

# Microbes in the Icelandic Marine Environment



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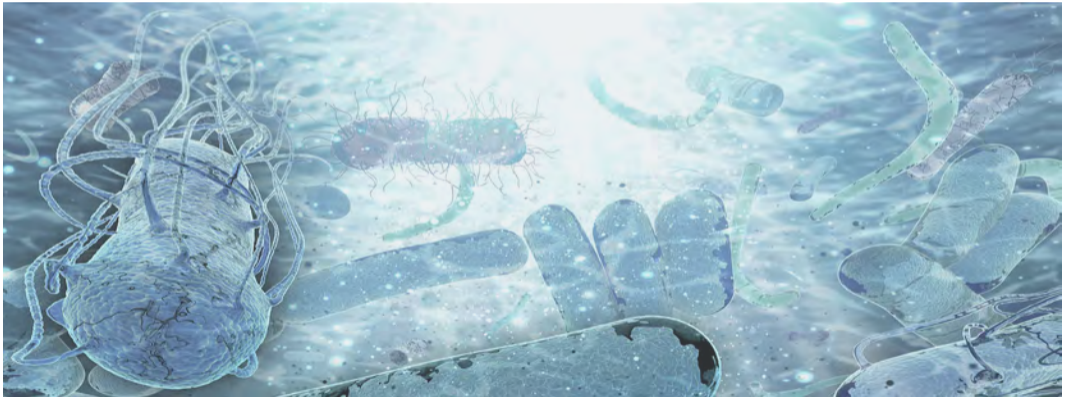


Illustration by Ken Mattiuz - [www.gymaera.com](http://www.gymaera.com)

Introduction

# MIME


Microbes in the  
Icelandic  
Marine  
Environment

Metagenomics

16S Metabarcoding

FCM

18S Metabarcoding

A satellite image of Earth showing the ocean and landmasses. The ocean is a deep blue color, and the landmasses are green and brown. The image is partially obscured by a white box containing text and a grey box containing more text.

Microbes support  
all life on earth.

Marine photosynthetic microbes - **phytoplankton** - draw nearly as much CO<sub>2</sub> out of the oceans and atmosphere as all land plants do (Falkowski, 2002).

Introduction

# Marine food web

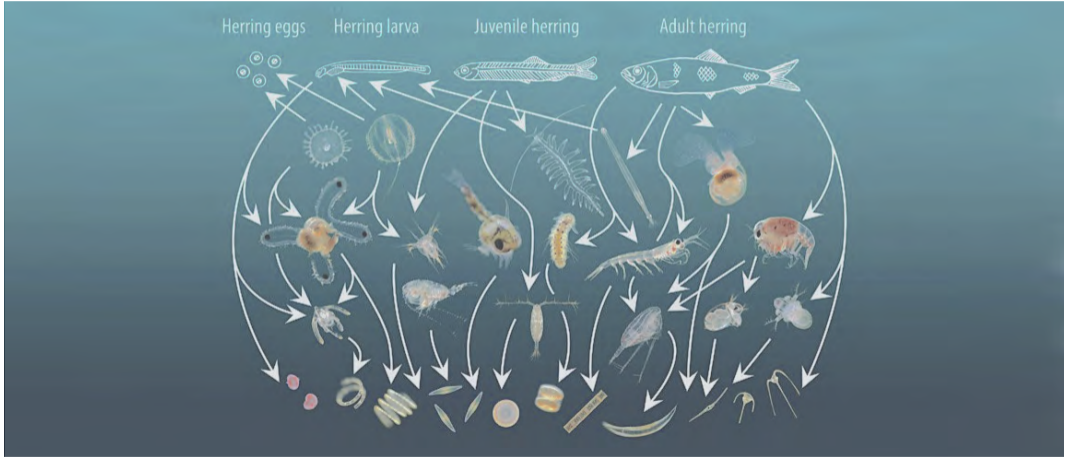


Illustration by Dr. Richard A. Kirby.

