A decorative graphic on the left side of the slide. It features several circles: a large orange circle with a white border at the top left, a medium blue circle with a white border in the center containing the word 'MERIDIAN' and binary code, a small orange circle at the bottom left, a medium light blue circle at the bottom center, a medium dark blue circle to the right of the central circle, and a small orange circle to the right of the dark blue circle. To the right of the central blue circle is a series of vertical orange bars of varying heights, resembling a sound wave or data visualization.

Marine Environmental Research Infrastructure for Data Integration and Application Network

Oliver Kirsebom
Lead Acoustic Data Analyst

Outline



- MERIDIAN - an overview
 - Who are we?
 - What do we do?
 - Funders and partners
- Data management projects
 - AIS vessel tracking data
 - Metadata profiles
 - Data discovery portal
- Modeling, data analysis, and visualization projects
 - Directional acoustic data
 - Ocean soundscape atlas
 - Shipping noise
 - Environmental noise
 - Acoustic detection and classification with neural networks
- Training initiatives
 - PyBaR, educational quiz, workshops

MERIDIAN - an overview



MERIDIAN - who are we?



- Consortium of ocean researchers, computer scientists, and data managers
- 1 PI + 4 team leaders + approx. 13 staff
- 3-year CFI grant (2017-2020)



MERIDIAN - what do we do?



We work hard to ...

- increase the data's value by
 - describing it
 - making it discoverable
 - and reusable
- create open-source software solutions for
 - data analysis
 - modeling
 - visualization

However, we ...

- do not collect data
- are not a data store

Funders and Partners



Funders



Partners



Data management projects



1. AIS vessel tracking data



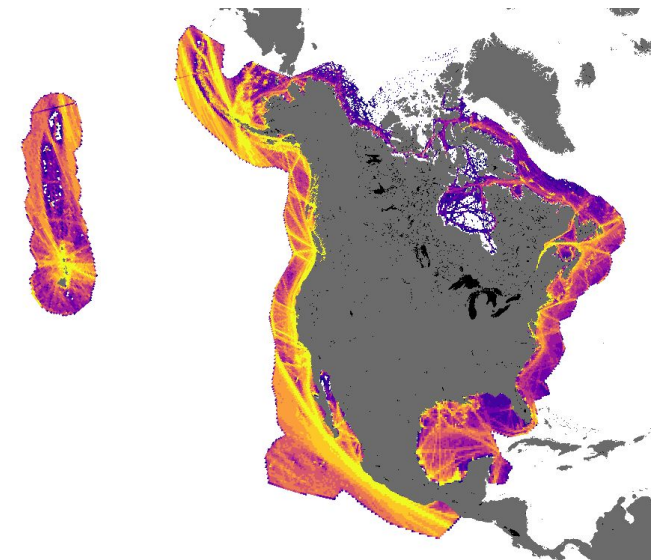
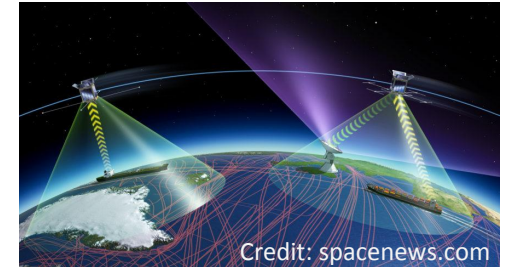
Large portion of the historical exactAIS Archive® data made available by MERIDIAN in partnership with exactEarth Ltd.

- AIS = Automatic Identification System
- Technology developed to communicate vessel information between vessels and from vessels to coastal authorities on a continuous and automatic basis.
- North American region, January 2013 to current (with new data being provided monthly until December 2020)
- 12 licenses for data access are accessible to MERIDIAN collaborators
- Apply at <https://meridian.cs.dal.ca/services/meridian-s-ais-access/>
- We also provide:
 - tools to produce derived products (e.g. GIS layers)
 - general advice on making use of the AIS data



CASEY HILLIARD
Data Manager

exactEarth



2. Metadata profiles



MERIDIAN is developing metadata profiles for ...

