

AARON M. THODE
Scripps Institution of Oceanography
University of California, San Diego
9500 Gilman Drive, La Jolla CA 92093-0238
athode@ucsd.edu, 858-534-9411

EXPERTISE:

Passive acoustic monitoring of marine mammals using autonomous recorders and towed arrays; acoustic propagation modeling in complex oceanic environments; three-dimensional acoustic tracking using portable array systems, automated detection and signal processing of bio-acoustic signals.

EDUCATION AND WORK HISTORY:

- July 2012- **Scripps Institution of Oceanography**, University of California, San Diego
Full Research Scientist and Senior Lecturer
- Mar 2005- **Scripps Institution of Oceanography**, University of California, San Diego
Associate Research Scientist
- Jan 2002- **Scripps Institution of Oceanography**, University of California, San Diego
Mar 2005 **Project Scientist**
- Oct 1999- **Massachusetts Institute of Technology**, Cambridge, MA
Nov 2001 **Post-Doctoral Scholar in Ocean Engineering**
- June 1999 **Scripps Institution of Oceanography**, University of California, San Diego
Ph.D. in Oceanography
Graduate Advisor: William Kuperman
Dissertation: "Localization, geophysical inversion, and source signature recovery of blue whale vocalizations". Research involved applying matched-field processing (MFP) and DIFAR sonobuoy algorithms to blue whale vocalizations, allowing 3D tracking and geophysical inversion. Demonstrated source signature recovery (propagation effect removal) on calls.
- June 1993 **Stanford University**, Palo Alto, CA
M.S. in Electrical Engineering
Major Field: Antenna and radio propagation.
- June 1993 **Stanford University**, Palo Alto, CA
B.S. in Physics (concurrent with M.S.)
- 1990-94 *Self-Initiated Research:* On own time investigated the feasibility of single-stage-to-orbit (SSTO) launch vehicle concepts. Debugged and installed rocket fuel performance code from NASA, designed and wrote rocket launch simulator, and combined both codes to demonstrate that mixed-mode propulsion techniques could increase the payload capacity of a SSTO by 10-15% with minor design changes.
Gave seminars on research results at Los Alamos and at the McDonnell Douglas Single Stage Rocket Technology Program in 1991. Paper published in 1994 (see below).

AWARDS:

- Dec 2010 Awarded the Medwin Prize in Acoustical Oceanography by the Acoustical Society of America, "for contributions to the development of acoustic methods for marine mammal research and to passive acoustic signal processing".
- Dec 2008 Elected a Fellow at the Acoustical Society of America "for contributions to signal processing in marine mammal research".
- Dec 2004 A.B. Wood Medal, UK Institute of Acoustics-"presented to an individual, under 35 years of age in the year of the Award, for distinguished contributions in the application of acoustics."
- Sep 2002 Office of Naval Research Acoustic Entry-Level Faculty Award.
- Dec 1997 Best Student Paper Award in Underwater Acoustics, Acoustical Society of America Conference in San Diego.

PUBLICATIONS:

- Shane C. Walker, Caglar Yardim, Aaron Thode, and Ery Arias-Castro, "Using Fisher information to quantify uncertainty in environmental parameters estimated from correlated ambient noise," *J. Acoust. Soc. Am.* Volume 133, Issue 4, pp. EL228-EL234 (2013);
- D. Mathias, A.M. Thode, J. Straley, and R.K. Andrews. "Depth and range tracking of sperm whales in the Gulf of Alaska using a two-element vertical array, satellite and bioacoustic tags," *J. Acoust. Soc. Am.* accepted, (2012).
- D. Mathias, A.M. Thode, J. Straley, J. Calambokidis, G.S. Schorr, K. Folkert, "Acoustic and diving behavior of sperm whales (*Physeter Macrocephalus*) during natural and depredation foraging in the Gulf of Alaska," *J. Acoust. Soc. Am.* **132**(1), 518-532, (2012).
- S.B. Blackwell, C.S. Nations, T.L. McDonald, C.R. Greene Jr., A.M. Thode, M. Guerra, A. M. Macrander, "Effects of airgun sounds on bowhead whale call detection rates in the Alaskan Beaufort Sea", in press, *Mar. Mammal Sci.*, (2012).
- A. Thode, K. Kim, S. Blackwell, C. R. Greene Jr., C. Nations, T. McDonald, A. M. Macrander, "Automated detection and localization of bowhead whale sounds in the presence of seismic airgun surveys", *J. Acoust. Soc. Am.* **131**(5), 3726-3747 (2012).
- D. Ponce, A.M. Thode, M. Guerra, J. Urban, S. Swartz, "Relationship between visual counts and call detection rates of gray whales (*Eschrichtius robustus*) in Laguna San Ignacio, Mexico", *J. Acoust. Soc. Am.* **131**(4), 2700-2713 (2012).
- M. Guerra, A.M. Thode, S.B. Blackwell, A.M. Macrander, "Quantifying seismic survey reverberation off the Alaskan North Slope," *J. Acoust. Soc. Am.* **130** (5), 3046-3058 (2011).
- A.M. Thode, J.S. Skinner, P. Scott, J. Roswell, J. Straley, and K. Folkert, "Tracking sperm whales with a towed acoustic vector sensor," *J. Acoust. Soc. Am.* **128**, 2681-2694 (2010).
- A. Thode, K. Kim, C. R. Greene Jr., and E.H. Roth, "Long range transmission loss of broadband seismic pulses in the Arctic under ice-free conditions," *J. Acoust. Soc. Am.* **128**, EL181-EL187 (2010).

- D. Mathias, A. Thode, J. Straley, K. Folkert, "Relationship between sperm whale (*Physeter macrocephalus*) click structure and size derived from videocamera images of a depredating whale," *J. Acoust. Soc. Am.* **125**, 3444-3453 (2009).
- A.M. Thode, J. Straley, C. Tiemann, K. Folkert, V. O'Connell, "Observations of potential acoustic cues that attract sperm whales to longline fishing in the Gulf of Alaska," *J. Acoust. Soc. Am.* **122**(2), 1265-1277 (2007).
- C. Tiemann, A. Thode, J. Straley, K. Folkert, V. O'Connell, "Three-dimensional localization of sperm whales using a single hydrophone," *J. Acoust. Soc. Am.* **120** (4), 2355-65 (2006).
- A.M. Thode, P. Gerstoft, W.C. Burgess, K. Sabra, M. Guerra, M.D. Stokes, M. Noad, and D.C. Cato, "A portable matched-field processing system using passive acoustic time synchronization," *IEEE J. Ocean. Eng.* **31**(3), 696-710 (2006).
- A.M. Thode, "Three-dimensional passive acoustic tracking of sperm whales (*Physeter macrocephalus*) in ray-refracting environments," *J. Acoust. Soc. Am.* **118**(6), 3575-3584(2005).
- K. G. Sabra, P. Roux, A. M. Thode, G. L. D'Spain, W.S. Hodgkiss and W.A. Kuperman, "Using ocean ambient noise for array self-localization and self-synchronization," *IEEE Journal of Oceanic Engineering*, **30**(2), pp. 338-347, (2005).
- A. Thode, "The derivative of a waveguide acoustic field with respect to a three-dimensional sound speed perturbation," *J. Acoust. Soc. Am.*, **115**(6), 2824-2833 (2004).
- A. M. Thode, "Tracking sperm whale (*Physeter macrocephalus*) dive profiles using a towed passive acoustic array," *J. Acoust. Soc. Am.*, **116**(1), 245-253(2004).
- S. Lee, M. Zanolin, A. M. Thode, R. T. Pappalardo and N. C. Makris, "Probing Europa's interior with natural sound sources," *Icarus*, **165**(1), 144-167, (2003).
- A. M. Thode, D.K. Mellinger, S. Stienessen, A. Martinez, K.D. Mullin, "Depth-dependent acoustic features of diving sperm whales in the Gulf of Mexico," *J. Acoust. Soc. Am.*, **112**(1) 308-321, Jul 2002.
- Thode, A.M., M. Zanolin, E. Naftali, I. Ingram, P. Ratilal and N. Makris, "Necessary conditions for a maximum likelihood estimate to become asymptotically unbiased and attain the Cramer-Rao lower bound. II. Range and depth localization of a sound source in an ocean waveguide," *J. Acoust. Soc. Am.*, **112** (5), 1890-1910 (2002).
- A.M. Thode, "Source ranging with minimal environmental information using a virtual receiver and waveguide invariants", *J. Acoust. Soc. Am.* **108**(4), 1582-1594, Oct. 2000.
- A.M. Thode, W.A. Kuperman, G.L. D'Spain and W.S. Hodgkiss, "Localization using Bartlett matched-field processor sidelobes," *J. Acoust. Soc. Am.*, **107** (1), 278-286 (2000).
- A.M. Thode, T. Norris, J. Barlow, "Beamforming on dolphin whistles using a sparse hydrophone array", *J. Acoust. Soc. Am.*, **107**(6), 3581-3584, June 2000.
- A.M. Thode, Gerald L. D'Spain, W.A. Kuperman, "Matched-field processing, source signature recovery, and geoacoustic inversion of blue whale vocalizations," *J. Acoust. Soc. America*, **107**(3), 1286-1300, Mar. 2000.

