

# IIT-I designs smart underwater robot

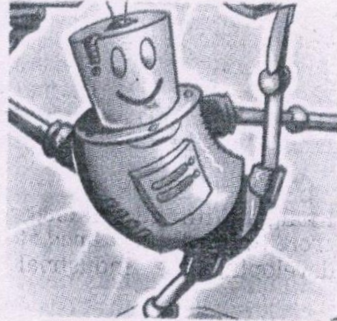
TIMES NEWS NETWORK

**Indore:** A research group at Indian Institute of Technology, Indore (IIT-I) has designed smart material based robot with potential application in probing the underwater condition and surveillance.

The group has designed the bio-mimetic shape memory alloy actuated underwater robot as a project funded under Promotion of Research/Innovation for Undergraduate Student (PRIUS) scheme of the institute. This project aims at bio-mimicking the undulating motion of a fish, using carangiform mode of swimming and uses its tail fin for propulsion. The robot will mimic fish movements in water. The buoyancy of the robot is set so that it can float just below the surface of water.

The skeleton of the robot fish is designed using CAD and the final prototype is 3D printed. SMA springs were chosen as actuators and it acts as a dynamic rib in the skeletal structures.

The skin and the caudal fin of the robot is manufactured at IIT-I using photopolymer, which was cured by UV rays to get the desired shape as an elastomer. The posterior end of the fish is made with a thin skin of soft polymer.



Apart from aquatic robot, the group led by Dr I A Palani is developing smart material based micro-devices. Research scholars from mechatronics and instrumentation lab at IIT-I has demonstrated for the first time, a novel copper based flexible shape memory alloy (SMA) bi-morph, with high flexibility and recovery ratio. This bi-morph has potential application towards energy harvesting and MEMS based device.

A project has been initiated in collaboration with Volvo Eicher, MHRD and IIT Indore for waste heat recovery from the automobile engine using SMA bi-morph. The post graduate students at IIT-I are involved in developing several other SMA actuated micro-devices, which include micro-valves for drug delivery and SMA actuated Stewart platform for Opto-Mechatronics device.