# Unculturable microbes



”Environmental microbiologists estimate that less than 2% of bacteria can be cultured in the laboratory.” (Wade, 2002)

Introduction

# History of ocean metagenomics



Introduction

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Venter et al. (2004)

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Venter et al. (2004)



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Karsenti et al. (2011)



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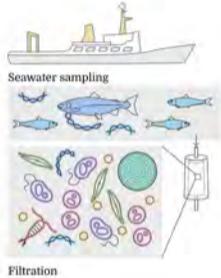
Karsenti et al. (2011)

Introduction

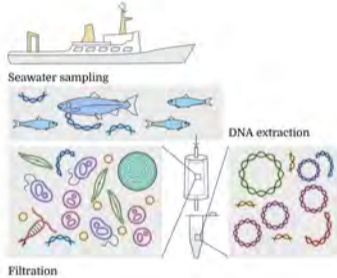
# History of ocean metagenomics



# Metagenomics

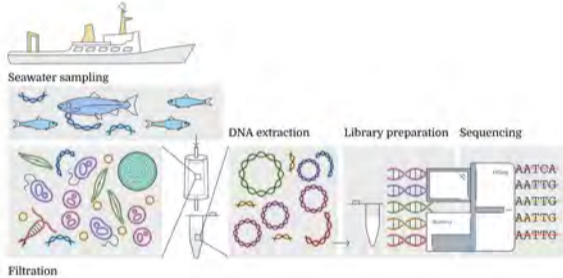


# Metagenomics

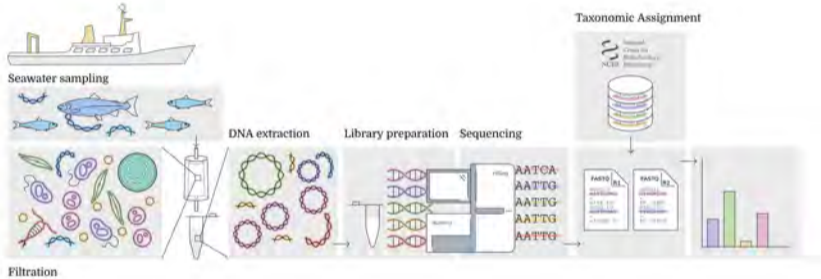




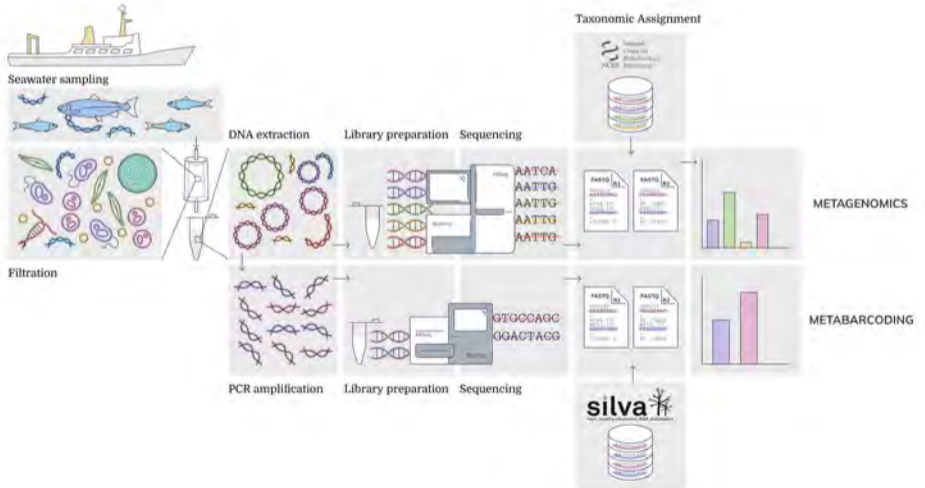
# Metagenomics



# Metagenomics



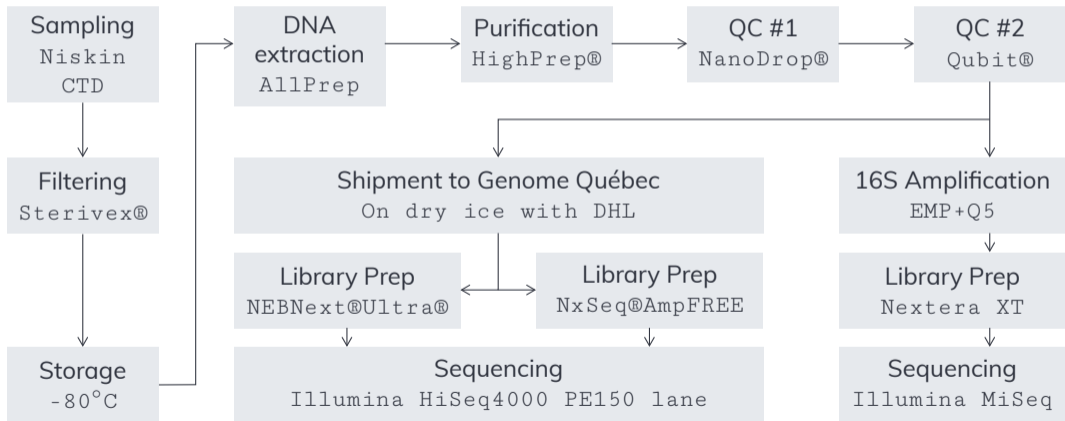
# Metagenomics



# Sampling

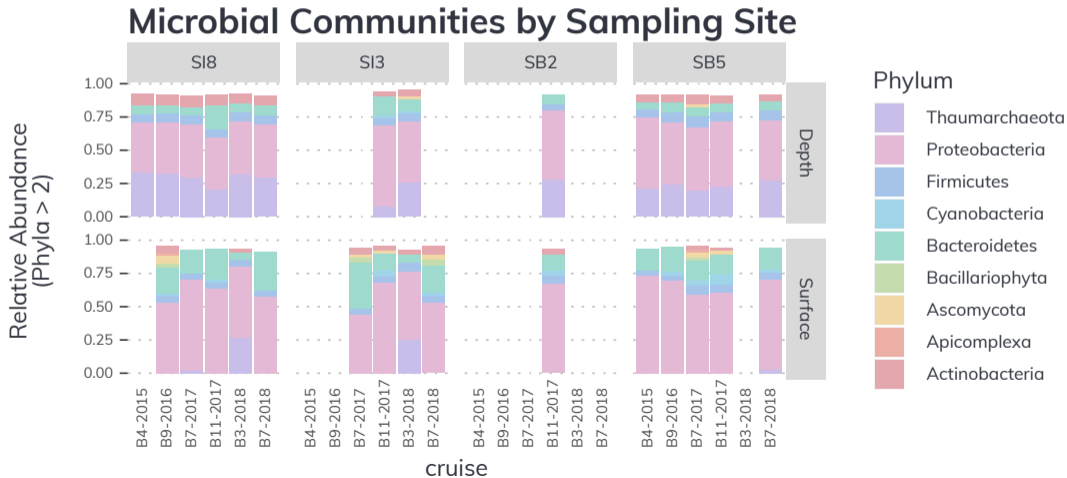


# Lab workflow



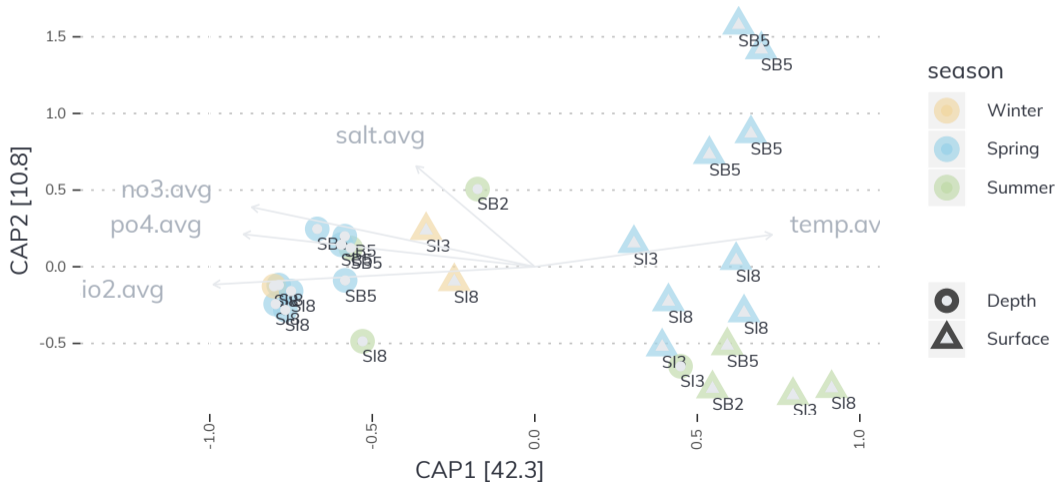
Results: Taxonomic profiles

# Phylum Composition

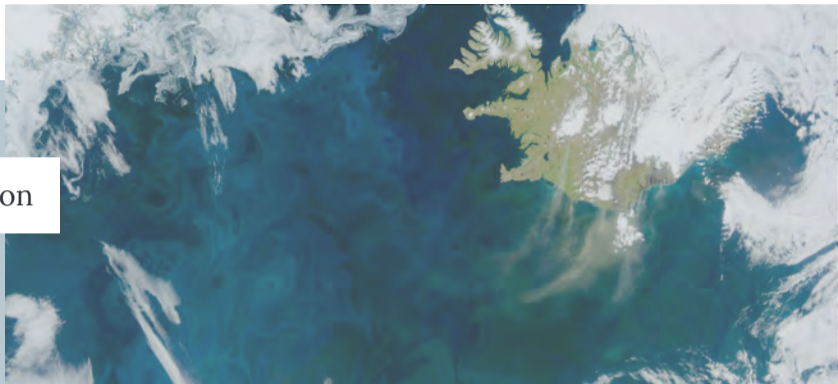


Results: Ordination

# Constrained Ordination



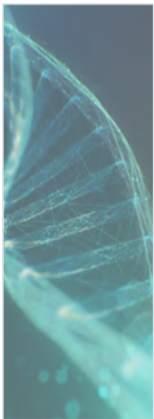
## Conclusion



- ▶ seasons and depths are the main explanatory variables.
