

*Curriculum Vitae*

**PAUL EUGENE NACHTIGALL, Ph.D.**

Hawaii Institute of Marine Biology  
46-007 Lilipuna Road, Kaneohe Hawaii 96744 USA  
(808) 247-5297  
e-mail: nachtiga@hawaii.edu

**POSITIONS:**

**Research Professor Emeritus**, Hawaii Institute of Marine Biology, University of Hawaii at Manoa. (2017-present)

**Director, Marine Mammal Research Program**, Hawaii Institute of Marine Biology. University of Hawaii (1993-2017).

**Member of the Faculty**, Researcher Level 5 (Equivalent to Full Professor), of the School of Earth Ocean Science and Technology, Hawaii Institute of Marine Biology. (1993-2017)

University of Hawaii Board of Regents **Graduate Faculty** appointments in the Psychology Department (1983 - present), Zoology/Biology Department (1993 - present) and Marine Biology Graduate Program (2010 – present).

**EDUCATION:**

**B.A. with distinction** - Experimental Psychology, San Jose State University, 1967

**M.A.** Experimental Psychology, San Jose State University, 1970

**Ph.D.** Comparative/Experimental Psychology, University of Hawaii, 1976

**PAST POSITIONS:**

Visiting Professor, Velux Scholar, Institute of Biology, University of Southern Denmark  
Spring/Summer, 2010

Interim Director Hawaii Institute of Marine Biology ( July 1, 2000 - Oct 1, 2001 and Sept 1, 2014 –Aug 24, 2015 )

Visiting scientist and Director of the Marine Mammal Research Program (Intergovernmental Personnel Act Assignment) at the University of Hawaii, Hawaii Institute of Marine Biology, 1993-1997

Head, Research Branch and Division (GS-15), Naval Command, Control and Ocean Surveillance

Center, Kailua, Hawaii. 1982-1993. Supervisor and director of Behavioral, Sensory, and Veterinary Medical research supervising 23 scientists and support personnel

Scientist, Naval Ocean Systems Center, Kailua, Hawaii 1972-1982

Research Associate, Naval Undersea Center, Kailua Hawaii 1970-1972

Teaching Assistant, Experimental and Comparative Psychology, San Jose State University 1967-1970.

## **EDITORIAL POSITIONS:**

**Editor**, *AQUATIC MAMMALS*, Journal of the European Association for Aquatic Mammals 1992-2000.

Editorial Board member and **Editor Emeritus**, *AQUATIC MAMMALS*, 2000-

**Guest Associate Editor**: MARINE MAMMAL SCIENCE 2010

## **HONORS:**

**Honorary Member**, European Association for Aquatic Mammals

**Fellow** – Acoustical Society of America

**Chief of Naval Operations Environmental Planning Team Award**

**President – Society for Marine Mammalogy 2002-2004**

**Invited Lecture Tour – Chinese Academy of Sciences Spring 2014**

(Sanya Institute of Deep Sea Science and Engineering; Sun Yat Sen University, Zhu Hai ; Zhejiang University, Hanzhou; Wuhan University, Institute of Hydrobiology, Chinese Academy of Sciences)

## **REVIEWED FOR:**

*Acta Zoologica Bulgarica*

*Animal Biotelemetry*

*Aquatic Biology*,

*Animal Cognition*

*Aquatic Mammals*,

Austrian Science Fund

*Biological Journal of the Linnean Society*

*Biology Letters: Royal Society*  
*Chinese Journal of Oceanology and Limnology*  
Congressional Research Service,  
*Conservation Biology*  
*Current Biology*  
Danish Natural Science Research Council  
Deutsche Forschungsgemeinschaft  
Earthwatch,  
*Elsevier/Academic Press*  
European Cetacean Society,  
*Experimental Brain Research*  
*Experimental Marine Biology*  
*Frontiers in Ecology and the Environment*  
Gulf of Mexico Research Initiative  
*IEEE Spectrum,*  
Indo-US Science & Technology Forum  
Joint Industry Program, Oil Company Research Consortium  
*Journal of Comparative Physiology -A,*  
*Journal of Comparative Psychology,*  
*Journal of Conservation Biology,*  
*Journal of Experimental Biology,*  
*Journal of Experimental Marine Biology and Ecology,*  
*Journal of Mammalogy*  
*Journal of Morphology*  
*Journal of the Acoustical Society of America,*  
*Mammalian Biology*  
Marine Mammal Commission,  
*Marine Mammal Science,*  
National Geographic-Grants,  
National Research Council - National Academy of Sciences,  
National Science Foundation,  
*Nature,*  
*Naturwissenschaften, (Science of Nature)*  
NOAA Fisheries  
*The Biological Bulletin*  
Office of Naval Research,  
*Pacific Science,*  
*Proceedings B of the Royal Society,*  
*Proceedings of the National Academy of Sciences,*  
*Science,*  
*Science Advances,*  
Sea Grant,  
Society for Marine Mammalogy,  
Strategic Environmental Research and Development Program.  
*The Veterinary Journal*  
*University of California Press,*

**ADVISORY BOARDS AND POSITIONS:**

Chair, Ethics Committee, The Society for Marine Mammalogy 2016 –

Scientific Advisory Committee, The Society for Marine Mammalogy 2014-2016

Invited Panel Reviewer. Gulf of Mexico Research Initiative. Consortium for Ocean Leadership 2015 and 2017.

Chair, Review Panel, Proposed Regulations concerning the effects of Sound on Marine Mammals. National Oceanographic and Atmospheric Administration, National Marine Fisheries Service Office of Protected Species. 2014.

Invited Panel Reviewer, VolkswagenStiftung Foundation. On-site reviewing the Marine Mammal Science Center's Lichtenberg Professorship program, Rostock University, Rostock Germany, Summer 2010.

Invited Member: National Marine Fisheries Service, Pacific Islands Region, False Killer Whale Take Reduction Team , 2009-

Invited Member: Chief of Naval Operations (N-45) Advisory Group on the effects of sound on marine mammals. Washington D.C. 2007-2009

Invited Member: Marine Mammal Advisory Working Group – Consortium for Oceanographic Research and Education. 1201 New York Ave NW, Washington D.C. 2006 –

Invited Selection Committee Member for Faculty position at University of Southern Denmark (Odense).

Invited Member: Western Regional Fisheries Management Council - Marine Mammal Advisory Committee. 2005-2015

Invited Member: U.S. Marine Mammal Commission's Federal Advisory Committee on Acoustic Impacts on Marine Mammals. 2004-2005

Invited Attendee - Organizational Meeting of the National Science Foundation and the European Science Foundation on International Research on the Impacts of Sound on Marine Mammals. London, England, September 27, 2004

President, Society for Marine Mammalogy - Over 2000 member International Society of Marine Mammal Scientists. Publishers of the journal – *Marine Mammal Science*. (2002-2004)

National Marine Fisheries Service National Advisory Panel on Sound in the Oceans (2003-2008)

Invited Testimony Before the Committee on Resources, *United States House of Representatives*: Hearing on a bill to amend the Endangered Species Act and the Marine Mammal Protection Act to make several clarifications and to ease the permitting of military readiness activities, Tuesday May 6, 2003

Member Board of Directors, Hawaiian Islands Stranding Response Group. Volunteer Organization to respond to stranded marine mammals in the Hawaiian Islands (2003-2006)

Sanctuary Advisory Council, Hawaiian Humpback Whale National Marine Sanctuary (Research Representative and Vice Chair 1995-2003, Alternate 2003 -2007)

Invited Chairman, Acoustic Resonance Workshop. National Marine Fisheries Service, Office of Protected Species. Silver Springs, Maryland. April 23-April 25.2003 Silver Springs Maryland.

