



Joseph Ayers [8], a biological professor at North-eastern University. With the rapid development in field of biology and computers, it is now possible to understand and imitate the behaviour of other animals.

Biomimetic fish like robots are gaining popularity as they can be used extensively in under water investigations and marine applications like checking quality of water i.e. level of contamination by chemical discharge and oil spills, certain space applications , underground investigations (snake type features) and certain rescue missions . Some researchers also think fish robots as effective weapon for ship propulsion which may reduce shoreline erosion and undermining of submarine installation caused by screws used in ships.

### 1.1. Design and implementation of a biomimetic robot

A biomimetic robot fish with tail is made for propulsion along with pectoral fins having three degree DOF (provided to give flexibility adaptability), and multiple sensors are designed based on the analysis of propulsion and manoeuvring mechanisms for carangiform swimming motion in which undulations of fish movement are limited to the caudal (tail) regions with the body bending into less than one half of a sinusoidal wave form [1]. A mechanical tail structure with cams and connecting rods for fitting carangiform fish body wave is designed based on the propulsion and manoeuvring mechanisms of real fishes, which provides the main propulsion.

In order to obtain the necessary environmental information, several kinds of sensors (video, infrared, and temperature, pressure and PH value sensors) are mounted on the robofish model. To analyse the carangiform propulsive mechanism and the large-amplitude elongated body theory, a model based on elongated-body theory was put forward as idea to analyse the irregular amplitude of tail. Several other developments have taken place in the field of biomimetic robofish, as MIT has successfully developed first free-swimming robotic fish ,which is an eight-link, fish-like machine named as RoboTuna. A fish-like micro robot prototype which possesses a pair of fins actuated by piezoceramics is being developed in Nagoya University. Under water robot research on imitating the propulsion mechanical structure of fish fins and constructed an experiment platform using elastic module, was conducted by the Harbin Institute of Technology [9].























