

Michael Ladegaard

Current job: Academic staff at Dept of Biology, Aarhus University
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Education

- PhD** Biology, Aarhus University,
2017 PhD thesis title: “**Echolocation in small cetaceans**”
Supervisor: Professor Peter Teglberg Madsen
- MSc** Biology, Aarhus University
2015 Master’s thesis title: “Echolocation in small cetaceans, Part A exam”
Supervisor: Professor Peter Teglberg Madsen
- BSc** Biology, Aarhus University
2011

Work experience

- 2022-now **Department of Biology, Aarhus University**, Denmark
Academic staff / Bioacoustician, Marine Bioacoustics Lab
- Investigations on toothed whale biosonar
 - Analysis of long-term passive acoustic monitoring recordings
- 2021-2022 **Greenland Institute of Natural Resources**, Greenland
Postdoc
- Passive acoustic monitoring of narwhals in Melville Bay and Baffin Bay
- 2017-2021 **Department of Biology, Aarhus University**, Denmark
Postdoc, Marine Bioacoustics Lab
- Long-term passive acoustic monitoring in Arctic waters
 - Biosonar adjustments to target range in harbour porpoises
 - Context-dependent biosonar adjustments in harbour porpoises
 - Noise impacts on biosonar performance in harbour porpoises
 - Noise impacts and vessel disturbance in nursing humpback whales
- 2011-2013 **Science Outreach (Bioformidlingen)**, Department of Biology, Aarhus University
Instructor
- Biology outreach for 7th to 10th graders in the Danish folkeskole
 - Experimental and theoretical 2 hour lectures and field trips

2010-2012 **Guide** at **Scandinavian Wildlife Park**, Kolind, Denmark

2009-2011 **Student assistant** at **Miljøcenter Aarhus**, Højbjerg, Denmark

Journal publications ([Google Scholar link](#))

Hermanssen, L., **Ladegaard, M.**, Tønnesen, P., Malinka, C., Beedholm, K., Tougaard, J., Rojano-Doñate, L., Tyack, P.L., Madsen, P.T. (*in review*). High-frequency vessel noise can mask porpoise echolocation. *Journal of Experimental Biology*

Zahn, M. J., **Ladegaard, M.**, Simon, M., Stafford, K. M., Sakai, T., & Laidre, K. L. (2024). Accurate species classification of Arctic toothed whale echolocation clicks using one-third octave ratios. *The Journal of the Acoustical Society of America*, 155(4), 2359-2370.

Macaulay, J. D. J., Rojano-Doñate, L., **Ladegaard, M.**, Tougaard, J., Teilmann, J., Marques, T. A., ... & Madsen, P. T. (2023). Implications of porpoise echolocation and dive behaviour on passive acoustic monitoring. *The Journal of the Acoustical Society of America*, 154(4), 1982-1995.

Bakkeren, C., **Ladegaard, M.**, Hansen, K. A., Wahlberg, M., Madsen, P. T., & Rojano-Doñate, L. (2023). Visual deprivation induces a stronger dive response in a harbor porpoise. *Isience*, 26(3).

Beedholm, K., **Ladegaard, M.**, Madsen, P. T., & Tyack, P. L. (2023). Latencies of click-evoked auditory responses in a harbor porpoise exceed the time interval between subsequent echolocation clicks. *The Journal of the Acoustical Society of America*, 153(2), 952-960.

Ladegaard, M., Macaulay, J., Simon, M., Laidre, K. L., Mitseva, A., Videsen, S., ... & Madsen, P. T. (2021). Soundscape and ambient noise levels of the Arctic waters around Greenland. *Scientific reports*, 11(1), 23360.

Pedersen, M. B., Tønnesen, P., Malinka, C. E., **Ladegaard, M.**, Johnson, M., Aguilar de Soto, N., & Madsen, P. T. (2021). Echolocation click parameters of short-finned pilot whales (*Globicephala macrorhynchus*) in the wild. *The Journal of the Acoustical Society of America*, 149(3), 1923-1931.

Beedholm, K., Malinka, C., **Ladegaard, M.**, & Madsen, P. T. (2021). Do echolocating toothed whales direct their acoustic gaze on-or off-target in a static detection task?. *The Journal of the Acoustical Society of America*, 149(1), 581-590.