A. Thode, "The effect of mixed-mode propulsion on the Delta Clipper," J. Practical Applications in Space, **VI** (2), 151-192 (1994).

GRADUATE STUDENTS ADVISED

Dawn Grebner, PostDoctoral Scholar, (2010)

Melania Guerra, PhD (2011)

Delphine Mathias, PhD (2012)

Kerri Seger, co-advisor (2012)

PROFESSIONAL:

Cumulative two years field experience in the Gulf of Mexico, Baja California, and the Arctic Ocean.

Independent Reviewer, NOAA Fisheries Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammals, 2013

Associate Editor, Acoustical Oceanography, Journal of the Acoustical Society of America, 2011-Membership Committee, Acoustical Society of America, 2010-

Reviewer, Journal of the Acoustical Society of America, IEEE J. Oceanic Eng. (listed as Outstanding Reviewer in 2012), Aquatic Mammals, Marine Mammal Science, 1999-present.

Certified Scripps SCUBA Research Diver, 1995-98, 2003-present.

Member, The Society of Marine Mammalogy, 1999-present.

Member, IEEE, American Geophysical Union, 2000-present

Interests include backpacking, sea kayaking, acoustic guitar, and running.

EUROPEAN
CURRICULUM VITAE
FORMAT



PERSONAL INFORMATION

Name DR. KLAUS LUCKE
Address Distelvlinder 44, 1791TP Den Burg, The Netherlands
Telephone +31 (0)317 487470
Fax +31 (0)317 48362
E-mail klaus.lucke@wur.nl
Nationality German

WORK EXPERIENCE

- Dates (from – to) 01. March, 2011 – present
- Name and address of employer Institute for Marine Resources and Ecosystem Studies (IMARES), Wageningen University and Research, The Netherlands
- Type of business or sector Marine Biology Research
- Occupation or position held Researcher/ biological and technical aspects of bioacoustics; coordination of acoustic related research projects; development and implementation of a research strategy on marine mammals; acquisition of research funds; lead underwater acoustics group

- Dates (from – to) 01. January, 1998 – 17. January, 2001
15. March, 2001 – 30. June, 2002
01. April, 2004 – 28. February, 2011
- Name and address of employer Forschungs- und Technologiezentrum Westkueste (FTZ), University of Kiel, Olshausenstrasse 40, 24098 Kiel, Germany
- Type of business or sector Marine Biology Research
- Occupation or position held Researcher/ sensory biology of marine mammals; studies on the impact of anthropogenic sound on the hearing system of marine mammals; development and testing of acoustic mitigation techniques; underwater acoustic measurements; marine mammal telemetry; studies on the habitat use of marine mammals; interim leader of the Department of Ecology of Birds and Marine Mammals at the FTZ; leader of the Acoustics Research Group; conceptual design of research studies and acquisition of research funding; advising students; lectures at the University of Kiel

- Dates (from – to) 01. July, 2002 – 31. March, 2004
- Name and address of employer Ruhr-University Bochum, Universitätsstrasse 150, 44780 Bochum, Germany
- Type of business or sector Marine Biology Research
- Occupation or position held Researcher/ sensory biology of marine mammals; study on the impact of anthropogenic sound on the hearing system of marine mammals

- Dates (from – to) 01. January 2000 – 30. April 2001
- Name and address of employer PROKON Nord Energiesysteme GmbH, D-26789 Leer
 - Type of business or sector Biological Consultancy
 - Occupation or position held Responsible contractor for the baseline environmental impact assessment on marine mammals at the first German offshore windfarm (now: "*alpha ventus*"); design, organisation and accomplishment of line transect surveys on marine mammals habitat use using passive acoustic monitoring (PAM) technology; analysis of abundance, distribution and habitat use of marine mammals and impact assessment

EDUCATION AND TRAINING

- Dates (from – to) July, 2004 – February, 2009
- Name and type of organisation providing education and training Christian-Albrechts-University of Kiel, Germany
- Principal subjects/occupational skills covered Ph.D. thesis: "Auditory studies on marine mammals"
Title of qualification awarded: Ph.D.

- Dates (from – to) November, 1989 – September, 1996
- Name and type of organisation providing education and training Christian-Albrechts-University of Kiel, Germany
Institute of Marine Sciences, D-24118 Kiel
- Principal subjects/occupational skills covered Zoology, Marine Biology, Oceanography
Thesis: "Analysis of the acoustic behaviour of bottlenose dolphins (*Tursiops truncatus*)"
Title of qualification awarded: Diploma

- Dates (from – to) August, 1995 – January, 1996
- Name and type of organisation providing education and training Loughborough University, U.K.
Department of Electronic and Electrical Engineering
- Principal subjects/occupational skills covered Analysis of acoustic recordings and behaviour of a bottlenose dolphin (practical part of Diploma study); basics in electronics; building of electronic devices

- Dates (from – to) July – August, 1996
- Name and type of organisation providing education and training University of California, Santa Cruz, U.S.A.
- Principal subjects/occupational skills covered U.S. Office of Naval Research Scholarship to participate at the "Bioacoustic Oceanography Course"

- Dates (from – to) June, 2008
- Name and type of organisation providing education and training University of Southern Denmark, DK
- Principal subjects/occupational skills covered Ph.D. Class on Research Training of Aquatic Animals
(funded by The Nordic Marine Academy from the Nordic Research Council, and the Research Graduate School SNAK, University of Southern Denmark)

PERSONAL SKILLS AND COMPETENCES

*Acquired in the course of life and career
but not necessarily covered by formal
certificates and diplomas.*

MOTHER TONGUE German

OTHER LANGUAGES

- | | |
|------------------|-----------|
| | English |
| • Reading skills | Fluent |
| • Writing skills | Fluent |
| • Verbal skills | Fluent |
| | Dutch |
| • Reading skills | Very good |
| • Writing skills | Moderate |
| • Verbal skills | Moderate |
| | French |
| • Reading skills | Basic |
| • Writing skills | Basic |
| • Verbal skills | Basic |