Invited Panel Member, German Science Foundation, Summer 2002, Berlin Germany (Deutcheforschungsgemeinschaft) Review of Sound in the Antarctic.

Taras Foundation - Scientific Advisory Board 2002-

Member of the Scientific Program Committee, Society for Marine Mammalogy (2000-2002)

Member Ad Hoc Industry Board to develop research Priorities related to the effects of impulse noise from seismic airguns on marine mammals.

Invited Advisor to Marine Mammal Research Program Cornell University (1998-2000)

Member of the Board and Chair, Scientific Program Committee, Society for Marine Mammalogy (1998-2000)

Animal Care Committee, Sea Life Park Hawaii (1995- 2000)

Shedd Aquarium, Marine Mammal Research Advisory Group, Chicago (1995)

Chair, Animal Care Committee, Naval Ocean Systems Center, Hawaii Laboratory (1987-1993)

Academic Council, Graduate Academic Program, Naval Ocean Systems Center (1985-1993)

## **RECENT SERVICE:**

Acoustical Society of America, Committee on Animal Bioacoustics (2010 -2014)

University of Hawaii Institutional Animal Care and Utilization Committee (1998-

Vice Chair (2005-2017)  
Hawaii Institute of Marine Biology Director Search Committee (June 2014- Jan 2015)

**CLASSES TAUGHT: 2010-2016**

**Lund University, Sweden** Fall 2014, Fall 2016, Fall 2018  
Invited Lecturer. International Invited Graduate Course in Sensory Ecology

**University of Southern Denmark, Odense Denmark**  
Visiting Professor, Velux Scholar, Institute of Biology, Spring/Summer, 2010

**Penn State University, State College Pennsylvania**  
Invited Lecturer. SeaBass Summer School Series. 2012.

**Syracuse University, Syracuse New York**  
Invited Lecturer, Summer 2016

**University of New Hampshire, Summer 2018**

**University of Hawaii**

**Zoology**

**Graduate**

800 - Dissertation Research

699 – Directed Research and Reading

691 – Seminar in Marine Biology (Study of Sounds Produced and Hearing by Marine Mammals)

**Undergraduate**

499 – Directed Research and Reading

399 - Directed Research and Reading

**Psychology**

**Graduate**

699- Directed Research and Reading

729- Selected Topics in Research

700- Master's Research

800- Dissertation Research

**GRADUATE STUDENTS:**

**Current Students:**

**Currently On Dissertation Committee**

Nicole Muszynski - Psychology

### **Recent Graduates- Committee Chair**

Adam Bruce Smith, Ph.D. – Dissertation Topic – Characteristics of hearing and echolocation in under-studied odontocete species (Currently Fulbright Fellow)

Kristen Anne Taylor, Ph.D. – Dissertation Topic - Directional Hearing and a Head Related Transfer Function of a bottlenose dolphin (*Tursiops truncatus*).

Meike Linnenschmidt, Ph.D. – University of Southern Denmark – Dissertation Topic: Echolocation in the Harbour Porpoise. (Post doctoral Research Fellow at University, Munich).

Laura Kloepper, Ph.D. – Zoology – Dissertation Topic: Dynamic click focusing in odontocetes Post Doctoral Fellowship, NSF, Brown University, Assistant Professor at St. Mary's University , Notre Dame.

Aude Pacini, Ph.D. – Zoology- Dissertation Topic: Hearing in Odontocetes. (Currently Researcher – Hawaii Institute of Marine Biology)

Aran Mooney, Ph.D. – Zoology – Dissertation Topic: Temporary Threshold Shifts of Bottlenosed Dolphins (Currently a Research Faculty member at Woods Hole Oceanographic Institution)

Brian Branstetter – Ph.D. Psychology- Dissertation Topic: Auditory Localization in the Bottlenosed Dolphin  
(Currently a National Academy of Sciences Post-Doctoral Fellow, National Marine Mammal Foundation, San Diego)

Michelle Yuen, Ph.D. – Zoology- Dissertation Topic: Hearing in the False Killer Whale

Aliza Milette – Masters degree - Psychology June 2015 (Currently at NOAA, Honolulu)

Sanami Nakyama- Zoology – Masters 2016

Jen Philips – Psychology – Masters 2000

## **Recent Graduates - On Graduate Committee**

Michael Richlen Ph.D. Zoology (Dec 2017)  
Giacomo Giorli – Oceanography  
Adrienne Copeland Ph.D. – Zoology  
Lee Shannon Ph.D. – Zoology  
Jessica Chen Ph.D.- Zoology  
Alexis Rudd Ph.D. – Zoology  
Kae Myriam Pusic Ph.D.– Medical School, Tropical Medicine and Microbiology  
Andrew Dewald Ph.D.– Psychology  
Mark Muller Ph.D. - Mechanical Engineering  
Alison Stimpert Ph.D.- Zoology  
Stuart Ibsen. Ph.D. – Zoology  
Marc Lammers – Ph.D. Zoology  
Jill Zamzow-Ph.D. Zoology  
Jennifer Philips – M.S. Psychology  
Kelly Benoit-Bird- Ph.D. Zoology (Recent McArthur Genius Award Winner)  
Carmen Bazua-Duran-Ph.D. Oceanography  
Caroline DeLong – Ph.D. Psychology  
David Lemonds – Ph.D. Psychology  
Catherine Combelles, M.S. Zoology  
Daniella Maldini – Ph.D. Animal Sciences  
Mark Xitco- Ph.D., Psychology  
Joseph Mobley- Ph.D. Psychology  
Adam A. Pack- M.A. and Ph.D. Psychology  
Gregory Hunter- M.A. and Ph.D.- Psychology  
David Helweg- Ph.D.- Psychology  
John D. Gory- M.A.- Psychology  
Kathy Sadao, M.A. –Psychology  
Heidi Harley, Ph.D.- Psychology

## **INVITED DOCTORAL EXAMINATION COMMITTEE MEMBER: European Universities.**

Marianne Rasmussen – Ph.D. Zoology, University of Southern Denmark

Frantz Havmand Jensen – Ph.D. “ Acoustic Behaviour of Bottlenose dolphins and Pilot Whales”  
Aarhus University. Denmark.

Line A. Kyhn Ph.D. Aarhus University, Denmark.

Kirstin Hansen Andersen Ph.D. University of Southern Denmark. “Hearing in the Cormorant”

## **POST DOCS**



Songhai Li, Ph.D – Hearing during echolocation in the bottlenose dolphin

Aude Pacini Ph.D.- Measuring Hearing with Auditory Evoked Potentials

Gordon Bauer Ph.D.- Cognition and Echolocation

Ted Cranford Ph.D.- Anatomy of Echolocation Structures

#### **GERMAN HABILITAT EVALUATION COMMITTEE MEMBER**

Frederike Hanke Ph.D.- University of Rostok. "Visual abilities of harbour seals and cephalopods- regarding selected aspects- for comparison"

#### **PATENTS:**

**Biomimetic Sonar System and Method**, September 28, 2004

Patent Number **6,798,715**

A patent for sonars and signal processing based on what has been learned about how dolphins process echolocation signals for target classification.

