G. R. Potty.
5. G. Dossot, "Acoustic fluctuations in shallow water due to nonlinear internal waves," Ph.D. in Ocean Engineering, 6/11, Co-advised with Prof. G. R. Potty.
6. H.-K. Kim, "Prediction of structure borne noise radiation and propagation from offshore impact pile driving," Ph.D. in Ocean Engineering, 12/13, Co-advised with Prof. G. R. Potty.
7. J. Amaral, "Analysis of fin whale vocalizations south of Rhode Island," Ph.D. in Ocean Engineering, expected 5/19, Co-advised with Prof. G. R. Potty.
8. N. Rotker, "Continuous active sonar," Ph.D. in Ocean Engineering, expected 05/19.
9. R. Alkinani, "Acoustic Tracking of Underwater Vehicles," Ph.D. in Ocean Engineering, expected, 05/22, Co-advised with Prof. G. R. Potty.

M.S. Thesis Supervision (NPS)

1. T. Rowan, "Monterey Bay Acoustic Tomography: Ray Tracing and Environmental Assessment," M.S. in Systems Technology (ASW) 9/88.
2. LCDR F. Strohm, French Navy, "Simulation of Ocean Acoustic Tomography using Matched Field Processing," M.S. in Electrical Engineering and M.S. in Oceanography, 6/89. Co-advised with Prof. R. Bourke.
3. LT R. Dees, USN, "Signal Processing and Preliminary Results the 1989 Monterey Bay Acoustic Tomography," M.S. in Engineering Acoustics, 6/89.
4. LT P. Lynch, USN, "Computer Simulation of Gold Code Phase Modulation in Ocean Acoustic Tomography," M.S. in Electrical Engineering, 6/89.

5. LT K. Schaaff, USN, "Monterey Bay Acoustic Tomography: Signal Processing Using Multi-Channel Data-Synchronized Quadrature Phase Demodulation," M.S. in Engineering Acoust. and M.S. in Applied Science, 9/89.
6. CAPT R. Scott, Canadian AF, "Parallel Processor Based Gaussian Beam Tracer for Use in Ocean Acoustic Tomography", M.S. in Electrical Engineering, 9/89. Advised with Prof. C.-S. Chiu.
7. LT C.-C. Kao, Taiwan Navy, "The Sensitivity of the Stochastic Acoustic Tomography Estimate to the Uncertainties in the Sound Speed Field Covariance," M.S. in Engineering Acoustics, 12/89. Co-advised with Prof. C.-S. Chiu.
8. LT D. Pierce, USN, "Underwater Source Localization with Matched Field Processing," M.S. in Engineering Acoustics, 12/89. Co-advised with Prof. C. Therrien.
9. LCDR R. T. Barock, USN, "Acoustic Tomographic Estimate of Ocean Advective Heat Flux: A Numerical Assessment in the Norwegian Sea," M.S. In Physical Oceanography, 6/90, Co-advised with Prof. C.-S. Chiu.
10. LT R. Eldred, USN, "Doppler Processing of Acoustic Tomography Signals," M.S. in Electrical Engineering, 9/90.
11. LT(N) Donald Smith, Canadian Navy, "Modeling Acoustic Eigenrays in a 3-D Ocean with Bathymetry," M.S. in Engineering Acoustics, 12/90. Advised with Prof. C.-S. Chiu.
12. LT(N) E. Chaulk, Canadian Navy, "Arrival time tracking of partially resolved acoustic rays with application to ocean acoustic tomography," M.S. in Engineering Acoustics, 1/91. Advised with Prof. Ralph Hippenstiel.
13. LT G. Frogner, USN, "Monitoring Global Acoustic Transmissions: Signal Processing and Preliminary Data Analysis," M.S. in Physical Oceanography, 9/91, Advised with Prof. C.-S. Chiu.
14. LT J. M. Emblidge, "A Feasibility Study of Ocean Acoustic Tomography in the Barents Sea," M.S. in Physical Oceanography, 9/91, Co-advised with Prof. C.-S. Chiu.
15. LT E. L. Westreich, USN, "Modeling Pulse Transmission in Monterey Bay using Parabolic Equation Methods," M.S. in Physical Oceanography, 9/91, Co-advised with Prof. C.-S. Chiu.
16. LT S. E. Crocker, USN, "Time Domain Modal Beamforming for a Near Vertical Acoustic Array," M.S. in Engineering Acoustics, 12/91.
17. LT J. M. Iacovetta, "ARMA Modeling of Acoustic Signals," M.S. in Electrical Engineering, 6/92, Co-advised with Prof. C. Therrien.
18. LT M. Elliot, USN, "Simulation of Acoustic Multipath Arrival Structure in the Barents Sea, M.S. in Physical Oceanography and M.S. in Engineering Acoustics, 6/92, Co-advised with Prof. C.-S. Chiu.
19. LT G. A. Omans, USN, "Broadband Modal Beamforming of Acoustic Tomography Signals Acquired by a Vertical Array, M.S. in Applied Science, 9/92, Advised with LCDR P. J. Rovero.
20. LCDR C. L. Nicholson, USN, "Localization of Acoustic Transients in Shallow Water Environments," M.S. in Electrical Engineering, 12/92, Advised with Prof. C.-S. Chiu.
21. LT J. L. Schultz, USN, "Implementation of a Time Domain Localization Algorithm in the AN/SQR-10 Tactical Towed Array Sonar System," M.S. in Applied Science, 12/92, Advised with Profs. C.-S. Chiu and M. Shields.
22. LT P. G. McLaughlin, "Signal Processing for the 1992 Barents Sea Tomography Experiment," M.S. in Electrical Engineering and M.S. in Engineering Acoustics, 12/93. Advised with Prof. C.-S. Chiu.
23. LT J. L. Mykyta, "Prediction of the Plane Wave Beamformed Acoustic Arrival Structure for the 1992 Barents Sea Coastal Tomography Test," M.S. in Physical Oceanography, 12/93, Co-advised with Prof. C.-S. Chiu.
24. LT J. K. Kresge, "Localization of Submarine Transients in Shallow Water (U)," M.S. in Electrical Engineering, 4/94, Advised with Prof. C.-S. Chiu, (S-NF).
25. LT C. E. Muggleworth, "Shallow Water Reverberation and Measurement and Modeling", M.S. in Electrical Engineering and M.S. in Engineering Acoustics, 6/94, Advised with Prof. C.-S. Chiu.
26. LT W. G. Huelsnitz, "Modelling Tools for Active Classification in Shallow Water Environments", M.S. in Applied Physics and M.S. in Physical Oceanography, 9/94, Advised with Prof. C.-S. Chiu.
27. LTCDR J. Franken, "A Tactical Application of Coastal Acoustic Tomography", M.S. in Engineering Acoustics, 12/94, Advised with Prof. C.-S. Chiu.
28. LCDR G. E. Kaemmerer, "Simulation of acoustic multipath arrival structure in the Middle Atlantic Bight," M.S. in Applied Physics, 6/95, Advised with Profs. C.-S. Chiu and K. B. Smith.
29. LCDR J. L. Benson, "Time-domain localization of transient sources in shallow water," M.S. in Electrical Engineering, 6/95, Advised with Prof. C.-S. Chiu.

