# Echolocation-Based Discrimination of Cylinder Wall Thickness Variations in Bottlenose Dolphins *(Tursiops truncatus)*

Supervisors: Andreas Fahlman, Sara Torres

AIM

## BACKGROUND

Odontocetes use **echolocation** by emitting acoustic pulses and analyzing the returning echoes. **Au and Pawloski (1992)** examined the **minimum wall thickness differences** that dolphins could detect trough echolocation, though their study involved a **stationary animal**.

> Replicate the experiment of Au and Pawloski (1992) but with free-swimming dolphins

#### **METHODS**

2 dolphins (Aquille and Clara) were trained to perform a **discrimination task** between **two cylinders** of different wall thickness while wearing gelatin **eyecups**.

**Standard cylinder** → 6.45 mm wall.

**12 comparison cylinders**  $\rightarrow$  With wall thicknesses that differ from that of the standard cylinder by ±0.05 mm to -0.9 mm.

### RESULTS

**PERFORMANCE: Au and Pawlosky** found the discrimination threshold in the 0.2 mm differences, but the **present study** found significant results for some **0.1 mm** and **0.05 mm** thickness differences



(Performance above 70%, Binomial test, p < 0.05).

**HEADSCANS: Clara** does not present a consistent pattern, but **Aquille** increased the number of head scans in the discriminations between more similar cylinders.



**PERFORMANCE DIFFERENCES BETWEEN THICKER AND THINNER COMPARISON CYLINDERS:** Dolphins were better at discriminating the standard cylinder when the **comparison one was thicker** than the standard (Paired t-test, p < 0.05).

# DISCUSSION



LORO PARQUE FUNDACIÓN

- The free-swimming dolphins were able to make more fine discriminations than the Au and Pawlosky (1992) one. However, in contrast to the results from Au and Pawlosky (1992), our dolphins performed better when the comparison cylinder was thicker than the standard one.
- Aquille's scanning behavior increased in the harder discrimination tasks, suggesting a need for more information to succeed.