#### **MEMBERSHIP IN PROFESSIONAL SOCIETIES:**

The Society for Marine Mammalogy (**Charter member and Past President**)

**Honorary Member** European Association for Aquatic Mammals

**Fellow** Acoustical Society of America

European Cetacean Society – U.S. Representative

#### **MAJOR SCIENTIFIC INTERNATIONAL MEETINGS ORGANIZED:**

- Artificial Intelligence Workshop, Stowe, **Vermont**, 11-15 June 1984.
- Principal Organizer, Third Animal Sonar Systems Symposium, NATO Advanced Studies Institute, Helsingor, **Denmark**, 10-19 September 1986.
- Animal Language Conference, University of Hawaii, **Honolulu**, Hawaii, 7-10 April 1989.
- Organizing Committee, Symposium on the Sensory Abilities of Aquatic Mammals. Soviet Academy of Sciences. **Moscow, USSR**, 15-24 October 1991.
- Co-organizer. Harderwijk Mammal Sensory Symposium, **Harderwijk Holland** 28 April - 3 May 1994.

- Scientific Organizing Committee, Twenty-fourth International Ethological Congress  
**Honolulu** Hawaii, August 10 - 17 1995.
- Organizing Committee, Joint Meeting of the Marine Mammal Society, European Association for Aquatic Mammals and European Cetacean Society, **Monte Carlo, Monaco**, January 1998
- Organizing Committee, Fourth Meeting on Animal Sonar. Invitational Meeting held once every 10 years. Albufiera, **Portugal**, June 1998
- **Scientific Program Chair**, 13th Biennial Meeting of the Society for Marine Mammalogy, Wailea Maui, Hawaii, November, 1999
- Organizer, 'How do you test the hearing of a great whale', Pauley Summer Program based on a grant from the Pauley Foundation, Hawaii Institute for Marine Biology, August 2001
- Organizing Committee, Fourth Joint Meeting of the Acoustical Society of Japan and the Acoustical Society of America, Honolulu 28 November- 2 December, 2006.
- Organizing Committee, Fifth Meeting on Animal Sonar. Invitational Meeting. Kyoto **Japan**, September 12 -20, 2009

## **PUBLICATIONS**

### **BOOKS**

**Nachtigall**, P. E. and P. W. B. Moore, (1988) Animal Sonar: Processes and Performance. Plenum Press, New York, 862 pp.

Roitblat, H. L., L. M. Herman, and P. E. **Nachtigall** (1993) Language and Communication: Comparative Perspectives. Lawrence Erlbaum Associates, Hillsdale, New Jersey, 502 pp.

**Nachtigall**, P.E., Lien, J., Au, W.W.L., and Read, A.J. (1995) Harbour Porpoises: Laboratory Studies to Reduce Bycatch. DeSpil Publishers, Woerden, The Netherlands, 167 pp.

Kastelein, R., J.A. Thomas, and **P.E. Nachtigall** (1996) Sensory Systems of Aquatic Mammals. DeSpil Publishers, Woerden, The Netherlands, 588 pp.

Read, Andrew J., Wiepkema, Piet R., and **Nachtigall**, P.E. (1997) The Biology of the Harbour Porpoise. DeSpil Publishers, Woerden, The Netherlands, 409 pp.

Surlykke, A. **Nachtigall**, **P.E.**, Popper, A.N. and Fay, R. (2014) *BioSonar*. Springer. New York 304 pp.

## **ORIGINAL PEER-REVIEWED RESEARCH REPORTS**

**Submitted:**

Sysueva, E.V., **Nachtigall, P.E.**, Cranford, T.W., Pacini, A., Allum, C. and Supin, A. Ya. (2018) Auditory sensitivity areas of head to local underwater stimulation in a bottlenose dolphin (*Tursiops truncatus*) *Proceedings of Meetings on Acoustics*

**Published:**

**Nachtigall, P.E.**, (2018) Review: Encyclopedia of Marine Mammals 3<sup>rd</sup> Edition. *Marine Mammal Science*, 34(2) 553-555.

Smith, A.B., Pacini, A., and **Nachtigall, P.E.**, (2018) Modulation rate transfer functions of four species of stranded odontocete (*Stenella longirostris*, *Feresa attenuata*, *Globicephala melas*, *Mesoplodon densirostris*). *Journal of Comparative Physiology A*

Kloepper, L.N., Buck, J.R. Liu, Y. and **Nachtigall, P.E.** (2018) Bottlenose dolphins direct sonar clicks off-axis of targets to maximize Fisher Information about target bearing. *Journal of the Acoustical Society of America EL*

**Nachtigall, P.E.**, Supin, A.Ya, Pacini, A. and Kastelein, R. (2017) Four Odontocete Species Change Hearing Levels When Warned of Impending Loud Sound. *Integrative Zoology* doi: **10.1111/1749-4877.12286**

Pacini, A.F., **Nachtigall, P.E.**, Smith, A.B., Leo, J.A., Suarez, C.M., Laule, G.E., Aragonés, L.V. and Braun, R. (2016) Evidence of hearing loss due to dynamite fishing in two species of odontocetes *Proc. Mtgs. Acoust.* 27, 010043 (2016); doi: 10.1121/2.0000393

**Nachtigall, P.E.** Biosonar and Sound Localization in Dolphins. *INVITED* (2016) *Oxford Encyclopedia of Neurosciences*. Nov 2016 DOI:10.1093/acrefore/9780190264086.013.103

**Nachtigall, P.E.**, Supin, A. Ya., Pacini, A.H., & Kastelein, R. (2016) Conditioned sensitivity change in the harbour porpoise (*Phocoena phocoena*) *Journal of the Acoustical Society of America*, 140, 960-967

**Nachtigall, P.E.** Supin, A.Ya., Smith, A. B., and Pacini, A.F. (2016) Expectancy and conditioned hearing sensation level in the bottlenose dolphin (*Tursiops truncatus*). *Journal of Experimental Biology* 219 844-850.

**Nachtigall, P.E.**, Supin, A.Ya. Esteban, J.A., and Pacini, A.F. (2016) Learning and extinction of conditioned hearing sensation change in the beluga whale (*Delphinapterus leucas*) *Journal of Comparative Physiology A* DOI 10.1007/s00359-015-1056-x

Smith, A.B., Kloepper, L.N., Wei-Cheng, H., I-Fen, J, Rideout, B.P. & **Nachtigall, P.E** (2016). Echolocation beam characteristics of the Risso's dolphin (*Grampus griseus*). *Journal of the Acoustical Society of America* 139, 53 <http://dx.doi.org/10.1121/1.4937752>

**Nachtigall, P.E.** and Supin, A.Ya. (2015) Hearing Sensation Changes When A Warning Predicts a Loud Sound In the False Killer Whale (*Pseudorca crassidens*). In: The Effects of Noise on Aquatic Life II, Popper, A.N. & Hawkins, A. Springer, Berlin. Pp 743-747

Pacini, A. and **Nachtigall, P.E.** (2015) Hearing in Whales and Dolphins: Relevance and Limitations. In: The Effects of Noise on Aquatic Life II, Popper, A.N. & Hawkins, A. Springer, Berlin. Pp 801-809

Au, W.W.L., Ford, J.L., Herman, L.M., **Nachtigall, P.E.**, Ridgway, S.H., Thomas, J., Wells, R., Whitehead, H., Johnson, C.M., and Herzing, D.L. (2015) Visions of the Future. In: *Dolphin Communication and Cognition*, D.L. Herzing and C.M. Johnson, MIT Press, Cambridge Massachusetts, 271-289

Kloepper, L N., Buck J.R., Smith, A.B., Supin, A. Ya., Gaudette, J.E. and **Nachtigall, P.E** (2015) Support for the beam forming hypothesis in the false killer whale. *Journal of Experimental Biology*

Wang, Z.T., **Nachtigall, P.E.**, Akamatsu, T., Wang, K.X., Wu, Y.P. Liu J.C. , Duan G.Q., Cao H.J. and Wang, D., (2015) Passive acoustic monitoring the diel, lunar, seasonal and tidal patterns in the biosonar activity of the Indo-Pacific humpback dolphins (*Sousa chinensis*) in the Pearl River Estuary, China. *PLOS ONE*. PONE-D-15-36486R1

**Nachtigall, P.E.** & Supin, A. Ya. (2015) Conditioned frequency dependent hearing sensitivity reduction in the bottlenose dolphin (*Tursiops truncatus*) *Journal of Experimental Biology*, 218, 999 -1005

Wisniewska, D., Johnson, M. **Nachtigall, P.E.**, and Madsen, P.T. (2014) Buzzing during biosonar-based interception of prey in the delphinids *Tursiops truncatus* and *Pseudorca crassidens*. *J Exp Biol.* 217, 4279-4282.