SOCIAL SKILLS AND COMPETENCES

*Living and working with other people, in
multicultural environments, in positions
where communication is important and
situations where teamwork is essential
(for example culture and sports), etc.*

Animal Training (especially marine mammals)
Civilian service (20 months) in a school for handicapped children
Several cruises on research vessels (North Sea, Baltic Sea, Caribbean)
Sports: Running, Skating, Diving

ORGANISATIONAL SKILLS AND COMPETENCES

*Coordination and administration of
people, projects and budgets; at work, in
voluntary work (for example culture and
sports) and at home, etc.*

Interim leader of the Department of Ecology of Birds and Marine Mammals at the FTZ Westkueste; leader of the Acoustics Research Group at the FTZ
Organisation of scientific workshops (PAMGUARD, Effects of noise on marine mammals etc.) and conference sessions (e.g. ECUA 2012)

TECHNICAL SKILLS AND COMPETENCES

*With computers, specific kinds of
equipment, machinery, etc.*

Scientific Diving
Scuba Diving
Article 9 officer at Stg. DLO IMARES, The Netherlands
PAMGUARD – certified
Survival at Sea /cf STCW '95 certified (DHTC, Den Helder, The Netherlands)

Computers:
All Windows software
Specialised sound recording and analysis software (custom made and commercial, e.g. AviSoft, Adobe Audition, SpectroPlotter)

Analysis of auditory evoked potentials (using custom made and commercial software, e.g. TDT BioSig)

OTHER SKILLS
AND COMPETENCES
Competences not mentioned above.

DRIVING LICENCE(S)

Car
Truck (to 7.5 t)
Motorbike
Motorboat

ADDITIONAL INFORMATION

KEY QUALIFICATIONS

Marine Ecology (with specialisation in marine vertebrates)
Functional Morphology
Ph.D. in Biological Oceanography, with specialisation on effects of sound on marine mammals
Experienced in measuring and analysing Auditory Evoked Potentials (AEPs)
Measurement and analysis of sound, with specialisation on underwater sound
Marine mammal observer (aerial and ship-based)
Animal training, with specialisation on marine mammals
Construction, deployment and analysis of satellite telemetry devices on marine mammals
Pathology (dissection of marine mammals)

SELECTED PROF. EXPERIENCE

Acquisition of significant research grants
Design and conduct of numerous scientific studies
Teamleader in scientific research studies
Member of various national and international scientific panels
Numerous oral presentations at scientific and policy meetings
Supervision of students (Bachelor, Master, Ph.D.)
Teamleader of a research group on underwater acoustics

REFERENCES

PEER-REVIEWED PUBLICATIONS

- Lucke K.**, Lepper P.A., Blanchet M.-A. and Siebert U. (2011). The use of an air bubble curtain to reduce the received sound levels for harbor porpoises (*Phocoena phocoena*). J. Acoust. Soc. Am., Vol. 130(5/2): 3406-3412
- Lucke, K.**, Dähne, M. Peschko, V., Müller S., Adler S., Gilles A., Krügel K., Brandecker A., Sundermeyer J., Verfuss U., Benke H. and Siebert U. (2011). StUKplus: Investigations in addition to the effects monitoring – marine mammals. Environmental research at alpha ventus – first results, German Federal Maritime and Hydrographic Agency, Hamburg, 10th May 2010, 77-78
- Dudzinski K., Gitter S., Lammers M., **Lucke K.**, Mann D., Simard P., Wall C., Rasmussen M., Magnúsdóttir E. E., Tougaard J. and Eriksen N. (2010). Trouble-shooting deployment and recovery options for various stationary passive acoustic monitoring devices in both shallow and deep water applications. J. Acoust. Soc. Am., Vol. 129(1): 436-448
- Lucke K.**, Lepper P.A., Blanchet M.-A. and Siebert U. (2009). Temporary shift in masked hearing thresholds in a harbor porpoise (*Phocoena phocoena*) after exposure to seismic airgun stimuli. J. Acoust. Soc. Am., Vol. 125(6): 4060-4070.

- Lucke K.**, Lepper P.A., Blanchet M.-A. and Siebert U. (2008). Testing the acoustic tolerance of harbour porpoises for impulsive sounds, *Bioacoustics*, 17: 329-330.
- Shepard E.L.C., Wilson R.P., Liebsch N., Quintana F., Gómez Laich A. and **Lucke K.** (2008). Flexible paddle sheds new light on speed: a novel method for the remote measurement of swim speed in aquatic animals. *Endangered Species Research*, 4: 157-164.
- Lucke K.**, Lepper P.A., Hoeve B., Everaarts E., van Elk N. and Siebert U. (2007). Perception of Low-Frequency Acoustic Signals by a Harbour Porpoise (*Phocoena phocoena*) in the Presence of Simulated Offshore Wind Turbine Noise. *Aquatic Mammals*, 33(1): 55-68.
- Pavlov V.V., Wilson R.P. and **Lucke K.** (2007). A new approach to tag design in dolphin telemetry: Computer simulations to minimise deleterious effects. *Deep-Sea Research part II.*, 54: 404-414.
- Siebert U., Gilles A., **Lucke K.**, Ludwig M., Benke H., Kock K.-H. and Scheidat M. (2006). A decade of harbour porpoise occurrence in German waters - Analyses of aerial surveys, incidental sightings and strandings. *Journal of Sea Research*, 56: 65-80.
- Wilson R.P., Liebsch N., Davies I.M., Quintana F., Weimerskirch H., Storch S., **Lucke K.**, Siebert U., Zankl S., Müller G., Zimmer I., Scolaro A., Campagna C., Plötz J., Bornemann H., Teilmann J. and McMahon C.R. (2007). All at sea with animal tracks; methodological and analytical solutions for the resolution of movement. *Deep Sea Research II*, 54: 193-210.
- Madsen P.T., Wahlberg M., Tougaard J., **Lucke K.** and Tyack P. (2006). Wind turbine underwater noise and marine mammals: Implications of current knowledge and data needs - Review. *Marine Ecology Progress Series*, 309: 279-295.
- Wilson R.P., Kreye J., **Lucke K.** and Urquardt H. (2004). Antennae on transmitters on penguins: balancing energy budgets on the high wire. *Journal of Experimental Biology*, 207: 2649-2662.

MOST RELEVANT REPORTS AND BOOK CHAPTERS

- ICES Advisory Committee (2012): Report of the Working Group on Marine Mammal Ecology (WGMME), ICES CM 2012/ACOM: 27, 146 pp.
- Lucke K.**, Dähne, M., Adler, S., Brandecker, A., Krügel, Sundermeyer, J.K. and Siebert, U. (2012). Evaluating the Effects of Offshore Pile Driving on *Phocoena phocoena* (Harbor Porpoises) by Using Passive Acoustic Monitoring. In: A.N. Popper and A. Hawkins (eds.), *The Effects of Noise on Aquatic Life*, Advances in Experimental Medicine and Biology 730, Springer Science+Business Media: 285-287. DOI 10.1007/978-1-4419-7311-5_63
- Reijnders P.J.H., Brasseur S.M.J.M., Borchardt T., Camphuysen K., Czeck R., Gilles A., Jensen L.F., Leopold M., **Lucke K.**, Ramdohr S., Scheidat M., Siebert U. and Teilmann J. (2009). Marine Mammals. Thematic Report No. 20. In: H. Marencic and J. Vlas J. de (Eds.): Quality Status Report 2009. Wadden Sea Ecosystem No. 25. Common Wadden Sea Secretariat, Trilateral Monitoring and Assessment Group, Wilhelmshaven, Germany. <http://www.waddensea-secretariat.org/QSR-2009/index.htm>
- Bräger S., Brensing K., Caddell R., Detloff K.C., Dolman S., Evans P., Frank V., Haelters J., Kless R., **Lucke K.**, Nunny L., Pavan G., Simmonds M. and Westerberg H. (2009). Report of the ASCOBANS Inter-sessional Working Group on the Assessment of Acoustic Disturbance. 25 pp.
- OSPAR Commission (2009) Overview of the impacts of anthropogenic underwater sound in the marine environment. Publ. No. 441/2009, 134 pp.
- OSPAR Commission (2009) Assessment of the environmental impact of underwater noise. Publ. No. 436/2009, 44 pp.
- Lucke K.**, Lepper P.A., Blanchet M.-A. and Siebert U. (2008) How tolerant are harbour porpoises to

underwater sound? In: K. Wollny-Goerke, K. Eskildsen (Eds.) *Marine mammals and seabirds in front of offshore wind energy – MINOS marine warm-blooded animals in North and Baltic Seas*. Teubner, Wiesbaden, p.59-76.