Ladegaard, M., & Madsen, P. T. (2019). Context-dependent biosonar adjustments during active target approaches in echolocating harbour porpoises. *Journal of Experimental Biology*, 222(16), jeb206169.

Ladegaard, M., Mulsow, J., Houser, D. S., Jensen, F. H., Johnson, M., Madsen, P. T., & Finneran, J. J. (2019). Dolphin echolocation behaviour during active long-range target approaches. *Journal of Experimental Biology*, 222(2).

Jensen, F. H., Johnson, M., **Ladegaard, M.**, Wisniewska, D. M., & Madsen, P. T. (2018). Narrow acoustic field of view drives frequency scaling in toothed whale biosonar. *Current Biology*, 28(23), 3878-3885.

Tønnesen, P., Gero, S., **Ladegaard, M.**, Johnson, M., & Madsen, P. T. (2018). First-year sperm whale calves echolocate and perform long, deep dives. *Behavioral Ecology and Sociobiology*, 72, 1-15.

Ladegaard, M., Jensen, F. H., Beedholm, K., Da Silva, V. M. F., & Madsen, P. T. (2017). Amazon river dolphins (*Inia geoffrensis*) modify biosonar output level and directivity during prey interception in the wild. *Journal of Experimental Biology*, 220(14), 2654-2665.

Ladegaard, M., Jensen, F. H., De Freitas, M., Ferreira da Silva, V. M., & Madsen, P. T. (2015). Amazon river dolphins (*Inia geoffrensis*) use a high-frequency short-range biosonar. *Journal of Experimental Biology*, 218(19), 3091-3101.

Reports

Tougaard, J., Griffiths, E. T., **Ladegaard, M.**, Findlay, C. R., Cosentino, M., Sveegaard, S., ... & Eriksson, P. (2023). EFFECTS OF REROUTING SHIPPING LANES IN KATTEGAT ON THE UNDERWATER SOUNDSCAPE: Report to the Danish Environmental Protection Agency on EMFF project TANGO.

Tougaard, J., Griffiths, E. T., **Ladegaard, M.**, Marcolin, C., Kyhn, L. A., & Sveegaard, S. (2023). Ekkolod og sonar som presfaktor: Foreløbige resultater af et pilotprojekt.

Peer-reviewed articles for:

Journal of the Acoustical Society of America

Journal of Experimental Biology

Marine Mammal Science

Scientific Reports

PlosONE

PeerJ

Arctic

Journal of Experimental Marine Biology and Ecology

Conferences

- 2023
Jan **Active Sensing: From Animal to Robots**, Weizmann Institute of Science, Israel
Abstract and presentation: *Echolocating porpoises adjust source levels to consistently receive weak target echoes in a simpler auditory scene*
- 2019
Dec **World Marine Mammal Conference**, Barcelona, Spain
Abstract: *Harbour porpoises modify biosonar behaviour in different environmental contexts*
NOTE: My abstract was accepted for a 15 min presentation, but I had to pass on the presentation to my co-author as the event coincided with the birth of my son.
- 2017
Oct **22nd Biennial Conference on the Biology of Marine Mammals**, Halifax, Canada
Abstract: *Free-Swimming Bottlenose Dolphins use Click Packets for Long-Range Echolocation*
NOTE: My abstract was accepted for a 15 min presentation, but I had to pass on the presentation to a co-author as the event coincided with the birth of my daughter.
- 2017
May **European Cetacean Society 31st Annual Conference**, Hindsøglav Castle, Denmark
Abstract and presentation: *River dolphins out of focus? General target assumptions misrepresent range-dependent biosonar adjustments*
- 2015
Dec **Society for Marine Mammology's 21st Biennial Conference**, San Francisco, CA
Abstract and presentation: *Amazon river dolphins (*Inia geoffrensis*) use a high-frequency short-range biosonar*

- 2015 **The 12th Danish Marine Mammal Symposium**, Aarhus, Denmark
Apr Abstract and presentation: *Biosonar of the Amazon river dolphin*
- 2013 **SMRU – AU meeting**, University of St Andrews, Scotland
Jan Presentation: *Loud Escapades during Cold Nights: Vocal Courtship of the Parti-coloured Bat*

Extracurricular courses

- 2015 **40 hour course in Laboratory Animal Science**
Oct The course covers the curriculum for category C (licence holders) of the Council of Europe's resolution of December 3, 1993.
- 2011 **30 hour course in Laboratory Animal Science**
Aug The course has been accredited by the Danish Ministry of Justice according to their Order 1016, §2, and is equivalent to the curriculum for category B (performers of procedures) of the Council of Europe's resolution of December 3, 1993.