- Underwater acoustic data
 - Based on ISO 19115-2:2009 standard
 - Interoperable with other profiles based on ISO 19115, e.g. US IOOS and CIOOS
 - Incorporates Darwin Core metadata standard for biological information
- Acoustic model outputs (NetCDF files)
 - Incorporates CF1.7 and ACDD1.3 standards



DR. INES HESSLER
Senior Data Manager



KIM MORTIMER
Data Management Expert

3. Data discovery portal



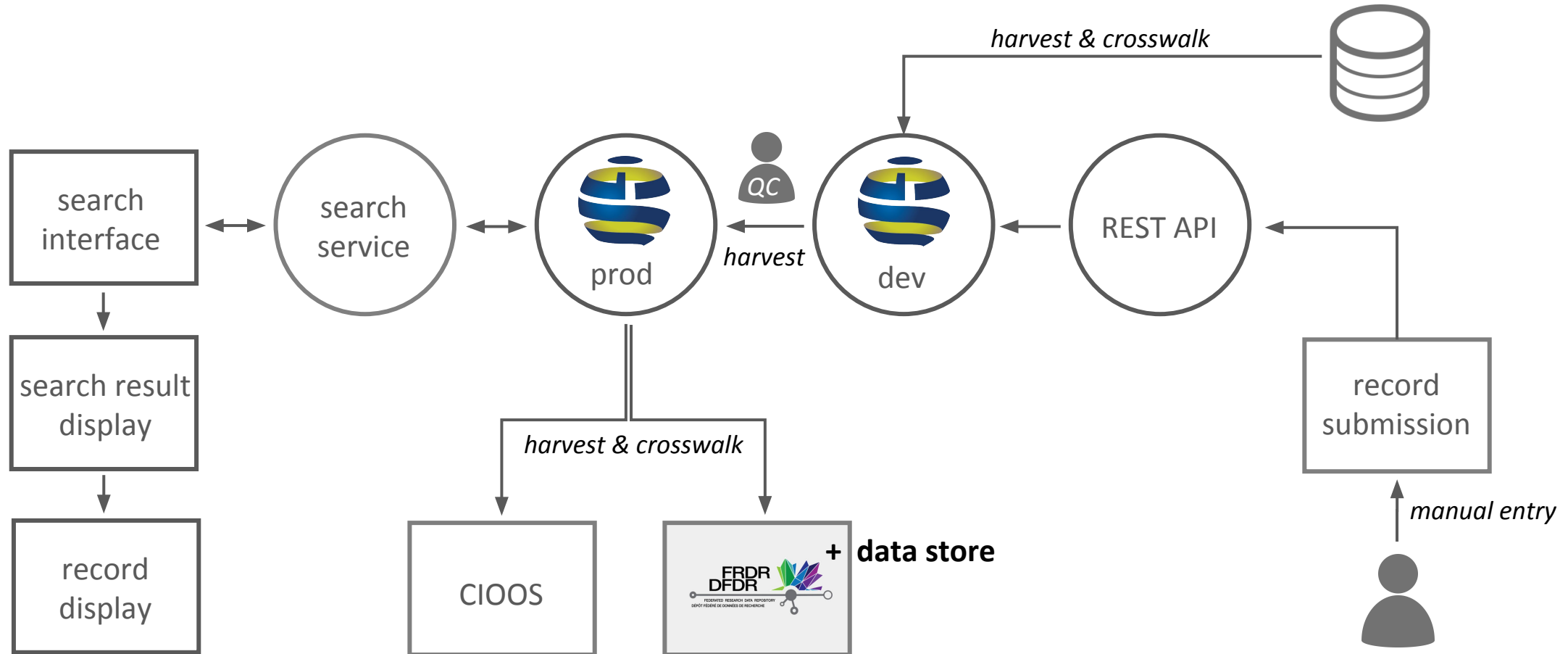
DR. INES HESSLER
Senior Data Manager



KIM MORTIMER
Data Management Expert



RYAN GOSSE
Data Manager Infrastructure



Modeling, data analysis, and visualization projects

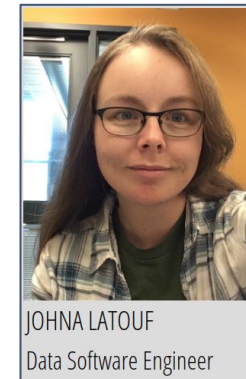
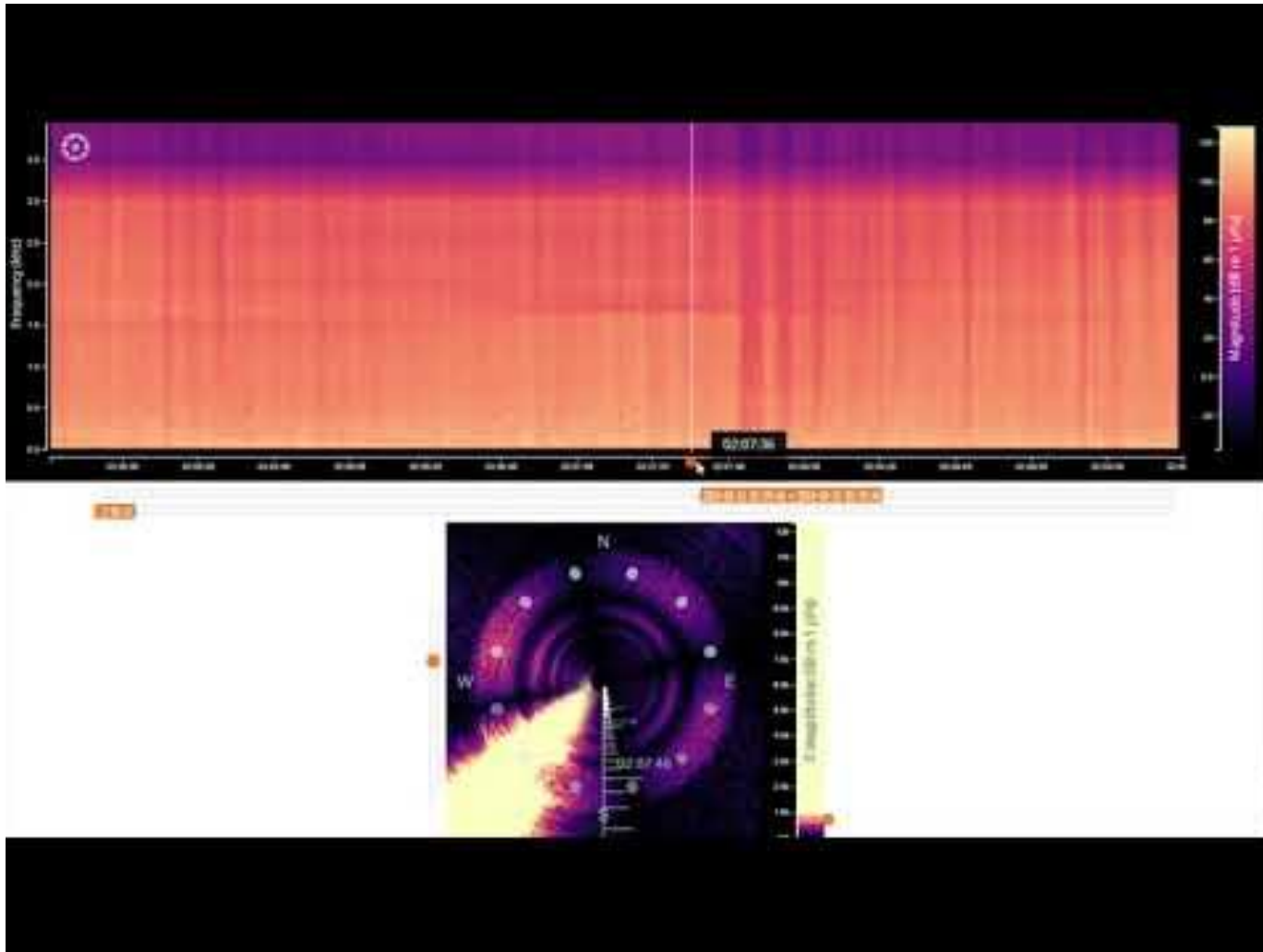


4. Directional acoustic data



Objective:

Intuitive and interactive 2D/3D visualization tool for directional acoustic data.