Lucke K., Sundermeyer J., Driver J., Rosenberger T. and Siebert U. (2008) Too loud to talk? Do wind turbine-related sounds affect harbour seal communication? In: K. Wollny-Goerke and K. Eskildsen (Eds.) *Marine mammals and seabirds in front of offshore wind energy – MINOS marine warm-blooded animals in North and Baltic Seas*. Teubner, Wiesbaden, p.95-110.

Bundesamt für Seeschifffahrt und Hydrographie (Eds.) (2007). Standard: Untersuchungen der Auswirkungen von Offshore-Windenergieanlagen auf die Meeresumwelt (StUK3). 58 pp.

Lucke K., Storch S., Cooke J. and Siebert U. (2006). Literature review of Offshore Windfarms with regard to Marine Mammals. In: C. Zucco, W. Wende, T. Merck, I. Köchling and J. Köppel (Eds.) *Ecological Research on Offshore Wind Farms: International Exchange of Experiences*, Project No.: 804 46 001, Part B: Literature review of the Ecological Impacts of Offshore Wind Farms, p. 199-284.

Lucke K. (2000). Environment Protection Protocol of the Antarctic Treaty, Ausführungsgesetz (AUG) – Assessment of research Application, Season 2000/2001; Assessment of the potential impact of acoustic studies on marine mammals in the Antarctic. Special report (in German) for the German Federal Agency for Nature Conservation, 69 pp.

Lucke K. (2000). Impact of acoustic devices on marine mammals – Use of devices for pelagic fisheries; Assessment of the potential impact of fisheries devices on marine mammals in the Antarctic. Special report (in German) for the German Federal Environmental Agency, 29 pp.

Lucke K. (2000) Marine Mammals and Noise – Impact of Seismic Surveys; Assessment of the potential impact of seismic surveys on marine mammals in the Antarctic. Special report (in German & English) for the German Federal Environmental Agency, 131 pp.

BIOGRAPHICAL SKETCH

Paul E. Nachtigall, Ph.D

EDUCATION

San Jose State University, San Jose California	Psychology	BA	1967
San Jose State University, San Jose California	Experimental Psychology	MA	1970
University of Hawaii, Honolulu Hawaii,	Experimental Psychology	Ph.D	1976

APPOINTMENTS

10/01 – present	Researcher Level 5 (Equivalent to Full Professor), School of Ocean Science and Technology, Hawaii Institute of Marine Biology and Director Marine Mammal Research Program.
06/00-10/01	Interim Director, Hawaii Institute of Marine Biology, University of Hawaii
10/97-06/00	Researcher Level 5 (Equivalent to Full Professor), School of Ocean Science and Technology, Hawaii Institute of Marine Biology and Director Marine Mammal Research Program.
12/97- present	Cooperating Graduate Faculty, Zoology Department, University of Hawaii.
10/83- present	Cooperating Graduate Faculty, Psychology Department, University of Hawaii
10/93-10/97	Visiting Scientist and Director Marine Mammal Research Program (Intergovernmental Personnel Act Assignment), University of Hawaii, Hawaii Institute of Marine Biology
10/82-10/93	Head Research Branch and Division, Naval Command Control and Ocean Systems Center. Kailua Hawaii
6/72-10/82	Bioscientist, Naval Ocean Systems Center, Kailua Hawaii

FIVE RECENT PUBLICATIONS (N=130, + 6 Books)

- Lemons, D.W., Au, W.W.L., Vlachos, S.A., and Nachtigall, P.E. (2012) High Frequency auditory filter shape for the Atlantic bottlenose dolphin. *Jnl Acous Soc Am*, 132, 1222-1228
- Linnenschmidt M., Kloepper, L. N. , M. Wahlberg, M. and Nachtigall, P.E. (2012) Extremely rapid gain control regulation in the biosonar of a harbour porpoise. *Naturwissenschaften* 99, 9, 767-771
- Kloepper, L. N., Nachtigall, P. E., Donahue, M. J., and Breese, (2012) M. Active echolocation Beam focusing in the false killer whale (*Pseudorca crassidens*) *Jnl Exp Biol* 1306-1312
- Li S, Nachtigall PE, Breese M, Supin AY (2012) Hearing Sensation Levels of Emitted Biosonar Clicks in an Echolocating Atlantic Bottlenose Dolphin. *PLoS ONE* 7(1): e29793. doi:10.1371/journal.pone.0029793
- Nachtigall, P.E., Supin, A.Ya., and Breese, M. Hearing, Noise and Echolocating Odontocetes. Popper, A. N. and Hawkins, A. eds. (2012). *Effects of Noise on Aquatic Life*. Springer Science+Business Media, LLC, New York. 49-51.

SYNERGISTIC ACTIVITIES

1. Visiting Professor, Velux Scholar, Institute of Biology University of Southern Denmark Spring/Summer 2010
2. Invited Panel Reviewer, VolkswagenStiftung Foundation. Reviewing the Marine Mammal Science Center's Lichtenberg Professorship program, Rostock University, Rostock Germany, Summer 2010.
3. Invited Doctoral Examiner, University of Aarhus, Denmark, Spring, 2011.
4. Invited Member: National Marine Fisheries Service, Pacific Islands Region, False Killer Whale

- TakeReduction Team , 2009-present
5. Invited Member: Chief of Naval Operations (N-45) Advisory Group on the effects of sound on marine mammals. Washington D.C. 2007-2009
 6. Invited Member: Taras Foundation - Scientific Advisory Board 2002-present
 7. Invited Member: Western Regional Fisheries Management Council - Marine Mammal Advisory Committee. 2005- present
 8. Vice Chair, University of Hawaii Institutional Animal Care and Utilization Committee 2005-present
 9. Honorary Member, European Association for Aquatic Mammals, Fellow Acoustical Society of America
 10. Editor Emeritus, current associate editor: *Aquatic Mammals*.
 11. Charter member, Past President, Society for Marine Mammalogy

COLLABORATORS AND OTHER AFFILIATES (PAST 4 YEARS)

