*1.-Ouled‐Cheikh et al 2024. Future climate‐induced distribution shifts in a sexually dimorphic key predator of the Southern Ocean. Global Change Biology, 30(3), e17191.* <https://doi.org/10.1111/gcb.17191>

Lead by Dr Jazel he did an incredible work projecting climate change impacts on Antarctic fur seals’ foraging distribution. Using satellite tracking and Earth System Models, we predict how warming scenarios affect habitat suitability for males and females in breeding and non-breeding seasons. We examine sex-specific responses, considering their distinct foraging locations and potential consequences for species distribution.

*2.-****Borras‐Chavez, R****., et al 2023. Time and behavioral adjustments to lactation: Insights from a marine predator. Marine Mammal Science.* <https://doi.org/10.1111/mms.12970>

I examined how lactating Antarctic fur seal females adjust foraging behavior compared to non-lactating seals. Diving/tracking data reveal lactating females work hard! and take shorter, consistent trips, spend less time onshore, and modify dive behavior to meet lactation demands. Findings highlight behavioral trade-offs make to cope with energetic constraints associated to lactation.

*3.-Charapata et al 2023. Whiskers provide time-series of toxic and essential trace elements, Se: Hg molar ratios, and stable isotope values of an apex Antarctic predator, the leopard seal. Science of The Total Environment, 158651.* <https://doi.org/10.1016/j.scitotenv.2022.158651>

Dr. Patrick Charapata did this incredible work where we explored leopard seal whiskers as a biomonitoring tool in Antarctica. By analyzing whisker segments, we tracked trace elements, stable isotopes, and mercury levels over time. The findings establish baseline data, assess contaminant changes, and highlight whisker sampling as a non-lethal method for monitoring seal health amid climate change.

*4.-Sperou et al 2022. Large and In Charge: Cortisol levels vary with sex, diet, and body mass in an Antarctic predator, the leopard seal. Frontiers in Marine Science, 10, 1097.* <https://doi.org/10.3389/fmars.2023.1179236>

Dr. Emily Sperou lead a great work where she examined cortisol levels in leopard seals, linking them to sex, body mass, and diet. Larger individuals (females) with high-trophic diets have lower cortisol, while smaller individuals show the opposite. Leopard seals exhibit exceptionally high cortisol, possibly an adaptation. Findings provide crucial baseline data for assessing their response to changes.

5.-***Borras-Chavez R****, et al 2024. Occurrence, residency, and habitat characterization of leopard seals in Chile. Frontiers in Ecology and Evolution. 12, 1448098.* <https://doi.org/10.3389/fevo.2024.1448098>

I challenged the view of leopard seals as strictly Antarctic, revealing their long-term presence in Chilean Patagonia. Using citizen sciences, strandings, and research expeditions, we identified multiyear resident aggregations in two areas of Patagonia and provide an account of births in Chile. Then Dr. Rodrigo Soteres did his magic and with his glacier expertise we characterized their glacial habitat preferences and assessed potential glaciars that may hold leopardseals across Chile. Findings highlight their reliance on ice and vulnerability to climate change-driven glacial retreat.

Testing sustainable management in Northern Chile: harvesting Macrocystis pyrifera (Phaeophyceae, Laminariales). A case study

Renato Borras-Chavez & Matthew Edwards &

Julio A. Vásquez

My goal was to identify a sustainable harvesting protocol for *Macrocystis pyrifera* (giant kelp) that could support the local kelp harvesting industry while preserving the kelp resources. I tested harvesting methods in northern Chile, including the typical which was removing the complete algal unit. then I evaluate the impacts on kelp regrowth, recruitment, herbivores, and algal diversity. We end up recommending harvesting half the fronds (half the stipes growing on a bolder) as the most sustainable approach for ecological and industry balance.

Renato Borras-Chavez\*, Matthew S. Edwards, Dora Luz Arvizu-Higuera, Yoloxochitl Elizabeth Rodríguez-Montesinos, Gustavo Hernández-Carmona and Diego Briceño-Domínguez

Repetitive harvesting of Macrocystis pyrifera (Phaeophyceae) and its effects on chemical constituents of economic value

I examinate whether repeated harvesting of giant kelp over a three-month period altered the alginate yield, quality, and the nutritional content relevant for aquaculture. Their findings suggest that while these properties fluctuate over time, likely due to environmental factors, repetitive harvesting itself does not significantly degrade these economically important constituents. This research contributes to understanding sustainable kelp harvesting practices, especially in regions where kelp abundance is low.