5. Ocean Soundscape Atlas



Objective:

Interactive web application for 2D/3D visualization of modeled underwater noise data

Shipping



Environmental



5. Shipping noise



- Initial focus:
 - Estuary and Gulf of St. Lawrence
 - 2013 + 2018
- Use validated shipping noise model:

[Aulanier, Simard *et al.* Proc. Mtgs. Acoust. 27, 070006 \(2016\)](#)



Université du Québec à Rimouski
Institut des sciences de la mer de Rimouski



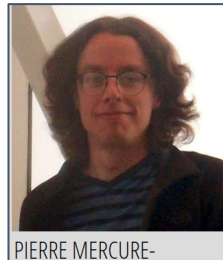
DR. YVAN SIMARD
Team Leader UQAR



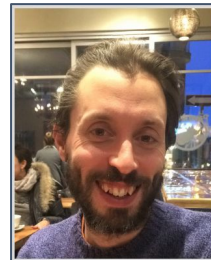
FLORIAN AULANIER
UQAR A/Prof and MERIDIAN
collaborator



PHILIPPE NAZAIR
Web Developer

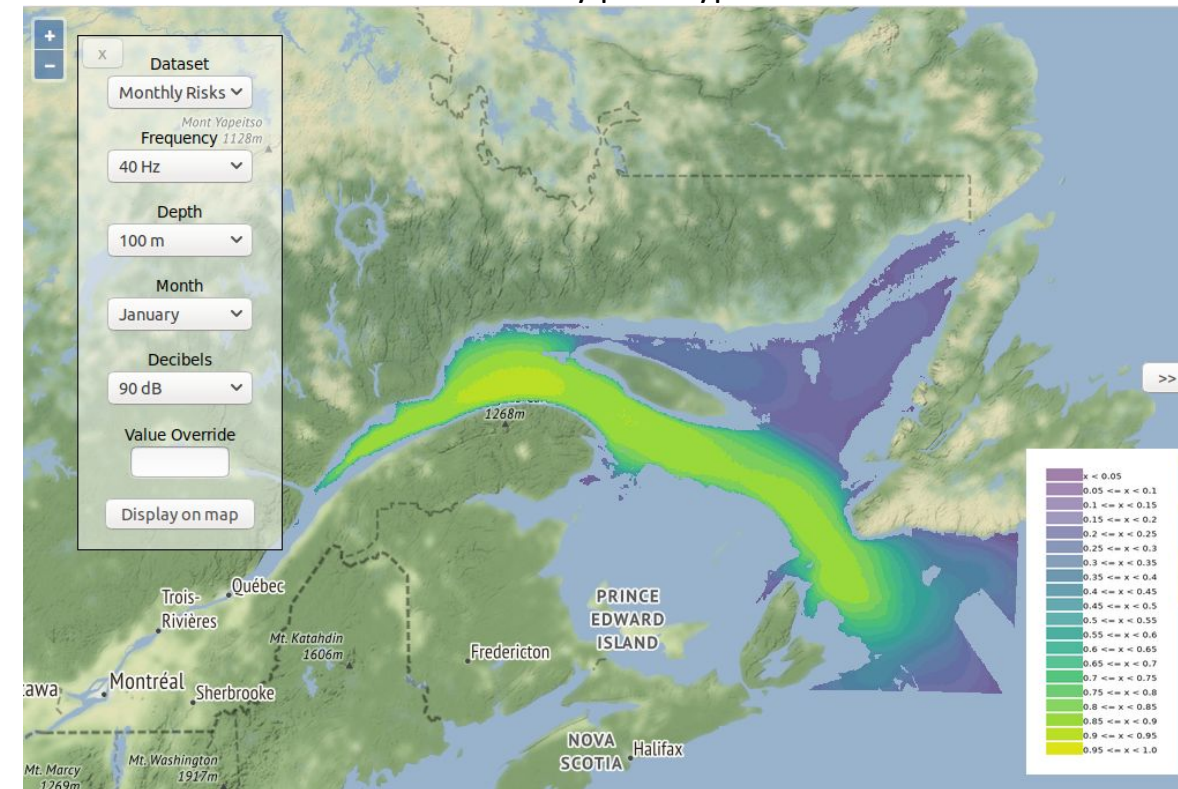


PIERRE MERCURE-
BOISSONNAULT
Data Analytics and Management

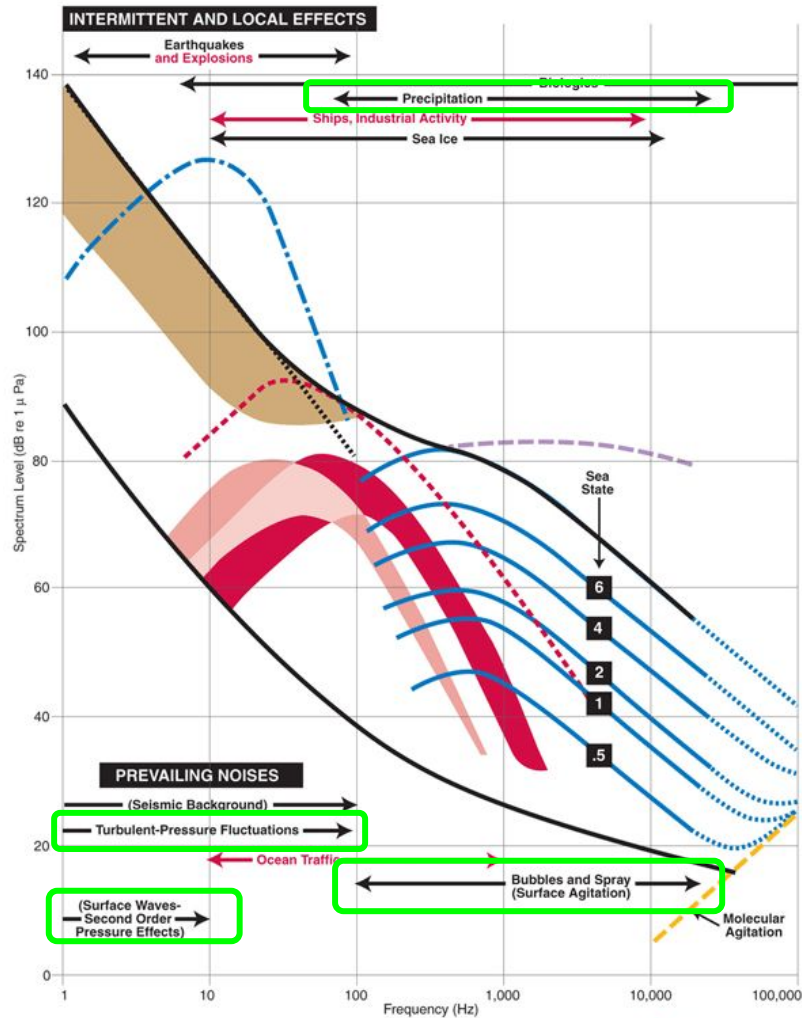


FRANCOIS GOSSELIN
Data Manager

Early prototype



5. Environmental noise

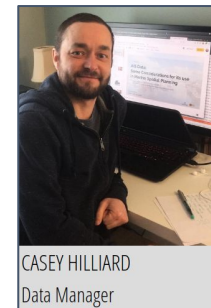


Objectives:

- Model noise due to waves and precipitation
- Develop open-source Python package