Ketten, D.R. (Harvard University) Donahue, M. J Breese, M. Quintos, C., Vlachos, S. Au, W.W.L. Pacini, A., Kloepper, L.K. Miller, M., Taylor, K.A., Allen, J.S.(University of Hawaii),Linneschmidt, M., Beedholm, K., Wahlberg, M, Hojer-Kristensen, J (University of Southern Denmark) Li, S. (Marine Mammal Institute, Singapore) Supin, A.Ya, (Russian Academy of Sciences) Schuller G. (Ludwig-Maximilians-University Munich) Surrlykke, A.(University of Southern Denmark) Popper, A.N.(University of Maryland) Fay, R.(Loyola University) Ibsen, S. (University of California, San Diego),Lemons, D.W (Lockheed Martin) Branstetter, B.K.(National Marine Mammal Foundation),Hawkins, A. (Loughine Ltd, Aberdeen), Schofield, D. Look, D.A., Levine, G. (National Marine Fisheries Service),Turner, J. (University of Hawaii, Hilo) Gisiner, R. L. (Naval Environmental Office), Mooney, T.A. (Woods Hole Oceanographic Institution) Hanlon, R.T (Marine Biological Laboratory, Woods Hole) Christensen-Dalsgaard J. (University of Southern Denmark, Odense), Madsen, P.T. (Aarhus, University) Reichmuth, C. (University of California, Santa Cruz) DeLong, C.M. (Brown University) Perrin, W.F. (National Marine Fisheries) Würsig, B (Texas A&M) Thewissen (Northeastern Universities College of Medicine). Southall, B.L. (National Marine Fisheries) Bowles, A.E. (Hubbs Research Institute), Ellison,W.T. (Marine Acoustics) Finneran, J.J.(Space and Naval Warfare Systems Center, San Diego) , Gentry, R.L (ProScience Consulting) Greene, C.R.Jr.(Greeneridge Sciences, Inc) , Kastak, D. (University of California, Santa Cruz) Miller J.H.(University of Rhode Island) Richardson, W.J.(LGL LTD) Thomas, J.A. (Western Illinois University), and Tyack, P.L (Woods Hole Oceanographic Institution)Castellote, M., Estaban, J.A. (Parques Reunidos Valencia S. A. L'Oceanogràfic) Schusterman, R.J.(University of California, Santa Cruz), Miller, L.A. (University of Southern Denmark, Odense), Akamatsu, T. (National Research Institute – Japan)Teilman, J (Aarhus University) Rasmussen M.H., Vikingsson G. A. (Húsavik University Center, University of Iceland)

GRADUATE ADVISORS

C.A. Thomson – M.A. Thesis Advisor
M.E. Bitterman- Ph. D Doctoral Advisor

GRADUATE STUDENT ADVISOR (PAST 5 YEARS)

Laura Kloepper – Zoology
Kristen Taylor- Zoology
Meike Linnenschmidt – University of S. Denmark
Aliza Milette – Psychology
Ali Bayless- Zoology
Sanami Nakayama- Zoology

Aude Pacini – Zoology
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POST GRADUATE SPONSOR

Songhai Li

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CURRICULUM VITAE

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EDUCATION:

- B.A. Ohio Wesleyan University, Delaware, Ohio; Zoology; *summa cum laude* & Phi Beta Kappa (1991)
- Ph.D. Woods Hole Oceanographic Institution & Massachusetts Institute of Technology, Biological Oceanography (1999)

Dissertation Title:

Sound use, sequential behavior, and ecology of foraging bottlenose dolphins, *Tursiops truncatus*

Dissertation Advisor:

Peter L. Tyack

POSITIONS:

Postdoctoral Fellow, Department of Biology, Woods Hole Oceanographic Institution (1999–2002)
Postdoctoral Research Associate, National Research Council/National Oceanic and Atmospheric Administration, Northeast Fisheries Science Center (2000–2002)
Staff Scientist, Sensory Biology and Behavior Program, Center for Marine Mammal and Sea Turtle Research, Mote Marine Laboratory (2002–2003)
Guest Investigator, Woods Hole Oceanographic Institution (2002–2003)
Assistant Professor, Department of Oceanography, Florida State University (2003–2008)
Associate Professor, Duke University, Nicholas School of the Environment & Pratt School of Engineering (2008-present)

CURRENT PROFESSIONAL SERVICE:

Western Gray Whale Advisory Panel, The World Conservation Union (IUCN), Gland, Switzerland
Society for Marine Mammalogy, Member of Board of Governors
North Atlantic Right Whale Consortium, Chair & Board Member
Invited Guest Editor, *Marine Ecology Progress Series*
Atlantic Scientific Review Group, NOAA Fisheries
Adjunct Scientist, Mote Marine Laboratory

Adjunct Faculty, Biological Sciences, University of North Carolina, Wilmington
Cetacean Specialist Group, Species Survival Program, The World Conservation Union, Switzerland
Acoustical Society of America, Animal Bioacoustics Committee

PAST PROFESSIONAL SERVICE:

Associate Editor, *Marine Mammal Science*
National Fish and Wildlife Foundation, Reviewer (2007)
NSF Biological Oceanography, Reviewer (2006)
Independent Scientific Review Panel, The World Conservation Union (IUCN), Gland, Switzerland
(2005)
NOAA Right Whale Program, Reviewer (2004)
NOAA, National Marine Fisheries Service, Atlantic Large Whale Take Reduction Team, Northeast
Implementation Team (2000-02)

PEER REVIEWED PUBLICATIONS:

Published or In Press:

54. Buckstaff, K.C., Wells, R.S., Gannon, J.G., & D.P. Nowacek. Responses of bottlenose dolphins to construction and demolition of coastal marine structures. In Press. *Aquatic Mammals*
53. Stimpert, A.K., Peavey, L.E., Friedlaender, A.S., and Nowacek, D.P. 2012. Humpback whale song and foraging behavior on an Antarctic feeding ground. *PLoS ONE* 7(12): e51214. doi:10.1371/journal.pone.0051214.
52. Espinasse, B. Zhou, M., Zhu, Y., Hazen, E.L., Friedlaender, A.S., Nowacek, D.P., Chu, D., and Carlotti, F. 2012. Austral fall–winter transition of mesozooplankton assemblages and krill aggregations in an embayment west of the Antarctic Peninsula. *Mar Ecol Prog Ser* Vol. 452: 63–80, doi: 10.3354/meps09626
51. Rolland, R.M., Parks, S.E., Hunt, K.E., Castellote, M., Corkeron, P.J., Nowacek, D.P., Wasser, S.K., and Kraus, S.D. 2012. Evidence that ship noise increases stress in right whales. *Proceedings of the Royal Society B: Biological Sciences*. Published online 8 February 2012, doi: 10.1098/rspb.2011.2429.
50. Johnston, D.W., Friedlaender, A.S., Read, A.J., and Nowacek, D.P. 2012. Preliminary density estimates of humpback whales (*Megaptera novaeangliae*) in the inshore waters of the Western Antarctic Peninsula during the late autumn. *Endangered Species Research* 18:63-71.
49. Kot, B.W., Sears, R., Anis, A., Nowacek, D.P., Gedamke, J., Marshall, C.D. 2012. Behavior response of minke whales (*Balaenoptera acutorostrata*) to experimental fishing gear in a coastal environment. *Journal of Experimental Marine Biology and Ecology*. 413: 13-20.
48. Wilson R.M., Kucklick, J.R., Balmer, B.C., Wells, R.S., Chanton, J.P., and Nowacek, D.P. 2012. Spatial distribution of bottlenose dolphins (*Tursiops truncatus*) inferred from stable isotopes and priority organic pollutants. *Science of the Total Environment*. 425: 223-230.
47. Klein, M. and D. Nowacek. 2012. Use of social sounds by humpback whales (*Megaptera novaeangliae*) in the Western Antarctic Peninsula feeding grounds. *J Acoust Soc Am* 132:1979-1979.
46. Nowacek, D. P., A. Vedenev, B. L. Southall, and R. Racca. 2012. Development and implementation of criteria for exposure of Western gray whales to oil and gas industry noise.