Kloepper, L.N., Smith, A.B., **Nachtigall, P.E.**, Buck, J.R., Simmons, J.A., & Pacini, A.F. (2014) Cognitive adaptation of sonar gain control in the bottlenose dolphin. *Plos One* 9 (8) 1-10. DOI:101371/journal.pone.0105938

**Nachtigall, P.E.** & Schuller G., Hearing during Echolocation in Whales and Bats. (2014) In: Surrlykke, A. **Nachtigall, P.E.**, Popper, A.N. and Fay, R. *BioSonar*. Springer. New York

Surlykke, A & **Nachtigall, P.E.**, (2014) In: Biosonar in Bats and Toothed Whales: An Overview. Surrlykke, A. **Nachtigall, P.E.**, Popper, A.N. and Fay, R. *BioSonar*. Springer. New York

**Nachtigall, P.E.** & Supin, A. Ya. (2014) Conditioned hearing sensitivity reduction in a bottlenose dolphin (*Tursiops truncatus*). *Journal of Experimental Biology* 217, 2806-2813

**Nachtigall, P.E.** (2014) Editing Aquatic Mammal Mammals 1992-2000. *Aquatic Mammals*, 40, 1, 1-4

- Nachtigall, P.E.** and Supin, A. Ya. (2013) False killer whales reduce their hearing sensitivity if a loud sound is preceded by a warning. *Jnl Exp Biol*, 216, 3062-3070
- Supin, A.Ya. and **Nachtigall, P.E.** (2013) Gain control in the sonar of odontocetes. *Jnl Comp Phys A* 199, 6, 471-478
- Supin, A. Ya., **Nachtigall, P.E.** & Breese, M. (2012) A whale better adjusts the biosonar to ordered rather than to random changes in the echo parameters. *J Acoust Soc Am* 132, 3, 1811-1819
- 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. *J 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* 215, 1306-1312
- Linneschmidt, M., Beedholm, K., Wahlberg, M., Hojer-Kristensen, J and **Nachtigall, P.E.** Keeping returns optimal: Gain control elicited by dynamic hearing thresholds in a harbour porpoise. (2012) *Biol Letters. Proceedings of the Royal Society B.* doi:10.1098/rspb.2011.2465. published online
- 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
- Mooney, T.A., Hanlon, R. Madsen, P.T., Christensen-Dalsgaard, J. Ketten, D.R & **Nachtigall, P.E.** (2012), Potential for Sound Sensitivity in Cephalopods. Popper, A. N. and Hawkins, A. eds. *Effects of Noise on Aquatic Life*. Springer Science+Business Media, LLC, New York. 125-128.
- Pacini, A., **Nachtigall, P.E.** and Kloepper, L.K. (2012) Portable auditory evoked potential system to assess odontocete hearing. Popper, A. N. and Hawkins, A. eds. *Effects of Noise on Aquatic Life*. Springer Science+Business Media, LLC, New York. 225-227.
- 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.
- Li, S., **Nachtigall, P.E.**, and Breese, M. Auditory brainstem responses associated with echolocation in an Atlantic bottlenose dolphin (*Tursiops truncatus*). Popper, A. N. and Hawkins, A. eds. (2012). *Effects of Noise on Aquatic Life*. Springer Science+Business Media, LLC, New York. 45-47.
- Ibsen, S., Krause-Nehring, J., **Nachtigall, P.E.**, Au, W.W.L, and Breese, M. (2011) Similarities in echolocation strategy and click characteristics between a *Pseudorca crassidens* and a *Tursiops*

truncatus, *J Acoust Soc Am* 130, 3085-3089.

Lemons, D.W., Kloepper, L.N., **Nachtigall, P.E.**, Au, W.W.L, Vlachos, S.A., and Branstetter, B.K. (2011) A re-evaluation of auditory filter shape in delphinids odontocetes: evidence of constant-bandwidth filters. *J Acous Soc Am* 130, 3107-3114

Supin, A.Ya., **Nachtigall, P.E.** and Breese, M. (2011) Interaction of emitted sonar pulses and simulated echoes in a false killer whale: An evoked-potential study. *J Acous Soc Am*,130, 1711-1720

Pacini, A.F., **Nachtigall, P.E.**, Quintos, C., Schofield, D. Look, D.A., Levine, G. and Turner, J. (2011) Audiogram of a stranded Blainville's beaked whale (*Mesoplodon densirostris*) measured using auditory evoked potentials. *Jnl Exp Biol* 214, 2409-2415.

Li, S. **Nachtigall, P.E.**, and Marlee Breese. (2011) Dolphin hearing during echolocation: evoked potential responses in an Atlantic bottlenose dolphin (*Tursiops truncatus*). *Jnl Exp Biol* 214, 2027-2035

Kloepper, L., **Nachtigall, P.E.** and Breese, M. (2010) Change in echolocation signals with hearing loss in a false killer whale (*Pseudorca crassidens*), *J Acous Soc Am.*, 128, 2233–2237

Kloepper, L. Gisiner, R. L. and **Nachtigall, P.E.** (2010) Decreased Echolocation Performance following High Frequency Hearing Loss in the False Killer Whale *J Exp Biol* 213, 3717-3722

Pacini, A.F., **Nachtigall, P. E.** Kloepper L. and Linnenschmidt, M. (2010) Audiogram of a formerly stranded long-finned pilot whale (*Globicephala melas*): measured using auditory evoked potentials. *Jnl Exp Biol* 213, 3138-3143

Mooney, T.A., Hanlon, R.T., Christensen-Dalsgaard, J., Madsen, P.T., Ketten, D.R., and **Nachtigall, P.E.** (2010) Sound detection by the longfin squid (*Loligo pealeii*) studied with auditory evoked potentials: sensitivity to low-frequency particle motion and not pressure. *Jnl Exp Biol* 213, 3748-3759

**Nachtigall, P.E.**, Gisiner, R. L. and Reichmuth, C. (2010) *Invited - In Memory: Ron Schusterman. Marine Mammal Science.* 26, 997-2001.

Ibsen, S.D., Au, W.W.L., **Nachtigall, P.E.**, DeLong, C.M., and Breese, M. (2010) Changes in consistency patterns of frequency content over time of an echolocating Atlantic bottlenose dolphin. *J Acoust Soc Am* 127, 3821-3829.

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### **Papers Presented At Conferences and Scientific Meetings.**

**Nachtigall, P.E., Supin, A.Ya., Pacini, A.F., & Kastelein, R.** Four Odontocete Species Change Hearing Levels When Warned of Impending Loud Sound. (**Invited Paper**) International Society of Integrative Zoology. Xining China, 27 August, 2017

**Supin, A. Ya, and Nachtigall, P.E.** (**Invited Paper**) Interaction of gain control mechanism in the sonar of odontocetes. Acoustical Society of American Meeting, Honolulu, 30 November, 2016.

