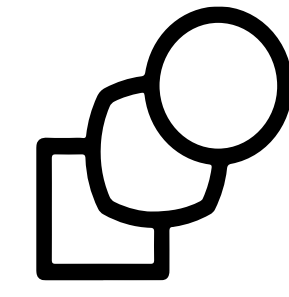# Mimicking Adaptation and Plasticity in WORMS: the MAPWORMS Project

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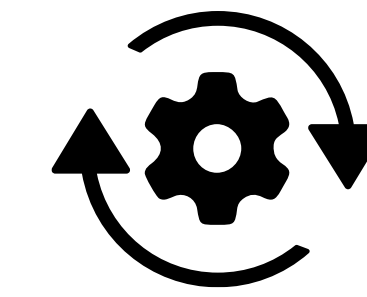
The main aim of MAPWORMS is developing a new concept of bioinspired robots qualified to fulfill tasks in response to environmental stimuli thanks to their smart materials.
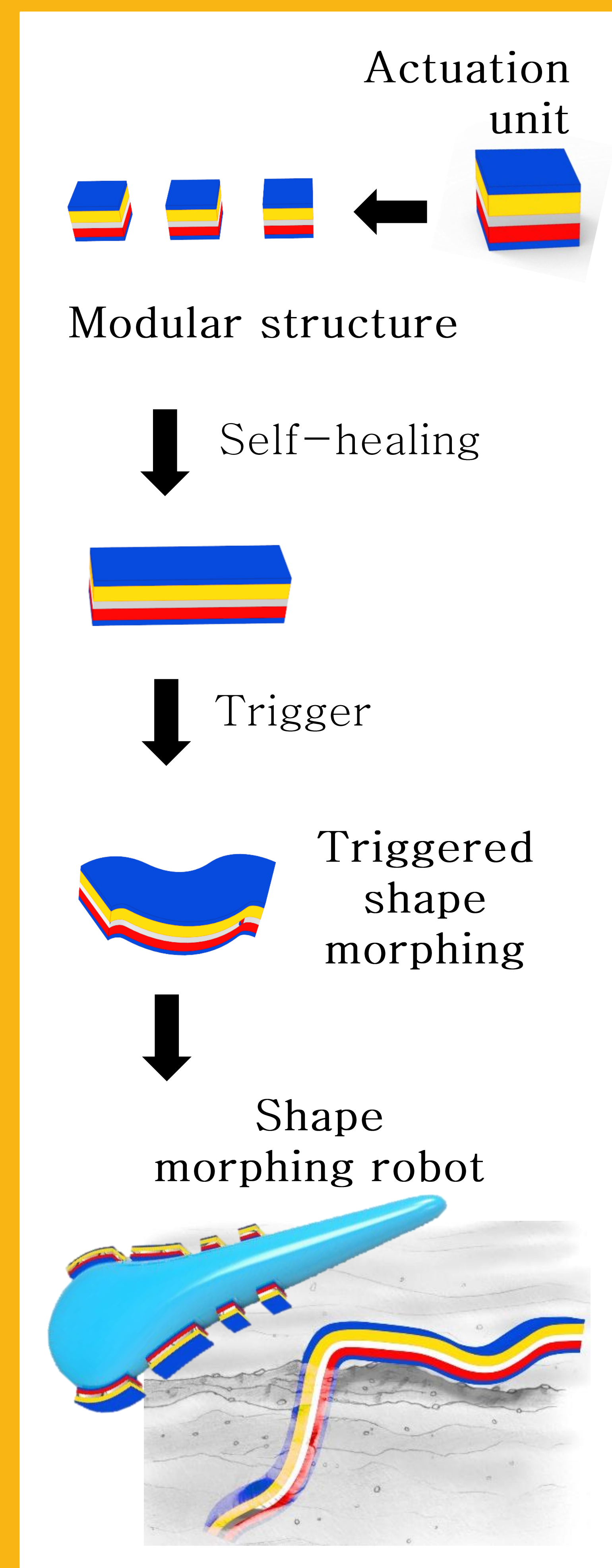
- Able to sense environmental cues
- Able to morph their shape
- Able to adapt to the environment

