

**PLASTDAGEN 2023**

# **Marine Plastic Pollution: A Biological Perspective**

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**MAPLE – Marine Plastic Pollution: Environmental Impact and life  
cycle scenarios**

*A project in the Interdisciplinary Sustainable Initiatives at NTNU*



# Plastic Impacts on Ecosystems

**Plastic as biological hazard**  
(vector for invasive and  
pathogenic species)

**Plastic as physical hazard to animals**  
(Ingestion, entanglement, etc.)

**Plastic as chemical hazard**  
(accumulation and transport of  
additives, organic pollutants, etc.)





# Ecosystem Impacts on Plastics

## Microbial Settlement



Biofilm formation and fouling  
Microbial activities

## Physiochemical Weathering



UV exposure  
Mechanical stress



**Behavior and Fate of plastic in the  
marine environment**



# Plastic Microbial Colonization

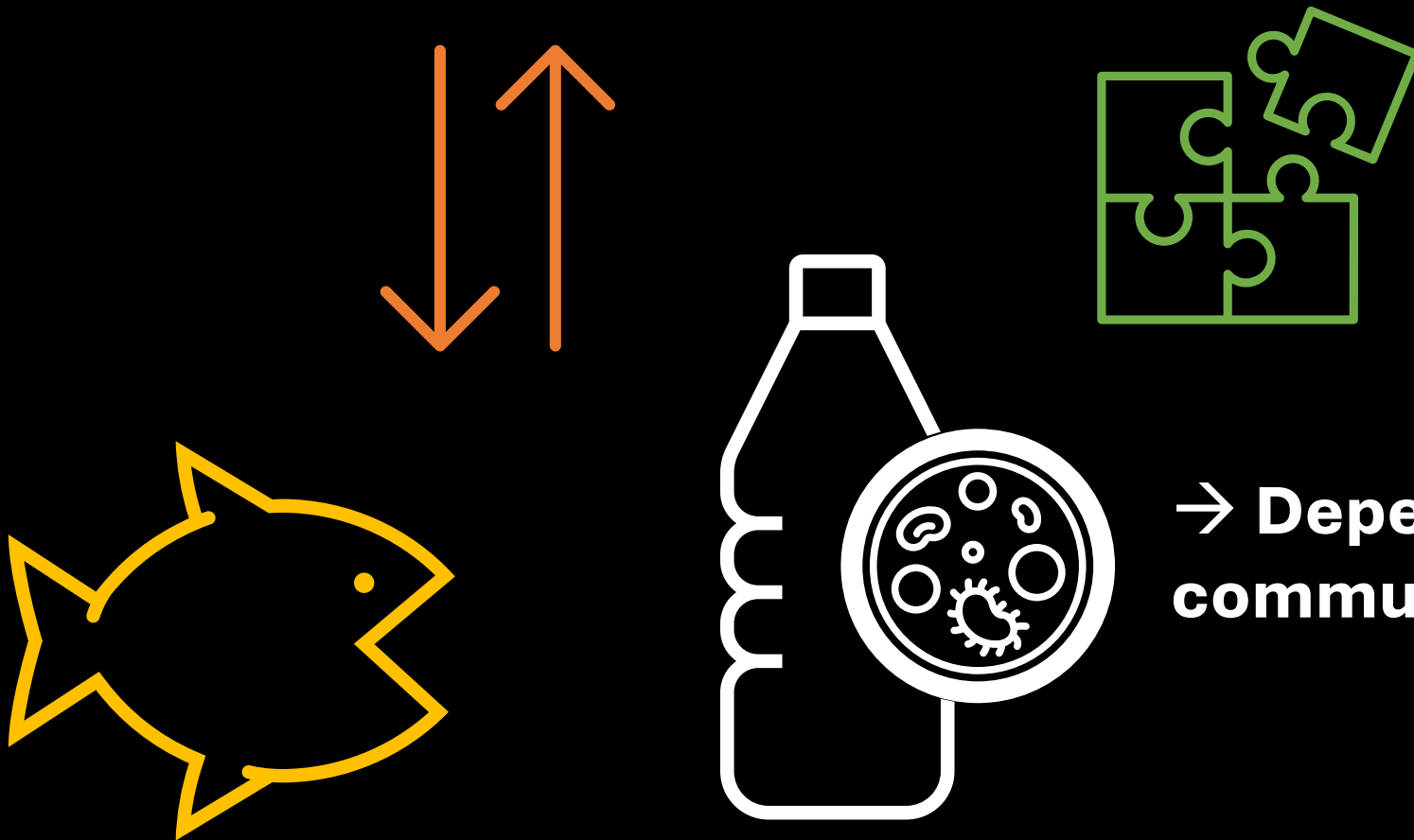


Conditioning film → Adherent Bacteria → Bacterial Biofilm → Microalgae and Diatoms → Larva of Invertebrates and Invertebrates

# Microbial Impact on Plastic fate

Hypotheses:

- Changes in density
- Increase ingestion
- Fragmentation



→ Dependent on the microbial community

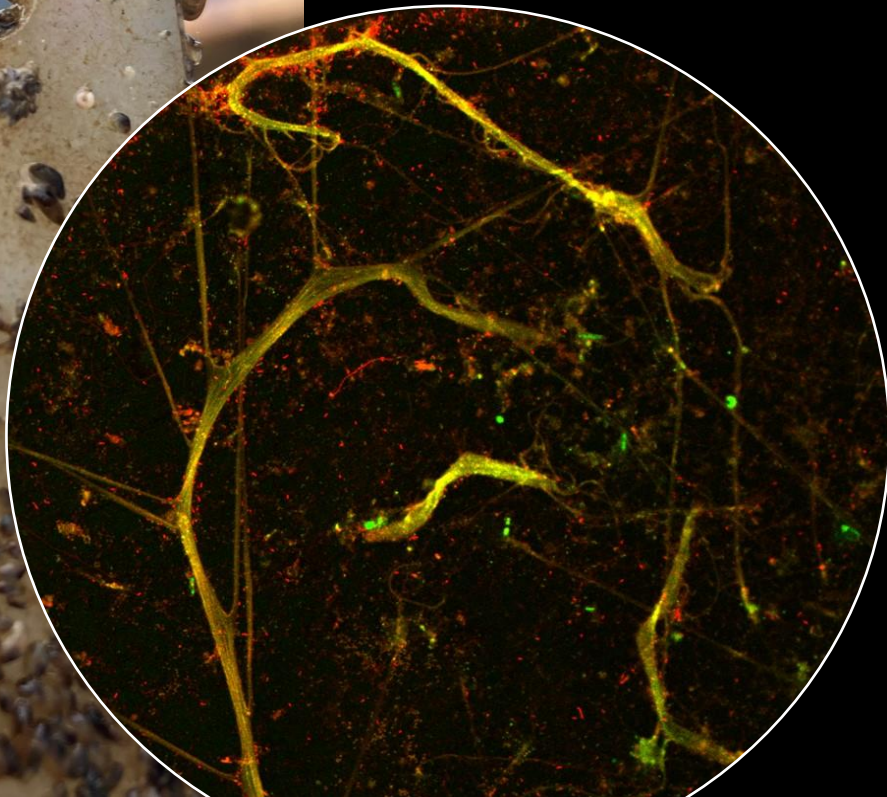


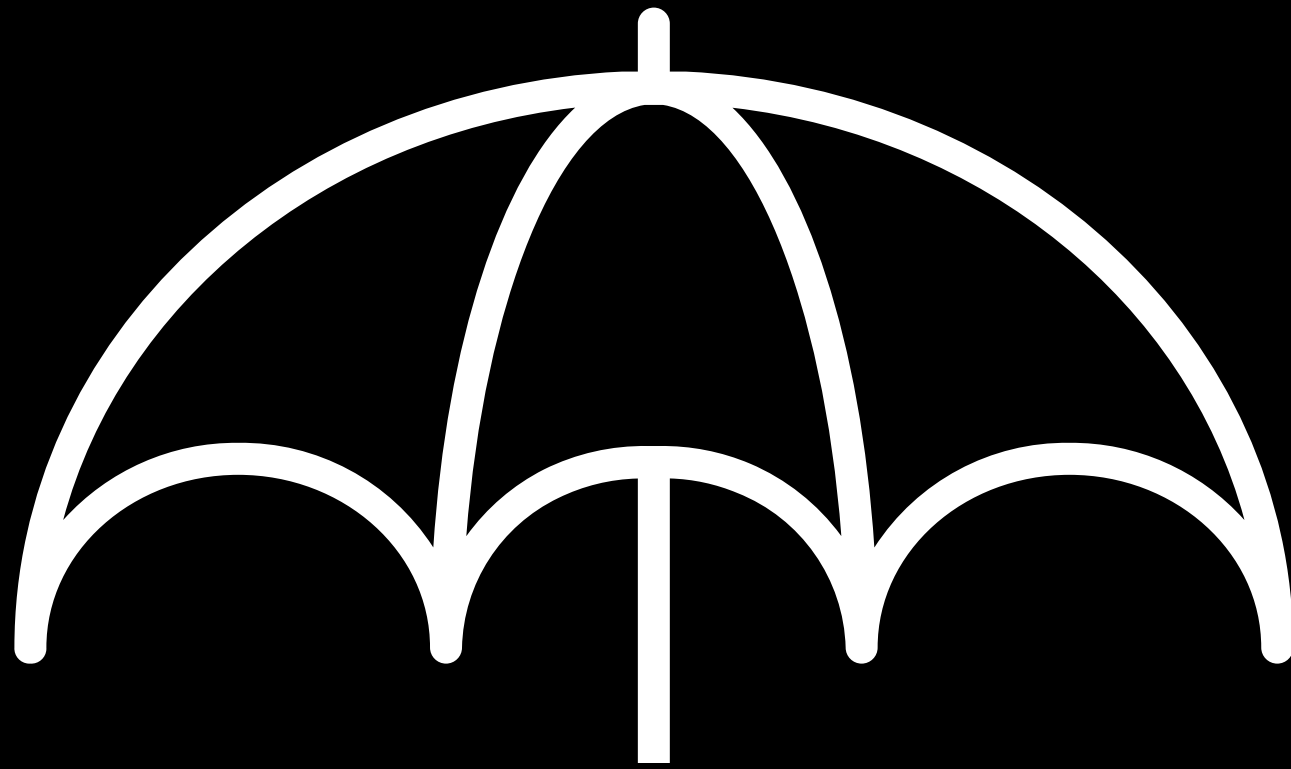
# Plastic Microbial Colonization

**Who lives there ?**

**Why are they there ?**

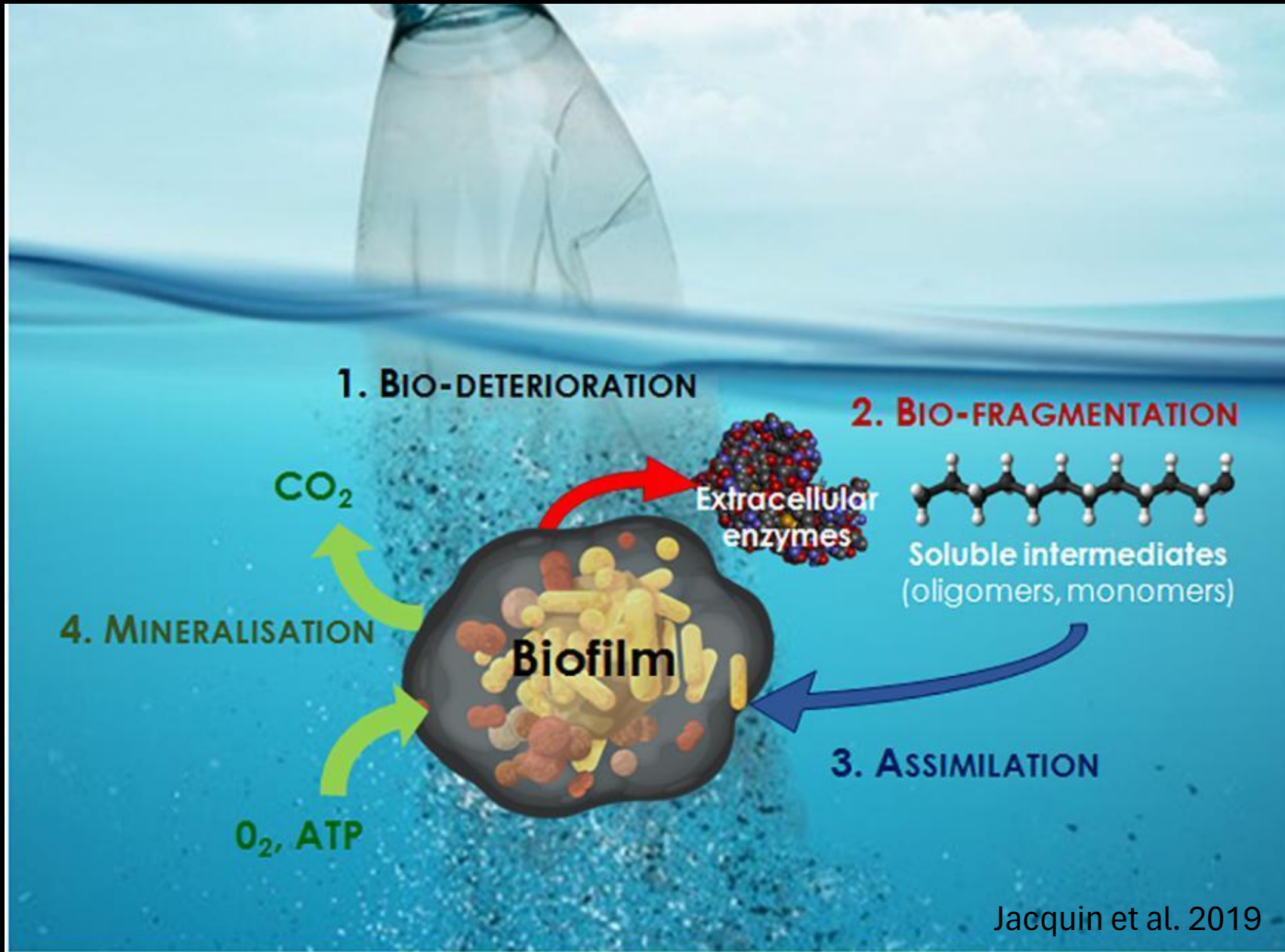
**What are they doing on there ?**





**Marine Plastic Biodegradation**

# Marine Plastic Biodegradation





# Plastic-associated microbes in Trondheimsfjorden





A clear plastic bottle is shown floating in the middle of the ocean. The water is a deep, vibrant blue, and the surface is covered in gentle ripples and small waves. The bottle is transparent, showing its hollow interior. Overlaid on the center of the image, partially covering the bottle, is the text "Thank You !" in a large, bold, black sans-serif font. The overall scene conveys a message of gratitude in the context of ocean conservation.

**Thank You !**