**Lee, W.J., Hsin, Y.Y. Au, W.W.L., Jen, I.F., Yang, W.C., Fan, Y.C., Nachtigall, P.E., & Chou, L.S.** Biosonar radiation field on the forehead of a Risso's dolphin. Acoustical Society of American Meeting, Honolulu, 30 November, 2016.

**Smith, A.B. Pacini, A.F., Nachtigall, P.E., Suarez, L., Aragonés, L., Magno, C., Laule G. & Kloepper, L.N.** Transmission beam characteristics of a spinner dolphin (*Stenella longirostris*) Acoustical Society of American Meeting, Honolulu, 30 November, 2016.

**Pacini, A.F., Nachtigall, P.E., Smith A.B., Owens, R., Vlachos, S.** Echolocation of fishing hooks and the implications for the Hawaiian longline fishery. Acoustical Society of American Meeting, Honolulu, 30 November, 2016.

**Nachtigall, P.E., Supin, A. Ya. and Pacini A.F.**, Three Odontocete Species Dampen Hearing Levels When Warned of Impending Loud Sound. Society for Marine Mammalogy, San Francisco December, 2015.

**Nachtigall, P.E.** Echolocation and hearing protection in cetaceans. Invited Lecture. Vancouver

Aquarium. Feb.7 2015. Trip sponsored and lecture broadcast on Internet.

**Nachtigall, P.E.**, Supin, A.Ya. and Pacini, A.F. Three odontocete species reduce their hearing sensitivity if a loud sound is preceded by a warning. Invited talk at the Effects of Sound on Marine Mammals Meeting, Amsterdam, Holland. September, 2014.

**Nachtigall, P.E. and Supin, A. Ya. Invited paper.** Hearing sensation change with loud sound warning in the false killer whale. Acoustical Society of America Meeting. Providence Rhode Island. May 4, 2014.

**Nachtigall, P.E.** Marine Mammal Research Program: Studying Hearing and Echolocation in Whales and dolphins. **Invited Lecture Series.** Chinese Academy of Sciences at a variety of Institutes and Universities throughout China. April 2014.

**Nachtigall, P.E. and Supin, A. Ya.** Whale changes hearing sensitivity when warned. Meeting of the European Association for Aquatic Mammals, Nuremberg Germany, 15-18 March, 2013.

**Nachtigall, P.E. Invited Paper.** False killer whales reduce their hearing sensitivity if a loud sound is preceded by a warning. 11th European Conference on Underwater Acoustics (ECUA) Meeting of the Institute of Acoustics. Edinburgh Scotland, July 2-6, 2012.

**Li, Songhai, Nachtigall, P.E., and Breese, Marlee. Invited Paper** Overcompensation of echo attenuation and dual component biosonar control in echolocation of an Atlantic bottlenose dolphin. ACOUSTICS 2012. Hong Kong, Joint Meeting of the Acoustical Society of America and the Acoustical Society of China. Hong Kong China, May 17, 2012.

**Nachtigall, P.E. Invited Paper.** Immediate changes in whale hearing sensitivity. ACOUSTICS 2012. Hong Kong, Joint Meeting of the Acoustical Society of America and the Acoustical Society of China. Hong Kong China, May 17, 2012.

**Nachtigall, P.E. Invited Paper.** Measuring Hearing of Stranded Marine Mammals. First Joint Institute for Marine and Atmospheric Research/ Pacific Islands Fisheries Science Center Symposium. Honolulu. East West Center, Imin Conference Center. February 29, 2012.

**Nachtigall, P.E. Invited Paper.** Audiogram of a young male stranded Blainville's beaked whale (*Mesoplodon densirostris*) measured using auditory evoked potentials. 4th International Conference on the Effects of Sound in the Ocean on Marine Mammals, Amsterdam Holland, September, 5, 2011.

**Nachtigall, P.E. Invited Paper.** Do cetaceans change their hearing in response to signaled loud sound? 4th International Conference on the Effects of Sound in the Ocean on Marine Mammals, Amsterdam Holland, September, 7 2011.

**Nachtigall, P.E.** Critical bandwidths in echolocating porpoises, dolphins and whales. **Invited Paper – Memorial Session in Honor of Ronald Schusterman and David Kastak.** Acoustical Society of America, Seattle Washington, May 23-27 2011.



Kloepper, L., **Nachtigall, P.E.**, Breese, M. The effect of age-related hearing loss on echolocation: Changes in click parameters and echolocation discrimination abilities are initiated by changes in auditory filters. Acoustical Society of America, Seattle Washington, May 23-27 2011.

Linnenschmidt, M., Kristensen, J.H., Beedholm, K, **Nachtigall, P.E.** and Wahlberg, M. Auditory brainstem recordings during echolocation at an aluminum cylinder in a harbour porpoise (*Phocoena phocoena*). Second Pan American/Iberian Meeting on Acoustics, Cancun Mexico, October 15-19, 2010.

**Nachtigall, P.E.**, Supin, A.Ya., and Breese, M. Hearing, Noise and Echolocating Odontocetes. **Invited Talk.** Second International Conference on the Effects of Noise on Aquatic Life. Cork, Ireland, August 15-20, 2010.

Pacini, A., Nachtigall, P.E. and **Kloepper, L.K.** **Portable auditory evoked potential system to assess odontocete hearing.** Second International Conference on the Effects of Noise on Aquatic Life. Cork, Ireland, August 15-20, 2010.

Kloepper, L.K., **Nachtigall, P.E.**, and Supin, A.Ya. Whales diminish attenuation of their biosonar beam. Second International Conference on the Effects of Noise on Aquatic Life. Cork, Ireland, August 15-20, 2010.

**Li, S., Nachtigall, P.E., and Breese, M. Auditory brainstem responses associated with echolocation in an Atlantic bottlenose dolphin (*Tursiops truncatus*)** Second International Conference on the Effects of Noise on Aquatic Life. Cork, Ireland, August 15-20, 2010.

**Nachtigall, P.E.** and Supin, A.Ya. Odontocete Hearing: Effects of Noise and Measurement during echolocation. **Invited Paper,** Acoustical Society of America, Baltimore Maryland 19-23 April 2010.

**Nachtigall, P.E.** and Supin, A.Ya. Hearing Processes Measured during Echolocation in a False Killer Whale. European Cetacean Society, Stralsund Germany 22-24 March, 2010.

**Nachtigall, P.E.** Arlete Zogorb, Aude Pacini, Laura Kloepper, Meike Linnenschmidt, and Sónia Matias, Measuring the hearing of a rehabilitated stranded pilot whale at the Lisbon Zoo European Association for Aquatic Mammals – Lisbon, Portugal, 12-16 March, 2010.

**Nachtigall, P.E.**, Supin, A. Ya, and Breese, M. Automatic Gain Control in odontocete echolocation: Measuring hearing during echolocation using auditory evoked potentials. Eighteenth Meeting of the Society for Marine Mammalogy, Quebec Canada, October 12- 16 2009.

Mooney, T.A., Hanlon, R.T., Christensen-Dalsgaard, J., Madsen, P.T., Ketten, D.R., and **Nachtigall, P.E.** Detecting echolocating Odontocetes: Can Squid detect toothed whale predators? Eighteenth Meeting of the Society for Marine Mammalogy, Quebec Canada, October 12- 16 2009. Eighteenth Meeting of the Society for Marine Mammalogy, Quebec Canada, October 12- 16 2009

Kloepper, L.N., **Nachtigall, P.E.**, Gisiner, R., Ibsen, S.D., and Breese, M. Changes in echolocation with hearing loss in a false killer whale. Eighteenth Meeting of the Society for Marine Mammalogy, Quebec Canada, October 12- 16 2009.