- Advances in experimental medicine and biology* 730:523-528.
45. Richardson, J., A. G. Wood, A. Neil, D. Nowacek, and M. Moore. 2012. Changes in distribution, relative abundance, and species composition of large whales around South Georgia from opportunistic sightings: 1992 to 2011. *Endangered Species Research* 19:149-156.
 44. Tyson, R. B., A. S. Friedlaender, C. Ware, A. K. Stimpert, and D. P. Nowacek. 2012. Synchronous mother and calf foraging behaviour in humpback whales *Megaptera novaeangliae*: insights from multi-sensor suction cup tags. *Marine Ecology Progress Series* 457: 209–220.
 43. Robbins, J., Dalla Rosa, L., Allen, J.M., Mattila, D.K., Secchi, E.R., Friedlaender, A.S., Stevick, P.T., Nowacek, D.P., Steel, D. 2011. Return movement of a humpback whale between the Antarctic Peninsula and American Samoa: a seasonal migration record. *Endangered Species Research* 13(2): 117-121.
 42. Parks, S.E., Searby, A., Célérier, A., Johnson, M.P., Nowacek, D.P., & Tyack, P.L. 2011 Sound production behavior of tagged individual North Atlantic right whales: implications for passive acoustic monitoring. *Endangered Species Research* 15(1): 63-76.
 41. Nowacek D.P., Friedlaender A.S., Halpin P.N., Hazen E.L., Johnston D.W., et al. 2011. Super-Aggregations of krill and humpback whales in Wilhelmina Bay, Antarctic Peninsula. *PLoS ONE* 6(4): e19173. doi:10.1371/journal.pone.0019173
 40. Hazen E.L., Nowacek D.P., St. Laurent L., Halpin P.N., Moretti D.J. 2011. The relationship among oceanography, prey fields, and beaked whale foraging habitat in the Tongue of the Ocean. *PLoS ONE* 6(4): e19269. doi:10.1371/journal.pone.0019269
 39. Kucklick, J., Schwacke, L., Wells, R., Hohn, A., Guichard, A., Yordy, J., Hansen, L., Zolman, E., Wilson, R., Litz, J., Nowacek, D., Rowles, T., Pugh, R., Balmer, B., Sinclair, C., and Rosel, P. 2011. Bottlenose dolphins as indicators of persistent organic pollutants in the Western North Atlantic Ocean and Northern Gulf of Mexico. *Environ Sci Technol* 45(10): 4270-4277 <http://pubs.acs.org/doi/abs/10.1021/es1042244>
 38. Parks, S.E., Johnson, M., Nowacek, D., and Tyack, P.L. 2011. Individual right whales call louder in increased environmental noise. *Biology Letters*, 7(1): 33-35 doi:10.1098/rsbl.2010.0451
 37. Ware, C., Friedlaender, A.S., and Nowacek, D.P. 2010. Shallow and deep lunge feeding of humpback whales in fjords of the West Antarctic Peninsula. *Marine Mammal Science*, DOI: 10.1111/j.1748-7692.2010.00427.x
 36. Nowacek, D. P., A. Vedenev, B. L. Southall, and R. Racca. 2011. Development and Implementation of Criteria for Exposure of Western Gray Whales to Oil and Gas Industry Noise. In A. N. Popper and A. Hawkins, editors. *The Effects of Noise on Aquatic Life*. Springer, New York.
 35. Friedlaender, A.S., Nowacek, D.P., Johnston, D.W., Read, A.J., Tyson, R.B., Peavey, L.E. and Revelli, E. 2010. An exceptional sighting of a large group of Arnoux's beaked whales (*Berardius arnouxii*) in the Gerlache Strait, Antarctica. *Marine Mammal Science*, 26(1): 246-250.
 34. Wilson, R.M., Chanton, J., Lewis, G., and Nowacek, D.P. 2010. Concentration-dependent stable isotope analysis of consumers in the upper reaches of a freshwater-dominated estuary: Apalachicola Bay, FL USA. *Estuaries and Coasts* 33(6): 1406-1419.
 33. Wilson, R.M., Chanton, J., Lewis, G., and Nowacek, D.P. 2009. Combining organic matter source and relative trophic position determinations to explore trophic structure. *Estuaries and Coasts* 32:999-1010 doi: 10.1007/s12237-009-9183-7
 32. Wilson, R.M., Chanton, J., Lewis, G., and Nowacek, D.P. 2009. Isotopic variation ($\delta^{15}\text{N}$, $\delta^{13}\text{C}$, and $\delta^{34}\text{S}$) with body size in post-larval estuarine consumers. *Estuarine, Coastal and Shelf Science* 83(3): 307-312.

31. Southall, B.L. and Nowacek, D.P. 2009. Acoustics in marine ecology; innovations in technology expands the use of sound in ocean science. *Marine Ecology Progress Series*, 395:1-3.
30. Hogg, C., Rogers, T.L., Shorter, K.A., Barton, K., Miller, P.J.O., Nowacek, D.P. 2009. Determination of steroid hormones in whale blow: is it feasible? *Marine Mammal Science*. 25(3): 605-618.
29. Friedlaender, A.S., Hazen, E.L., Nowacek, D.P., Halpin, P.N., Ware, C., Weinrich, M.T., Hurst, T., & Wiley, D. 2009. Diel changes in humpback whale *Megaptera novaeangliae* feeding behavior in response to sand lance *Ammodytes* spp. behavior and distribution. *Marine Ecology Progress Series* 395: 91-100.
28. Brownell, R.L., Nowacek, D.P., & K. Ralls. Hunting cetaceans with sound: a worldwide review. 2008. *Journal of Cetacean Research and Management* 10(1): 81-88.
27. Balmer, B.C., Wells, R.S., Nowacek, S.M., Nowacek, D.P., Schwacke, L.S., McLellan, W.A., Scharf, F.S., Rowles, T.K., Hansen, L.J., Spradlin, T.R. & D. A. Pabst. Seasonal abundance and distribution patterns of common bottlenose dolphins (*Tursiops truncatus*) near St. Joseph Bay, Florida, USA. 2008. *Journal of Cetacean Research and Management* 10(2): 157-167.
26. Nowacek, D.P. and P.L. Tyack. 2008. Assessing effects of anthropogenic noise on the behaviour of marine mammals. *Bioacoustics* 17: 338-341.
25. Tyson, R.B., Nowacek, D.P., & P.J.O. Miller. 2007. Nonlinear phenomena in the vocalizations of North Atlantic right whales (*Eubalaena glacialis*) and killer whales (*Orcinus orca*). *Journal of the Acoustical Society of America* 122(3): 1365-1373.
24. Dobbins, P.F. & D.P. Nowacek. 2007. Passive azimuth localization of dolphin whistles using acoustically small sensors. *Proceedings of the Institute of Physics* 29(3): 149-156.
23. Nowacek, D.P., Thorne, L.H., Johnston, D.W., & P.L. Tyack. 2007. Responses of cetaceans to anthropogenic noise. *Mammal Review* 37(2): 81-115.
22. Chapla, M.E., Nowacek, D.P., Rommel, S.A., & V.M. Sadler. 2007. CT scans and 3D reconstructions of Florida manatee (*Trichechus manatus latirostris*) heads and ear bones. *Hearing Research* 228: 123-135.
21. Remage-Healey, L., Nowacek, D.P., & A.H. Bass. 2006. Dolphin foraging sounds suppress calling and elevate stress hormone levels in a prey species, the Gulf toadfish. *Journal of Experimental Biology* 209: 4444-4451.
20. Parks, S.E., Nowacek, D.P., Johnson, M.P., & P.L. Tyack. 2006. Right whales – Social sounds. *Journal of the Acoustical Society of America* 119(5), pt. 2: 3402-3403.
19. Dewar, W.K., Bingham, R.J., Iverson, R.L., Nowacek, D.P., St. Laurent, L.C., & P.H. Wiebe. 2006. Does the marine biosphere mix the ocean? *Journal of Marine Research* 64(4): 541-561.
18. Mann, D.A., O’Shea, T.J., & D.P. Nowacek. 2006. Nonlinear dynamics in manatee vocalizations. *Marine Mammal Science* 22(3): 548-555.
17. Nowacek, D.P. 2005. Acoustic ecology of foraging bottlenose dolphins (*Tursiops truncatus*), habitat-specific use of three sound types. *Marine Mammal Science* 21(4): 587-602.
16. Kraus, S.D., Brown, M.W., Caswell, H., Clark, C.W., Fujiwara, M., Hamilton, P.K., Kenney, R.D., Knowlton, A.R., Landry, S., Mayo, C.A., McLellan, W.A., Moore, M. J., Nowacek, D.P., Pabst, D.A., Read, A.J. & R.M. Rolland. 2005. North Atlantic right whales in crisis. *Science* 309: 561-562.
15. Reeves, R.R., Brownell, R.L., Burdin, A., Cooke, J.C., Darling, J.D., Donovan, G.P., Gulland, F.M.D., Moore, S.E., Nowacek, D.P., Ragen, T.J., Steiner, R.G., VanBlaricom, G.R., Vedenev, A., & A.V. Yablakov. 2005. Report of the Independent Scientific Review Panel on the Impacts of Sakhalin II Phase 2 on Western North Pacific Gray Whales and related Biodiversity. International Union for Conservation of Nature and Natural Resources (IUCN), Gland, Switzerland and Cambridge, UK. 123 pp.