Shape Morphing Robots

Actuation unit

Modular structure

↓ Self−healing

↓ Trigger

Triggered shape morphing

↓

Shape morphing robot

Developing **modular robots** able to change their shape. These modular robots will stand out for their **self−adaptability** to the environment and shape morphing capabilities.
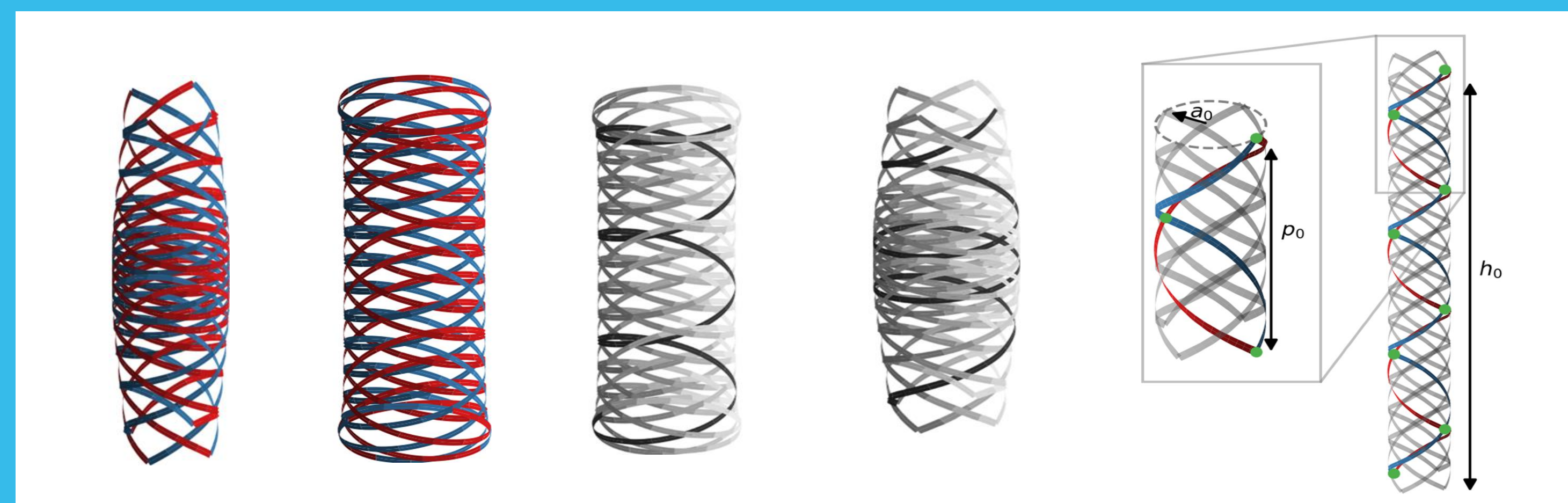
Phylogeny, Habitat Adaptation and Plasticity

Observing the **body plasticity** plan in marine Annelida, with focus on Sipinculidae species, and its capability to **adapt** to the external environment constraints.
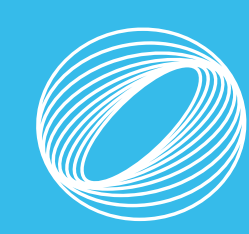
Mathematical Modelling

Developing mathematical models of the marine Annelida plasticity and its **adaptation** to the environment in order to program the behavior of the worm−mimicking robot.

Shape Memory Hydrogels

Developing smart materials (leaning onto **DNA−based hydrogels**) able to respond to different stimuli (light, pH, chemicals, etc.) thanks to their shape memory capability and variable stiffness.

THE BIOROBOTICS INSTITUTE Sant'Anna School of Advanced Studies - Pisa | hcmr ΕΛΚΕΘΕ | VEXLUM | THE HEBREW UNIVERSITY OF JERUSALEM | ACMIT AUSTRIAN CENTER FOR MEDICAL INNOVATION AND TECHNOLOGY | CoNISMa Consorzio Nazionale Interuniversitario per le Scienze del Mare

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