Pacini, A., **Nachtigall, P.E.**, Cranford, T.W., Breese, M., Look, D., Vlachos, S. Sound pathways in the head and mouth of two species of odontocetes: the bottlenose (*Tursiops truncatus*) and the false killer whale (*Pseudorca crassidens*).

**Nachtigall, P.E.**, Kloepper, L., and Gisiner, R. High Frequency Hearing and odontocete echolocation. **Invited Talk** The Fifth Animal Sonar Symposium. Kyoto, Japan, September 14-18, 2009.

Supin, A. Ya. and **Nachtigall, P.E.** Echo-related auditory evoked potentials in a false killer whale: invariance of target distance. **Invited Talk** The Fifth Animal Sonar Symposium. Kyoto, Japan, September 14-18, 2009.

Mooney, T.A., Hanlon, R.T., Christensen-Dalsgaard, J., Madsen, P.T., Ketten, D.R., and **Nachtigall, P.E.** Can Squid detect toothed whale predators? A hearing study of the longfin squid (*Loligo paeleii*). The Fifth Animal Sonar Symposium. Kyoto, Japan, September 14-18, 2009.

Pacini, A., **Nachtigall, P.E.**, Breese, M., Look, D., Vlachos, S. Comparisons of hearing sensitivities and potential sound pathways for the bottlenosed dolphin (*Tursiops truncatus*) and the false killer whale (*Pseudorca crassidens*). The Fifth Animal Sonar Symposium. Kyoto, Japan, September 14-18, 2009.

Kloepper, L.N., **Nachtigall, P.E.**, Gisiner, R., Ibsen, S.D., and Breese, M. Change in echolocation performance and click parameters with hearing loss in a false killer whale. The Fifth Animal Sonar Symposium. Kyoto, Japan, September 14-18, 2009.

**Nachtigall, P.E.** Using Auditory Evoked Potentials to Measure Marine Mammal Hearing, **Invited Talk**, Acoustical Society of America Meetings, Special Session Honoring Sam Ridgway, Miami Florida, Nov. 11, 2008.

**Nachtigall, P.E.** An attempt to catch, measure the hearing, and tag and release a minke whale off Iceland. **Invited Talk** Joint Oil Industry Producers Review. Houston, Texas October, 2008

Southall, B.L. , Bowles, A.E., Ellison, W.T., Finneran, J.F., Gentry R.L. Greene, C.R. Jr., Kastak, D., Ketten D.R., Miller, J.H., **Nachtigall, P.E.**, Richardson, W.J., Thomas J.A., and Tyack, P. L. Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations. **Invited Talk**. Undersater Noise Measurement, Impact and Mitigation Meeting. Loughborough University, Southampton England, October, 2008.

**Nachtigall, P.E.** How do you test the hearing of polar bears, dolphins and whales? **Invited Talk**

Bishop Museum. Honolulu, September, 2008.

**Nachtigall, P.E. & Supin, A.Ya.** False killer whale hearing adjustment during echolocation measured with evoked potentials. **Invited Talk.** Acoustics 08. Paris France.

Taylor, Kristen A., Mooney, T. Aran, **Nachtigall, Paul E.**, Rasmussen, Marianne, and Miller, Lee A. The high frequency hearing and temporal processing of caught-and-released white-beaked dolphins, *Lagenorhynchus albirostris* Capetown, S.A. Meeting of the Society for Marine Mammalogy.

**Nachtigall, P.E.**<sup>1</sup>; Supin, A.Ya.<sup>2</sup>; Amundin, M.<sup>3</sup> Röken, B.<sup>3</sup>, Møller, T.<sup>3</sup>, Mooney, T.A.<sup>1</sup>, Taylor, K.A.<sup>1</sup>, Yuen, M.E.<sup>1</sup>. Polar bear (*Ursus maritimus*) hearing in air Capetown, S.A. Meeting of the Society for Marine Mammalogy. (POSTER)

**Nachtigall, P.E. & Supin, A. Ya.** What does a small toothed-whale hear when it echolocates? **Invited talk.** Journal of Experimental Biology Discussion Meeting – Neurosensory Ecology. Il Cicalino, Tuscany, Italy. September 8-12, 2007.

**Nachtigall, P.E.** Recent directions in odontocete cetacean hearing. **Invited talk.** International conference on the effects of Noise on Aquatic Life. Nyborg Denmark, August 13-17, 2007.

**Nachtigall, P.E.** Measuring Marine Mammal Hearing with Evoked Auditory Potentials. **Invited Paper.** 21<sup>st</sup> Pacific Science Congress, Naha Okinawa, June 12-18, 2007

Taylor, K., **Nachtigall, P.E.**, Amundin, M. Mosesson, P., Edberg, S., and Karlsson, S. Auditory evoked potential hearing measures of a group of bottlenosed dolphins (*tursiops truncatus*) Acoustical Society of America Meeting, Salt Lake City Utah, 5 June, 2007.

Muller, M.W., Allen J.S., Au, W.W.L. and **Nachtigall, P.E.**, Modeling and analysis of the backscatter of dolphin echolocation clicks from elastic targets. Acoustical Society of America Meeting, Salt Lake City Utah. 4 June, 2007.

**Nachtigall, P.E.**, and Supin, A. Ya. Auditory brainstem response recovery rates during double pulse presentation in the false killer whale (*Pseudorca crassidens*): A mechanism of automatic gain control? Acoustical Society of America Meeting. Honolulu Hawaii, 1 December 2006.

Mooney, T.A., **Nachtigall, P.E.**, Au, W.W.L., Breese, M. and Vlachos, S. Temporary threshold shifts in the bottlenose dolphin (*Tursiops truncatus*) varying noise duration and intensity. Acoustical Society of America Meeting. Honolulu Hawaii, 1 December 2006

Fromm, D.M., Mobley, J.R., Martin, S.W., and **Nachtigall, P.E.** Analysis of melon-headed whale aggregation in Hanalei Bay, July 2004. Acoustical Society of America Meeting. Honolulu Hawaii, 1 December 2006

Taylor, K.A., **Nachtigall, P.E.**, Mooney, T.A., and Yuen, M.M. Evaluation of the auditory capabilities of marine mammals using a portable auditory evoked potential system. Acoustical

Society of America Meeting. Honolulu Hawaii, 1 December 2006

Muller, M., Au, W.W.L., **Nachtigall, P.E.**, and Breese, M. Echo highlight amplitude and temporal difference resolution of an echolocating *Tursiops truncatus*. Acoustical Society of America Meeting. Honolulu Hawaii, 1 December 2006

Supin, A. Ya, Nachtigall, P.E., Breese, M. How well does a whale hear its own biosonar pulses? **Invited Paper** Acoustical Society of America Meeting. Providence Rhode Island, 7 June 2006.

Mooney, T.A., **Nachtigall, P.E.** Au, W.W., Breese, M. and Vlachos, S. The effects of noise intensity and exposure duration and potential protective mechanisms in the bottlenose dolphin (*tursiops truncatus*). Ocean Sciences Meeting, 20-24 February, 2006, Honolulu, Hawaii.

Miller, J.A., Bowles, A.E., Gentry, R.L., Ellison, W.T., Finneran, J.J., Greene, C.R., Kastak, D., Ketten, D.R., **Nachtigall, P.E.**, Richardson, W.J., & Thomas, J.A. (NOAA Noise Exposure Criteria Panel) **Invited Paper**. Strategies for weighting exposure in the development of acoustic criteria for marine mammals. Acoustical Society of America Meeting, 20 October 2005, Minneapolis, Minnesota.