Semi-Supervised Deep Learning for Estimating Fur Seal Numbers

We put together students from Chile and New Zealand to work on this problem and it worked! Rujia Chen led the publication where we investigate a **semi-supervised deep learning approach** to estimate the population of Juan Fernandez fur seals using drone imagery. We use the **Faster R-CNN algorithm**, training the model with a limited number of manually labeled seals and then testing its ability to identify and count seals in unlabeled images. Results demonstrate the **potential of this method for wildlife monitoring**.

Morphological, ultrastructural, and genetic characterization of coalescence in the intertidal and shallow subtidal kelps Lessonia spicata and L. berteroana (Laminariales, Heterokontophyta)

A. V. González & R. Borras-Chavez & J. Beltrán &

V. Flores & J. A. Vásquez & B. Santelices

This was a beautiful work that I did for three years while working with the brilliant National Sciences Award, Dr. Bernabe Santelices (and his gang). Led by Dr. Alejandra Gonzalez, we investigate the phenomenon of **coalescence in kelps** (where individual kelp individuals fuse together) in two dominant Chilean kelp species. I did the lab work to characterize the cellular changes during fusion of natural populations to determine the prevalence of these fused, genetically diverse individuals, known as **chimeras**. We found that coalescence is a frequent process in these kelps, involving specific modifications at the cellular level, and that chimerism is widespread in natural settings, suggesting potential **ecological advantages** for these fused organisms in their intertidal and shallow subtidal habitats.

Kienle SS, Goebel ME, LaBrecque E, Borras-Chavez R, Trumble SJ, Kanatous SB, Crocker DE and Costa DP (2022) Plasticity in the morphometrics and movements of an Antarctic apex predator, the leopard seal. Front. Mar. Sci. 9:976019. doi: 10.3389/fmars.2022.976019

Dr. Sarah Kienle worked with the satellite tracking data of our 22 leopard seals tagged near the Western Antarctic Peninsula to investigate their movement patterns including diving behavior. We also find out **female-biased sexual size dimorphism in leopard seals**, with females being considerably larger than males, and also highlights substantial **individual variability** in how far the seals travel and their diving strategies. Ultimately, the findings suggest that this flexibility may be crucial for leopard seals to **adapt to the rapidly changing environment** of the Southern Ocean.

Variability in age of the Southern Ocean myctophid (Gymnoscopelus nicholsi)

derived from scat-recovered otoliths

Usually, we work with Antarctic fur seal poop and find hard remains such as otoliths (a little fish ear bone found from the myctophid fish they eat). Then we have awesome people like Angela Klemmedson that led this research and analyzed this huge 16-year period otolith dataset. We understand changes in the **age structure and reconstructed length** of the myctophid population, ultimately demonstrating the value of using predator diets to monitor otherwise elusive but ecologically significant prey species.

Novel penguin Avian avulaviruses 17, 18 and 19 are widely distributed in the Antarctic Peninsula

Florencia Olivares1 | Rodrigo Tapia1 | Camilo Gálvez1 | Fernanda Meza1 | Gonzalo P. Barriga2 | Renato Borras‐Chavez3,4 | Juan Mena‐Vasquez1 | Rafael A. Medina5,6,7 | Victor Neira1

Lead by Florencia Olivares, we investigated the prevalence and distribution of three newly identified **penguin avian avulaviruses (PAVs 17, 18, and 19)** across the Antarctic Peninsula. Samples came from– Gentoo, Adélie, and Chinstrap – at seven different locations and used antibody tests to determine if the penguins had been exposed to these viruses. The findings revealed that **these novel PAVs are widespread** among the studied penguin populations throughout the Antarctic Peninsula, suggesting the viruses can infect all three species over a large geographical range. This research provides the first broad serological evidence of these viruses in Antarctic penguins.

