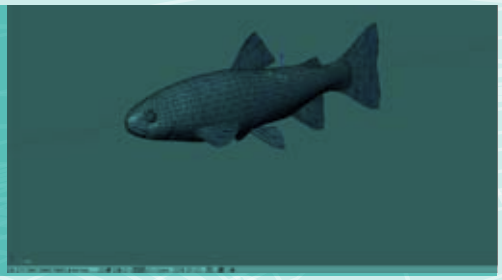
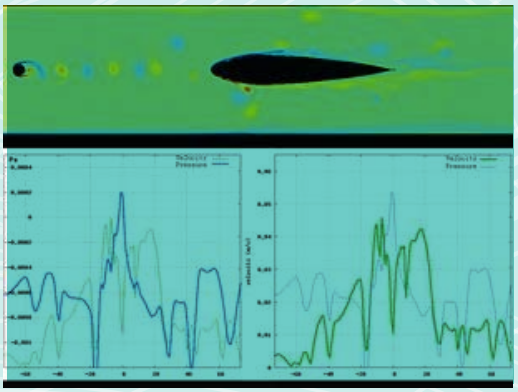
filose

We investigate how fish sense the flow around them and react to the changes in the flow patter and we build robots that act in the same way.



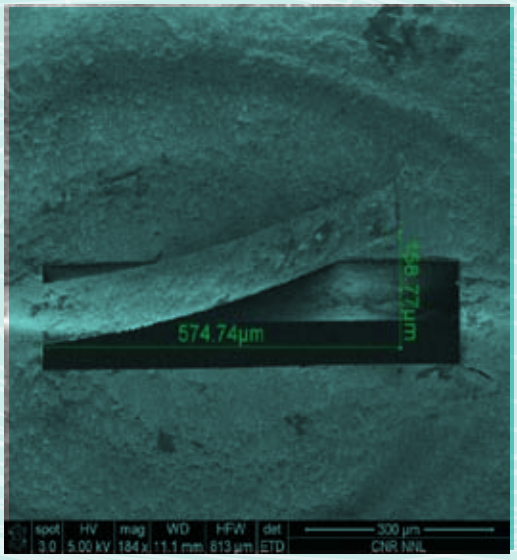
FISH BEHAVIOUR

We conduct experiments in a controlled hydrodynamic environment to understand how fish change their locomotion patterns in response to certain hydrodynamic events.



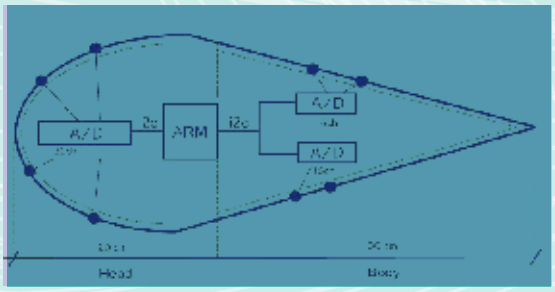
LATERAL LINE SENSING

Fish use lateral line to sense the surrounding water. This information is then used to gain stability and achieve high maneuverability in turbulent waters, to exploit energy-saving locomotion patterns and to harvest energy back from the environment, to track prey, to identify and avoid obstacles and to maintain optimal distance when swimming in schools. We investigate how to lateral line of a fish detect the flow around it. Our objective is to characterize hydrodynamic images and to map them to fish locomotion patterns.



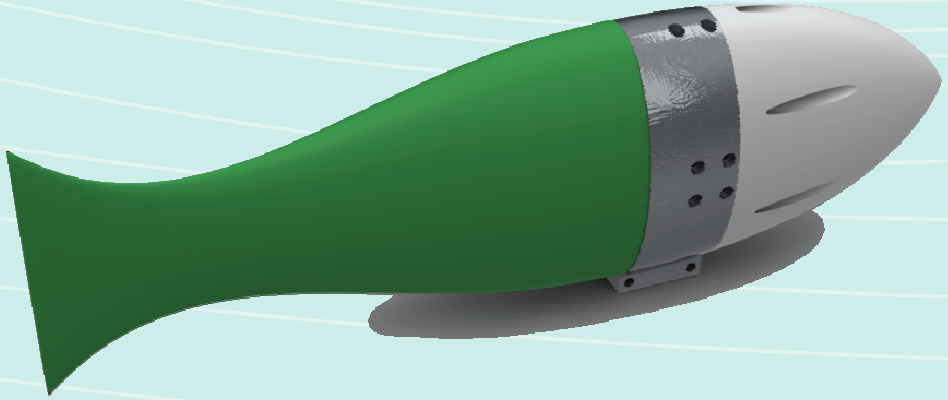
ARTIFICIAL LATERAL LINE

The fish lateral line consists of an array of neuromasts that are sensitive to water velocity and pressure gradient, which allows fish to perceive hydrodynamic events. We mimic the mechanosensory system of fish by developing a MEMS array for detecting hydrodynamic events.



CONTROL

The fish is controlled by using the information from aritificial lateral line sensors and a bio-inspired Central Pattern Generator (CPG), approach replicate the locomotion patterns identified in a real fish.



FISH ROBOT

The mechanical fish robot permits to replicate kinematics of a real fish with the lowest possible mechanical complexity. High adaptability and efficiency is achieved by tuning the material properties of the body.