M.S. Thesis Supervision (URI)

1. R. Gampert, "Development of an Acoustic Tracking System for Harbor Porpoise," M.S. in Ocean Engineering, 6/98.
2. M. Estaphan, "Acoustic Tomography in Narragansett Bay: A Feasibility Study," M.S. in Ocean Engineering, 6/98.
3. A. Tuttle, "Software Development for the AWARE Obstacle Avoidance Sonar," M.S. in Ocean Engineering, 6/99.
4. T. Weber, "Hardware Development for the AWARE Obstacle Avoidance Sonar," M.S. in Ocean Engineering, expected 2/00.
5. M. Zarnetske, "Transducer Modeling and Calibration using Finite Element Analysis and Wave Propagation Theory," M.S. in Ocean Engineering, 9/99.
6. J. Laliberte, "Analysis of Modal Dispersion in the Middle Atlantic Bight," M.S. in Ocean Engineering, 6/99.
7. Adele Wang, "Development of Sigma-Delta Demodulator for Sonar," M.S. in Electrical Engineering, 12/99, Advised with Prof. Godi Fischer.

8. R. Fortgang, "4-D Acoustic Doppler Profiler", M.S. in Ocean Engineering, expected 8/04.
9. C.-S. Chen, "Time-frequency analysis of underwater acoustic signals in the 2001 ASIAEX – East China Sea Experiment," M.S. in Electrical Engineering, Advised with Prof. Faye Boudreaux-Bartels, 8/02.
10. P. Obuchowski, "Control system for a autonomous underwater vehicle," M.S. in Ocean Engineering, 09/03.
11. S. Sarangapani, "Measuring and Modeling the Target Strength of Divers," M.S. in Ocean Engineering, 06/06.
12. K. Moore, "Evaluation of an autonomous underwater vehicle for acoustic surveys, investigation of 3D propagation effects at the New Jersey Shelf Break Front and acoustic backscatter in controlled water wave fields," M.S. in Ocean Engineering, 08/07.
13. G. Langer, "Phase and travel time variations of acoustic normal modes in shallow water," M.S. in Electrical Engineering, 08/07.
14. LT J. Greene, "Development of a mooring system for a geophone array," M.S. in Ocean Engineering, 06/11.
15. H. Vargas, "Finite element modeling of the propagation of sound from air to water in the Atlanta Aquarium," M.S. in Ocean Engineering, 08/11.
17. P. Aggarwal, "Measurement of geoacoustic signals in mud," M.S. in Ocean Engineering, 12/17.
18. N. Aggarwal, "Modeling geoacoustic signals in mud," M.S. in Ocean Engineering, 12/17.
16. A. Ragusa, "Finite element modeling of the propagation of intense sound from pile driving," M.S. in Ocean Engineering, expected 12/18.
19. C. J. Wesley, "Interface Wave Sediment Profiler: A seismo-acoustic source," M.S. in Ocean Engineering, expected 12/18.
20. K. Cutler, "Modal attenuation coefficients from broadband horizontal array data," M.S. in Ocean Engineering, expected 5/19.
21. J. Moore, "Tracking animals using phase differences on compact arrays," M.S. in Ocean Engineering, expected 5/20.