Southern Ocean food-webs and climate

change: A short review and future directions

**José P. QueirósID 1,2\*, Renato Borras-ChavezID**

**3,4, Noémie FriscourtID 5, Jasmin GroßID**

6,7,

**Candice B. LewisID 8, Georgia MergardID**

**5, Katie O’BrienID 2,9**

Dr Jose Queiros is awesome we have worked together in the Association of Polar Early Career Scientist for a long time, and he invited me to write with him this review. We synthesize current understanding of **Southern Ocean food webs** and their **vulnerability to climate change**. We examine the structure of these Antarctic ecosystems, highlighting the traditional view of a krill-dominated system while also emphasizing the importance of **alternative food pathways**. We also discusse various **methodologies used to study these complex networks**, their strengths, and limitations, and concludes by outlining **future research directions** and the significant role of early career researchers in advancing this critical field of polar study.

CS-PHOC: weekly census counts of Southern Ocean phocids at Cape Shirreff, Livingston Island

Samuel M. Woodman 1 ✉, Renato Borras-Chavez2,3, Michael E. Goebel4,5, Daniel torres3, anelio Aguayo3 & Douglas J. Krause1

I have to give a bit more context to this data paper. I long admired the work done by Daniel Torres with pinnipeds at Cape Shirreff, Antarctica for more than 20 years, being the first guy ever putting a station there. He collected a lot of data that was lost in piles of printed documents at the Chilean Antarctic Institute (INACH). I recovered it and reorganized it and then told Dr. Michale Goebel and Dr. Douglas Krause that we should put together this data with the next 20 years of data they collected at this location and Sam Woodman was the bartender of this cocktail. The **Cape Shirreff Phocid Census (CS-PHOC) dataset** is a valuable collection of **weekly counts of four seal species** at Cape Shirreff, Antarctica, spanning most austral summers since 1997. It is the result of a long-term collaboration between INACH and the U.S. Antarctic Marine Living Resources (AMLR) Program to monitor **phocid populations in a region undergoing rapid climate change**. This publicly available dataset on the SCAR Biodiversity Portal provides crucial information for understanding **population trends and habitat use of these key Southern Ocean predators**.

First paired observations of sexual behavior and calls in wild leopard seals

Sarah S. Kienle1 · Carolina A. Bonin2 · Gabriela Gómez3 · Michael E. Goebel4 · Marcelo Donke3 · Emily S. Sperou1 · Alicia I. Guerrero5 · Renato Borras‑Chavez1

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This was our first baby between from San Rafael National Park. Led by Dr. Sarah Kienle we meticulously documents a two-hour courtship interaction between a male and a female in Chile, providing the **first detailed account of their sexual behaviors and associated vocalizations in their natural habitat**. Sarah also analyze their corresponding in-air and underwater calls, suggesting the importance of both **acoustic and behavioral displays in leopard seal courtship**. Furthermore, the observation of a potentially injured male the following day offers **direct evidence of attempted mating** and suggests that Laguna San Rafael in South America could be a significant breeding area for this Southern Ocean predator outside of Antarctica.

Individual Specialization in a Generalist Apex Predator: The

Leopard Seal

Emily Sperou1, Douglas Krause2, Renato Borras-Chavez1, Patrick Charapata3, Daniel Costa4, Daniel Crocker5, Kerri Smith6, Bradley Thompson1, Azana Best1, Jaelyn Anderson1, Michael Goebel3, Carolina Bonin Lewallen7, and Sarah Kienle1

Dr. Emily Sperou led this project that aimed to explore the feeding habits of **leopard seals**, challenging the typical assumption that such animals are dietary generalists. Emily analyzed stable isotopes signatures in whiskers to reveal significant **individual specialization** in their diets, with most seals consistently focusing on specific prey while only a few act as true generalists. This specialization, even by a small number of seals, have a substantial impact on local prey populations, such as the decline of Antarctic fur seals, highlighting the broader ecological importance of understanding **individual-level foraging behaviors** in apex predators.

Juan Fernandez Fur Seal Arctocephalus philippii (Peters, 1866)

Renato Borras-Chavez1,2,\*, Constanza Toro-Valdivieso3 and Maritza Sepúlveda4

Together with two brilliant researchers Dr. Maritza Sepúlveda and Dr. Constanza Toro, I lead this in-depth overview of the least study fur seal of the world, the Juan Fernandez fur seal (*Arctocephalus philippii*). This book chapter soon to be published in the book “Mammals of Middle and South America: Carnivora” from *Springer Nature Publisher* covered the species taxonomy, distribution, morphology, physiology, genetics, life history, behavior, diet, and ecology. We also address conservation status, threats from climate change and human activities, and outlines key management strategies and research needs for protecting this endemic and understudied Chilean pinniped.