Nachtigall, P.E. **Invited Talk** Cetacean Sensory and Perceptual Processes. International Tuna Fisheries Conference on Responsible Fisheries and Third International Fishers Forum. Yokohama Japan. 25-29 July, 2005.

Nachtigall, P.E. **Invited Talk** Current Laboratory Basic Research: Hearing and Echolocation. NOAA Pacific Islands Fisheries Science Center Cetacean Research Workshop, June 22-24, 2005, Honolulu, Hawaii

Dooling, R., Fay, R., Heffner, H., Nachtigall, P.E., Trahiotis, T., and Yost, W. **Invited Panel Discussion**. Animal Bioacoustics and ASA Committee on Standards: behavioral audiometric Methods in Animal Bioacoustics: The Search For Standards. Acoustical Society joint meeting with the Canadian Acoustical Association, Vancouver, B.C., 16-20 May 2005.

Nachtigall, P.E., Yuen, M., Mooney, T.A. & Taylor, K. Auditory Evoked Potential Methodology for odontocetes and a comparison of measured thresholds with those obtained using psychophysical techniques. **Invited Paper**. Acoustical Society joint meeting with the Canadian Acoustical Association, Vancouver, B.C., 16-20 May 2005.

Mooney, T.A., Lammers, M.O., Santos, P.A. and Nachtigall, P.E. Monitoring ecologically important fish sounds: the characteristics and diel trends of sounds produced by three species of Pomacentrids. Acoustical Society joint meeting with the Canadian Acoustical Association, Vancouver, B.C., 16-20 May 2005.

Nachtigall, P.E., Yuen, M., Mooney, T.A. & Taylor, K. Hearing thresholds of a stranded infant Risso's dolphin. **Invited Paper**. Special Symposium Honoring Ronald Schusterman. Acoustical Society of America Meeting, San Diego, 15-19 November 2004.

Mooney, T.A., Nachtigall, P.E. & Yuen, M.E. Modulation rate transfer function of a Risso's dolphin *Grampus griseus* using the envelope following response. Acoustical Society of America Meeting, San Diego, 15-19 November 2004.

Yuen, M.E. Comparison of behavioral and auditory evoked potential (AEP) audiograms of a false killer whale (*Pseudorca crassidens*). Acoustical Society of America Meeting, San Diego, 15-19 November 2004.

Supin, A. Ya., Nachtigall, P.E., Au, W.W.L., & Breese, M. Evoked-Potential study of automatic gain control in the sonar of a false killer whale. **Invited Paper**. Acoustical Society of America Meeting, San Diego, 15-19 November 2004.

Mooney, T.A., Au, W.W.L., & Nachtigall, P.E. Will acoustically enhanced nets reduce odontocete gillnet bycatch because they are better sound reflectors? Acoustical Society of America Meeting, San Diego, 15-19 November 2004.

Ibsen, S., Au, W.W.L., Nachtigall, P.E. & Breese, M. Consistency in received echo characteristics with an echolocating *Tursiops truncatus*. Acoustical Society of America Meeting, San Diego, 15-19 November 2004.

Nachtigall, P.E. **Invited Presentation**. First Plenary Meeting of the Federal Advisory Committee on Acoustic Impacts on Marine Mammals. U.S. Marine Mammal Commission, Bethesda MD 4 Feb 2004. (Presentation Posted on U.S. Marine Mammal Commission Website)

Nachtigall, P.E. **Invited Guest Lecture**. Measuring what a false killer whale hears while it echolocates by monitoring its Auditory Brainstem Responses. Biologisk Institutets Seminarium. University of Southern Denmark. 22 March, 2004.

Nachtigall, P.E. **Invited Address**. Measuring Hearing and the Effects of Noise on Marine Mammals. Fifteenth Biennial Meeting of the Society for Marine Mammalogy. Greensboro, North Carolina, December 17, 2003.

Nachtigall, P.E. **Invited Lecture**. Comparative Perspectives on Perception, Cognition, and Behavior: A Festschrift in Honor of Ronald J. Schusterman. University of California, Santa Cruz April 25, 2003.

Nachtigall, P.E. **Invited Guest Lecture**. Dolphin and whale hearing and the Hawaiian Islands Stranding Response Group. Society of Research Administrators Meeting. May 20, 2003, Kihei Maui. (Travel expenses supported)

Nachtigall, P.E. **Invited Lecture**. **Workshop-Active Sonars and Cetaceans**. European Cetacean Society. Las Palmas Canary Islands. March 8-16 2003. New Research Approaches to Cetacean Hearing and Anthropogenic Sound.

Supin, A. Ya., Nachtigall, P.E. and Au, W.W.L. Evoked-potential study of echolocation in whales and dolphins. **Invited Paper.** First Pan-American/Iberian Meeting on Acoustics. Cancun, Mexico December 2-6 2002. *Journal of the Acoustical Society of America*, 112 (5) 2313

Nachtigall, P.E. **Invited Lecture.** Plans for the Hawaiian Islands Stranding Response Group. NOAA Pacific Scientific Review Group. Kihei Maui, Nov. 12, 2002 (Travel expenses and per diem supported)

Mooney, T.A., Nachtigall, P.E. and Au, W.W.L. Target strengths of two gillnets and predictions of biosonar detection ranges. First Pan-American/Iberian Meeting on Acoustics. Cancun, Mexico December 2-6 2002. *Journal of the Acoustical Society of America*, 112 (5) 2335

Nachtigall, P.E. Low Frequency Hearing in Odontocetes and Evoked Auditory Potentials Measuring Temporary Threshold Shifts. (**Invited Presentation**) Deutsche Forschungsgemeinschaft (German National Science Foundation), "Impact of Acoustics on Marine Organisms". Berlin, Germany June 16-20, 2002. (Travel expenses and per diem supported).

Nachtigall, P.E. **Invited Chairman,** Acoustic Resonance Workshop. National Marine Fisheries Service, Office of Protected Species. Silver Springs, Maryland. April 23-April 25 2002. Silver Springs Maryland. (Travel expenses and per diem supported).

Supin, A.Ya, Nachtigall, Paul E., Pawloski, J., and Au W.W.L. Evoked potential application to the study of echolocation in cetaceans. Acoustical Society of America Meeting, Pittsburgh Pennsylvania, June 3-7, 2002.

Nachtigall, P.E. Supin, A., Pawloski, J.L. and Au, W.W.L. Measuring recovery from temporary threshold shifts with evoked auditory potentials in the bottlenosed dolphin *Tursiops truncatus*. **Invited Presentation** – Acoustical Society of America. Ft. Lauderdale Florida, Dec 5-7, 2001

Nachtigall P.E., Supin, A., Pawloski J.L., and Au W.W.L. Evoked auditory potentials measuring recovery from temporary threshold shifts in the bottlenosed dolphin *Tursiops truncatus*. Fourteenth Biennial Conference on the Biology of Marine Mammals. Vancouver B.C. November 28- Dec 4, 2001

Nachtigall, P.E. Temporary Threshold Shifts. **Invited Presentation – National Academy of Sciences.** Beckman Center, Irvine CA, October 15, 2001

Lemons, D.W., Au W.W.L., Nachtigall, P.E., Roitblat, H.L. **Invited Talk – William Cummings Session on the Acoustics of Whales and Dolphins.** High Frequency Auditory Filter Shapes in the Atlantic Bottlenosed dolphin. Acoustical Society of America, December 3-8, 2000, Newport Beach, California.

Au, W.W.L., Lammers, M.O., Nachtigall, P.E., Mobley, J., Burgess, Wm C. **Invited Talk – William Cummings Session on the Acoustics of Whales and Dolphins.** Characteristics of chorusing sounds of humpback whales wintering in waters off Western Maui. Acoustical Society of America, December 3-8, 2000, Newport Beach California.