Field experience

- 2013- **Experiments at Fjord & Bælt**, Kerteminde, Denmark
I have been investigating harbour porpoise echolocation as part of my PhD project and subsequent research positions. I have conducted studies on biosonar adjustments to target range and target size, target discrimination capabilities, biosonar adjustments during different noise and reverberant conditions, and biosonar jamming responses.
- 2023 **Sperm whale tagging with camera tags**, Dominica
Apr I was lead tagger during a three-week camera tagging expedition conducted in collaboration with BBC Natural History Unit with the aim of documenting sperm whale behaviour during deep foraging dives via video and additional sensor data such as sound and acceleration. Some of the video material features in the BBC shows *Mammals* (2024) and *The Americas* (2025).
- 2019 **Noise exposure study on humpback whales**, Exmouth, Western Australia
Aug Acoustic specialist on a behavioural disturbance study of humpback whales exposed to boat noise on their nursing grounds in Exmouth. Dr [Kate Sprogis](#) led fieldwork.
- 2016 **Long-range echolocation during target approach**, San Diego, California, USA
Dec Trained US Navy bottlenose dolphins were released outside their pens in San Diego Bay and recorded using synchronized DTAG-3 and SoundTrap recording devices. I was the sole participant from Aarhus University during the fieldwork and conducted the experiments in collaboration with Drs [James Finneran](#) and [Jason Mulsow](#).
- 2016 **Southern right whale communication**, Augusta, Western Australia
Aug Research assistant during two weeks of fieldwork where southern right whales were instrumented with DTAG-3 archival tags to study communication behaviour between females and their offspring. I personally deployed three tags. Professor [Lars Bejder](#) led the fieldwork in collaboration with Professor [Peter Teglberg Madsen](#).
- 2015 **Sperm whale echolocation and communication**, Dominica
Feb-Apr Research assistant during 2 months of fieldwork in Dominica as part of the Dominica Sperm Whale Project. Fieldwork included finding and tracking sperm whales by means

of a directional hydrophone, doing photo ID, and attachments of DTAG-3 archival tags on sperm whales. I personally deployed 14 DTAGs on sperm whales. The research platform was the research vessel *Balaena* on which the research team also lived. Dr [Shane Gero](#) led the fieldwork.

- 2014
Apr **Sperm whale echolocation and communication studies**, Dominica
Research assistant during 1 month of fieldwork in Dominica as part of the Dominica Sperm Whale Project. I personally deployed 5 DTAGs on sperm whales. The research platform was a 35-foot rigid hull inflatable boat. Dr [Shane Gero](#) led the fieldwork in collaboration with Professor [Peter Teglberg Madsen](#).
- 2013
Oct-Nov **Amazon river dolphin, tucuxi and costero echolocation study**, Amazon, Brazil
Fieldwork in Brazil for 1 month as part of my PhD project. Amazon river dolphins and two toothed whale species of the genus *Sotalia* were recorded using sophisticated hydrophone arrays allowing for subsequent acoustic localisation along with beam pattern and source parameter estimation. Professor [Peter Teglberg Madsen](#) led the fieldwork in collaboration with Dr [Vera M.F. da Silva](#).
- 2012
Jun-Jul **Humpback whale foraging behaviour**, Greenland
Research assistant during three weeks of fieldwork carried out on the west coast of Greenland in a study investigating feeding behaviours in humpback whales. Senior Scientist [Malene Simon](#) from Greenland Institute of Natural Resources led the fieldwork.
- 2011-2014 **Parti-coloured bat communication**, 15 ECTS project work, Aarhus University Park
Field recordings of bat communication calls using a linear microphone array allowing acoustic localisation and source parameter estimation. Data was collected in Aarhus University Park.