- ▶ build new database including fish reference genomes to check if there are DNA molecules from fish in our samples.



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Captain and crew of the Bjarni Sæmundsson research vessel

## University of Iceland

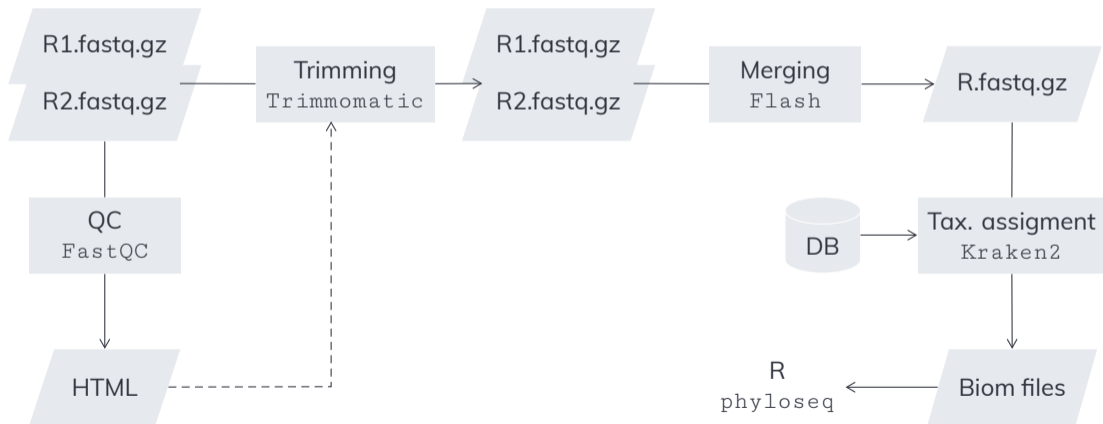
Prof. Arnar Pálsson

Dr. Halldór Pálmar Halldórsson

# References I

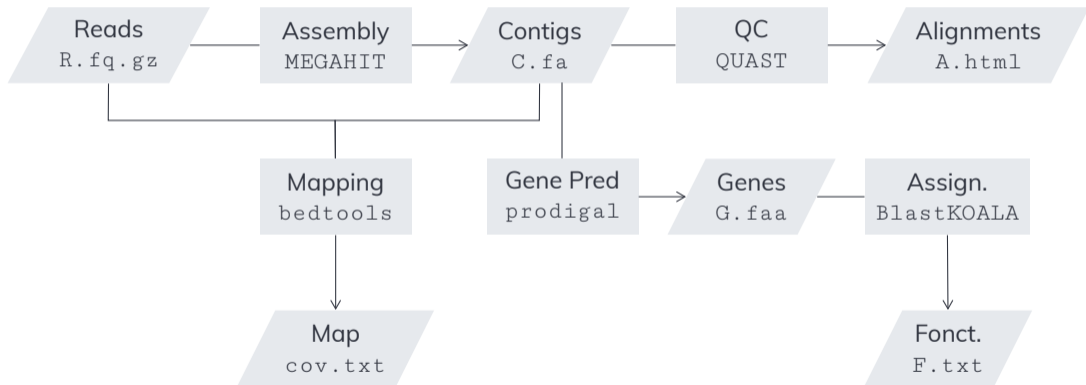
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# Data analysis



Flow chart of the data processing and read-based taxonomic profiling.

# Data analysis



Flow chart of the assembly-based functional analysis.