David Barclay
Assist. Prof.
Oceanography



CASEY HILLIARD
Data Manager



DR. OLIVER KIRSEBOM
Lead Acoustic Data Analyst

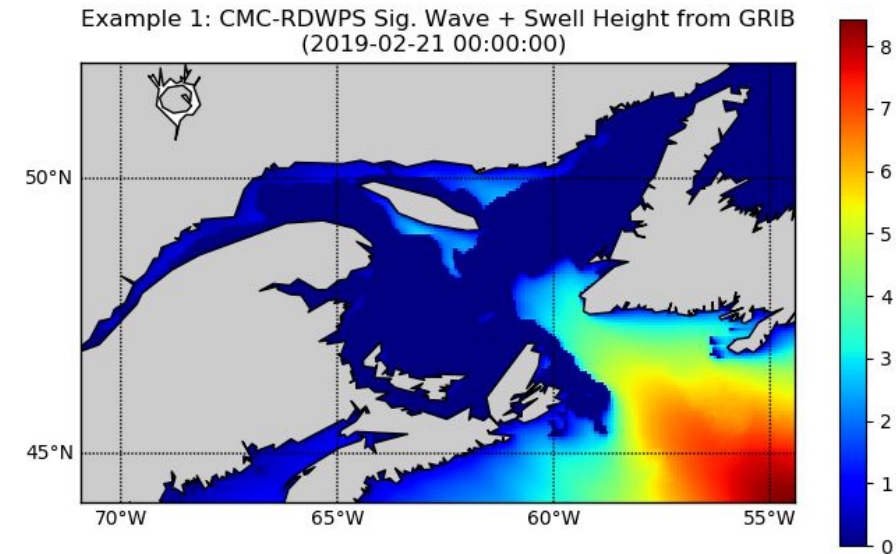


5. Environmental noise



Python package capabilities:

- Automatic retrieval of relevant environmental data:
 - Bathymetry
 - Seafloor acoustic properties
 - Water column properties (temperature, salinity, etc)
 - Wave height and precipitation forecasts/hindcasts
- Interpolation of retrieved data
- Transmission loss calculation
- Noise modeling



6. Acoustic detection and classification with neural networks



Fabio's talk!



University
of Victoria



AMALIS RIERA
Acoustic Data Analyst



DR. OLIVER KIRSEBOM
Lead Acoustic Data Analyst



FABIO FRAZAO
Data Scientist

Training initiatives



Training initiatives



PyBaR

- Informal co-working group at Dalhousie University
- A space to discuss data analysis and computational challenges
- Open to students and researchers from all scientific disciplines
- Focuses on Python and R

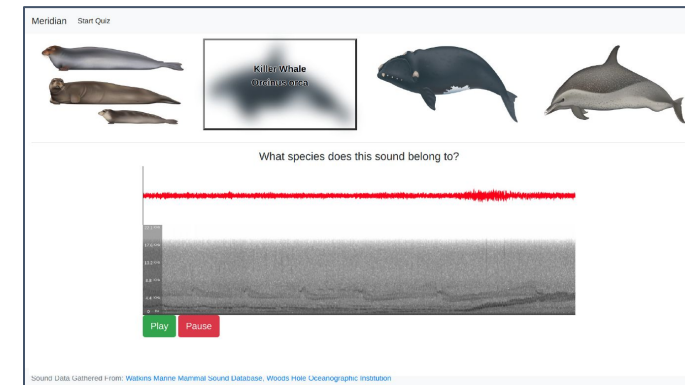


Workshops

- 2-3 workshops currently being planned for fall 2019 and winter 2019/20:
 - Neural-network based sound detectors/classifiers
 - Underwater acoustic data management

Marine Mammal Sound Quiz

- Sound clips from Watkins Marine Mammal Sound Database
- Education web-app for school children
- Used in the Big Data Educational Program for Mi'kmaq Children in Nova Scotia





<http://meridian.cs.dal.ca>



MERIDIAN_CFI



meridian@dal.ca