Philips, J. D., Nachtigall, P.E., Au, W.W.L., Pawloski, J.L. Echolocation in the Risso's dolphin

*Grampus griseus*. Acoustical Society of America, December 3-8, 2000, Newport Beach, California

Nachtigall, P.E. Dolphin Biosonar: A model for Biomimetic Sonars. **Invited Keynote Speaker**, First International Symposium on Aqua Bio-Mechanisms – 2000, August 29, 2000, Honolulu Hawaii.

Au, W.W.L., Lemonds, D., Vlachos, S. and Nachtigall, P.E. Detection threshold of echo signals in a noise-free environment by an Atlantic bottlenosed dolphin. Acoustical Society of America, Atlanta Georgia, 30 May – 3 June, 2000.

Nachtigall, P.E. Echolocation through Sediments. **Invited Keynote Speaker**, Ocean Day 99:Hawaii's Oceans at the Dawn of the new Millenium, 2 June, 1999, State of Hawaii and PACON International, Honolulu, Hawaii.

Aubauer, R. Au, W.W.L, Pawloski, J.L. and Nachtigall, P.E. Discrimination of phantom targets by an Atlantic bottlenose dolphin (*Tursiops truncatus*). Joint Meeting of the European Acoustics Association and the Acoustical Society of America 15-19 March 1999, Berlin Germany.

Nachtigall, P.E., Studying the Sensory Processes of Marine Mammals (**Invited Address with Honorarium**) November 11, 1998. The 29<sup>th</sup> Annual Clifford Strahley Symposium. Tripler Army Medical Center. Honolulu, Hawaii.

Roitblat, H. L., Ketten, D., Au, W. W. L., Lemonds, D. W. & Nachtigall, P. E. (1998, November). A model of early stages of dolphin hearing. Paper presented at the 39th Annual Meeting of the Psychonomic Society. Dallas, Texas. November 21, 1998.

Nachtigall, P.E. Current Studies of the Hearing of Whales and Dolphins. (**Invited address – Airfare and expenses paid**) Seismic and Marine Mammal Workshop, London School of Economics, 23-25 June, 1998.

Nachtigall, P.E., Au, W.W.L., and Pawloski, J.L. (**Invited Address**) Echolocation by cetaceans through sediments. Biological Sonar Conference, Carvoeiro, Portugal, 27 May-1 June 1998.

Nachtigall, P.E. Au, W.W.L., Lemonds, D., and Roitblat, H.L. (**Invited Symposium Address**) Hearing and Noise in Odontocetes. The World Marine Mammal Science Conference, Monte Carlo, Monaco, 20-24 January, 1998.

Aubauer, R., Au, W.W.L., Pawloski, J.L., Pawloski, D., and Nachtigall, P.E. Discrimination of acoustically simulated and real underwater targets by dolphins. The World Marine Mammal Science Conference, Monte Carlo, Monaco, 20-24 January 1998.

Nachtigall, P.E., Au, W.W. L., and Pawloski, J.L. Low-frequency hearing in three species of odontocetes. Joint Meeting: Acoustical Societies of America and Japan, Honolulu Hawaii, 2-6

December, 1996.

Au, W.W.L, Shizamura, R.H., Nachtigall, P.E., Hicks, R.J., Roitblat, R.L., and Moons, J. Aspect-independent sonar recognition of cylinders using dolphin-like signals. Joint Meeting: Acoustical Societies of America and Japan, Honolulu Hawaii, 2-6 December, 1996.

Roitblat, H.L, Ketten, D.R., Au, W.W.L., and Nachtigall, P.E. A computational model of early stages of dolphin hearing. Joint Meeting: Acoustical Societies of American and Japan, Honolulu Hawaii, 2-6 December 1996.

Au, W.W.L., and Nachtigall P.E. (**Invited Address**). Workshop to Assess the Effectiveness and Effects of Acoustic Devices for Preventing or Reducing the Adverse Effects of Marine Mammal-Fishery Interactions. Seattle, Washington: 20-22 March 1996.

Nachtigall, P.E. , Au, W.W.L., and Pawloski, J.L. Low Frequency Hearing Thresholds of *Pseudorca crassidens* and *Grampus griseus*. Eleventh Biennial Conference on the Biology of Marine Mammals. 14-18 December 1995, Orlando Florida.

Au, W.W.L and Nachtigall, P.E. and Pawloski, J.L. The effects of the ATOC Signals on Dolphins and Small Whales. Eleventh Biennial Conference on the Biology of Marine Mammals. 14-18 December 1995, Orlando Florida.

Nachtigall, P.E., Au, W.W.L., Pawloski, J.L. and Roitblat, H.L. Animal Sonar and Signal Processing. Oceans 94, Brest France, Meeting of IEEE, September 13, 1994.

Nachtigall, P.E., Au, W.W.L., and Pawloski, J. Marine Mammal Research at the Hawaii Institute of Marine Biology. Twenty-second Annual Meeting of the European Association for Aquatic Mammals, Kolmarden Sweden, March 10-13 1994.

Au, W.W.L., Pawloski, J.L, Nachtigall, P.E., Cranford, T.W., and Gisiner, R.C. Echolocation signals and Transmission beam pattern of a false killer whale (pseudorca crassidens). Tenth Biennial Conference on the Biology of Marine Mammals, Galveston Texas November 11-15, 1993.

Combelles, C., Atkinson, S. and Nachtigall, P. Reproductive hormone profiles of false killer whales using a variety of body fluids. Tenth Biennial Conference on the Biology of Marine Mammals. Galveston, Texas, November 11-15, 1993

Harley, H.E., Roitblat, H.L. and Nachtigall, P.E. Object representation in the bottlenosed dolphin (Tursiops truncatus). Tenth Biennial Conference on the Biology of Marine Mammals. Galveston, Texas, November 11-15, 1993.

Helweg, D.A., Roitblat, H.L., and Nachtigall, P.E. Object constancy in dolphin echolocation. Tenth Biennial Conference on the Biology of Marine Mammals. Galveston, Texas, November 11-15, 1993.



Roitblat, H. L., P. W. B. Moore, D.A. Helweg, and P. E. Nachtigall. Representation and Processing of Acoustic Information in a Biomimetic Neural Network. Second Conference on the Simulation of Adaptive Behavior: From Animals to Animats. Honolulu, Hawaii, December 1992.

Nachtigall, P. E. Sensory processes of marine mammals. Pacific Congress on Marine Science and Technology. Kona, Hawaii, 31 May - 6 June 1992.

Au, W. W. L., P. W. Moore, P. E. Nachtigall, and H. L. Roitblat. Marine mammal Echolocation and neural networks. Neural Networks Ocean Engineering Workshop. Washington, D.C., 15-17 December 1991.

Nachtigall, P. E., P. W. Moore, and J. L. Pawloski, Hearing thresholds of a Risso's dolphin (*Grampus griseus*). Presentation to the Ninth Biennial Conference on the Biology of Marine Mammals, 5-9 December 1991, Chicago, IL.

Harley, Heidi E., H. L. Roitblat, and P. E. Nachtigall, Mixed modality matching-to-sample by a bottlenosed dolphin. Presentation to the Ninth Biennial Conference on the Biology of Marine Mammals, 5-9 December 1991, Chicago, Illinois.

Gisiner, R. C., W. W. L. Au, P. E. Nachtigall, and J.L. Pawloski, Cylinder wall thickness discriminations by an echolocating false killer whale. Presentation to the Ninth Biennial Conference on the Biology of Marine Mammals, 5-9 December 1991, Chicago, Illinois.

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