14. Gannon, D.P., Barros, N.B., Nowacek, D.P., Read, A.J., Waples, D.M., & R.S. Wells. 2005. Prey detection by bottlenose dolphins (*Tursiops truncatus*): an experimental test of the passive listening hypothesis. *Animal Behaviour* 69(3): 709-720.
13. Maresh, J.L., Fish, F.E., Nowacek, D.P., Nowacek, S.M., & R.S. Wells. 2004. High performance turning capabilities during foraging by bottlenose dolphins (*Tursiops truncatus*). *Marine Mammal Science*, 20(3): 498-509.
12. Nowacek, S.M., Wells, R.S., Owen, E.C.G., Speakman, T.R., Flamm, R.O., & D.P. Nowacek. 2004. Florida manatees, *Trichechus manatus latirostris*, respond to approaching vessels. *Biological Conservation*, 119: 517-523.
11. Nowacek, D.P., Johnson, M.P., & P.L. Tyack. 2004. Right whales ignore ships but respond to alerting stimuli. *Proceedings of the Royal Society B: Biological Sciences*, 271: 227-231.
10. Nowacek, D.P., Casper, B.M., Wells, R.S., Nowacek, S.M., & D.A. Mann. 2003. Intraspecific and geographic variation of West Indian manatee (*Trichechus manatus* spp.) vocalizations. *Journal of the Acoustical Society of America*, 114(1): 66-69.
9. Nowacek, D.P. 2002. Sequential foraging behaviour of bottlenose dolphins, *Tursiops truncatus*, in Sarasota Bay, FL. *Behaviour*, 139 (9): 1125-1145.
8. Matthews, J.N., Brown, S., Gillespie, D., Johnson, M., McLanaghan, R., Moscrop, A., Nowacek, D.P., Leaper, R., & P.L. Tyack. 2001. Vocalisation Rates of the North Atlantic Right Whale. *Journal of Cetacean Research and Management* 3(3): 271-282.
7. Miksis, J.L., Grund, M.D., Nowacek, D.P., Solow, A.R., Connor, R.C., & P.L. Tyack. 2001. Cardiac responses to acoustic playback experiments in the captive bottlenose dolphin *Tursiops truncatus*. *Journal of Comparative Psychology*, 115 (3): 227-232.
6. Nowacek, D.P., Johnson, M.P., Tyack, P.L., Shorter, K.A., McLellan, W.A., & D.A. Pabst. 2001. Buoyant balaenids: the ups and downs of buoyancy in right whales. *Proceedings of the Royal Society B: Biological Sciences*, 268: 1811-1816.
5. Nowacek, D.P., Wells, R.S., & P.L. Tyack. 2001. A platform for continuous behavioral and acoustic observation of free-ranging marine mammals: Overhead video combined with underwater audio. *Marine Mammal Science* 17(1): 191-199.
4. Flamm, R.O., Owen, E.C.G., Weiss, C.F., Wells, R.S., & D.P. Nowacek. 2000. Aerial videogrammetry from a tethered airship to assess manatee life-stage structure. *Marine Mammal Science*, 16(3): 617-630.
3. Nowacek, D.P., Tyack, P.L., Wells, R.S., & M.P. Johnson. 1998. An onboard acoustic data logger to record biosonar of free-ranging bottlenose dolphins. *Journal of the Acoustical Society of America* 103(5), Pt. 2: 2908.
2. Jacobs, M., Nowacek, D.P., Gerhart, D.J., Cannon, G., Nowicki, S., & R.B. Forward, Jr. 1992. Seasonal changes in vocalizations during behavior of the Atlantic bottlenose dolphin. *Estuaries*. 16(2): 241-246.
1. Grant, D.C., Ligibel, J.A., Nowacek, D.P., Horsburgh, S.E., Link, M.A., Ngu, M.N., Furr, K.I., & C.M. Hall. 1991. Impact of feral horse migration on soft bottom infaunal community structure. *The Journal of the Elisha Mitchell Scientific Society*. 107(1): 13-20.

SCIENTIFIC CORRESPONDENCE:

- Gannon, D.P., Johnston, D.W., Read, A.J., & D.P. Nowacek. 2004. Resonance and Dissonance: Science, Ethics, and the Sonar Debate. *Marine Mammal Science*, 20(4):898-899.

POPULAR ARTICLES AND BOOKS:

- Clark, C.W., Gillespie, D., Nowacek, D.P., & S.E. Parks. 2007. Listening to their world: Acoustics for monitoring and protecting right whales in an urbanized ocean. In: Kraus, S.D. & R.M. Rolland (eds). *The Urban Whale: North Atlantic Right Whales at the Crossroads*. Harvard University Press.
- Nowacek, S.M., & D.P. Nowacek. 2006. *Discovering Dolphins*. Colin Baxter Photography, Voyageur Press.

BOOK REVIEWS:

- Echolocation in Bats and Dolphins. 2004. Thomas, J.A., Moss, C.F. & M. Vater (editors). University of Chicago Press, Chicago, IL. Reviewed at the request of the Press.

TEACHING AND GRADUATE TRAINING:

Courses Taught:

- Marine Bioacoustics, Duke University (2011)
Marine Ichthyology, Duke University (2009-present)
Applied Ocean Acoustics, Florida State University (2006–2008)
Marine Vertebrates Field Course, Florida State University (2006)
Bioacoustics, Florida State University (2005–2008)
Marine Nekton, Florida State University (2004–2008)
Biology of Marine Mammals, Florida State University (2004–2008)
Biology of Marine Mammals, Eckerd College (2000)
Biology of Marine Mammals, Duke University (1999–2004)
Marine Mammals, Boston University Marine Program (1999)

Advisor for current students in:

- Ph.D. Program in Ecology, Duke University (1)
Ph.D. Program in Marine Science and Conservation, Duke University (4)
Ph.D. Program in Biological Oceanography, Florida State University (1)
Masters in Environmental Management, Duke University (5)

Advisor for Ph.D. Graduates from Duke University:

- Anna Nousek-McGregor. 2010. The costs of locomotion in North Atlantic Right Whales (*Eubalaena glacialis*).

Advisor for Masters in Environmental Management Graduates from Duke University:

- Casey Dziuba. 2011. Sea level rise education and outreach for coastal North Carolina.
- Jaime L. Budzynkiewicz. 2011. A comparison of Environmental Impact Statement methodologies for assessing sound propagation, density determination and impacts of protected marine mammals: BEOMRE & the U.S. Navy.
- Kimberly Gordon. 2010. Catch share management: An appropriate tool for New England?

Advisor for M.Sc. Graduates from Florida State University:

- Marie E. Chapla. 2006. Florida manatee (*Trichechus manatus latirostris*) outer and middle ear morphology: Potential sound pathways and middle ear mechanism. Current position – Research associate, NOAA, National Marine Fisheries Service, Pacific Islands Fisheries Science Center, Honolulu, HI.
- Athena Rycyk. 2007. Acoustic ecology of the bottlenose dolphin (*Tursiops truncatus*) in the Big Bend region of Florida. Current position – Ph.D. student, Department of Oceanography, Florida State University, D.P. Nowacek, advisor.
- Reny B. Tyson. 2008. Abundance of bottlenose dolphins in the Big Bend region of Florida: St. Vincent Sound to Alligator Harbor.

Graduate Thesis Committees:

Duke University
Florida State University
University of North Carolina at Wilmington

PRESENTATIONS AT SCIENTIFIC MEETINGS:

First-Author Presentations:

- Nowacek, D.P. & P.L. Tyack. 2007. Assessing effects of anthropogenic sound on behavior of marine mammals. International Conference on the Effects of Noise on Aquatic Life, Nyborg, Denmark.
- Nowacek, D.P. 2007. Biological functions of acoustic communication and the effects of noise on marine animals. Potential Application of Vessel-Quieting Technology on Large Commercial Vessels. Convened by NOAA, National Marine Fisheries Service - Acoustics Program, Washington, DC.
- Nowacek, D.P. 2006. Application of tagging data to the design and implementation of right whale ship strike mitigation, U.S. Marine Mammal Commission Review of Right Whale Research, Marine Biological Labs, Woods Hole, MA
- Nowacek, D.P. & D.A. Mann. 2006. GNOMES – Gulf of Mexico noise monitoring system. Part of ‘Understanding Acoustic Impacts on Marine Animals: National Lecture Series’, NOAA Acoustics Program, held at Duke University, Nicholas School of the Environment and Earth Sciences.
- Nowacek, D.P. 2006. Methods for assessing the response of cetaceans to seismic exploration. International Whaling Commission, Scientific Committee, St. Kitts.
- Nowacek, D.P., Mann, D.A., Remage-Healey, L., & A.H. Bass. 2006. Dolphin foraging sounds suppress calling and elevate stress hormones in a prey species, the Gulf toadfish. Carnivores 2006, St. Petersburg, FL.

- Nowacek, D.P. 2005. Do dolphins have language? Philosophy Department, Case Western Reserve University, Cleveland, OH.
- Nowacek, D.P., Renner, W., Cavanagh, R., & A. Eller. 2005. Transmission of Vessel Noise Through Right Whale Environments. 16th Biennial Conference on the Biology of Marine Mammals, San Diego, CA.
- Nowacek, D.P., Barton, K., Bocconcelli, A., Johnson, M.P., Moore K.C., Parks, S.E., Shorter, K.A., & P.L. Tyack. 2005. Response of right whales at the surface to alert/alarm signal. North Atlantic Right Whale Consortium, New Bedford, MA.
- Nowacek, D.P. 2005. Behavioral Ecology of Marine Mammals. Southeast and Mid-Atlantic Marine Mammal Symposium, University of North Carolina Wilmington.
- Nowacek, D.P. 2005. Detection of boats by manatees. Manatee Forum IV, Florida Fish and Wildlife Conservation Commission. St. Petersburg, FL.
- Nowacek, D.P. 2004. Behavioral ecology and bioacoustics of cetaceans: 'tales from tagging'. Hopkins Marine Station, Stanford University.
- Nowacek, D.P., Renner, W., Cavanagh, R., & A. Eller. 2004. Transmission Of Vessel Noise Through Right Whale Environments. North Atlantic Right Whale Consortium, New Bedford, MA.
- Nowacek, D.P. 2004. Effects of Shipping Noise on Marine Mammal Behavior. NOAA Fisheries Symposium: "Shipping Noise and Marine Mammals: A Forum for Science, Management, and Technology", Washington, DC.
- Nowacek, D.P. 2004. Behavioral responses of marine mammals to human generated noise. Part of 'Understanding Acoustic Impacts on Marine Animals: National Lecture Series', NOAA Acoustics Program', held at Mote Marine Laboratory, Sarasota, FL.
- Nowacek, D.P., Tyack, P.L., & M.P. Johnson. 2003. North Atlantic right whales (*Eubalaena glacialis*) ignore ships but respond to alarm signal. 15th Biennial Conference on the Biology of Marine Mammals, Greensboro, NC.
- Nowacek, D.P., Tyack, P.L., & M.P. Johnson. 2003. North Atlantic right whales (*Eubalaena glacialis*) ignore ships but respond to alarm signal. Environmental Consequences of Underwater Sound, San Antonio, TX.
- Nowacek, D.P., Tyack, P.L., & M.P. Johnson. 2003. North Atlantic right whales (*Eubalaena glacialis*) ignore ships but respond to alerting signal. Hawaiian islands humpback whale National Marine Sanctuary, Vessel collision avoidance workshop, Wailea, Maui, Hawaii.
- Nowacek, D.P., Tyack, P.L., & M.P. Johnson. 2003. North Atlantic right whales (*Eubalaena glacialis*) ignore ships but respond to alerting signal. U.S. Marine Mammal Commission, Annual Meeting, Newport, RI.
- Nowacek, D.P., Johnson, M.P., & Tyack, P.L. 2003. North Atlantic right whales ignore ships but respond to alerting stimuli: have we found the 'right whale deer whistle'? 15th Biennial Conference on the Biology of Marine Mammals, Greensboro, NC.
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AWARDS (OVER \$25 K):

Pending:

Current:

Collaborative Research: The ecological role of a poorly studied Antarctic krill predator: the humpback whale, *Megaptera novaeangliae*. *National Science Foundation, Office of Polar Programs*. Requested amount \$967,165. With M. Zhou, P. Halpin and P. Tyack.

Beaked and sperm whale foraging ecology and habitat characterization. \$825,593. *Office of Naval Research*. November 2007 – October 2012. With P. Halpin, P. Tyack, & T. Stanton.

Delphinid Cetaceans: Quantifying Behavioral Ecology and Response to Predators using a multi-species approach. \$2.04M. *Strategic Environmental Research and Development Program (SERDP)*. May 2011 – March 2015. Co-PI with Read, A.J. and others.

Previous:

Response of Manatees to Vessel Traffic: Simultaneous Measurements of Behavioral Responses and the Acoustic Environment. \$149,932. *Florida Fish and Wildlife Conservation Commission, Manatee Avoidance Technology Program*. January 2007 – June 2009. With C. Deutsch, & R. Wells.

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Why do North Atlantic right whales fail to avoid ships? Evaluating ship sound energy that reaches whales and testing mitigation measures with controlled exposure experiments. \$593,144. *National Marine Fisheries Service, Right Whale Grants Program*. With P. Tyack, & M. Johnson. 2003-2007.

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