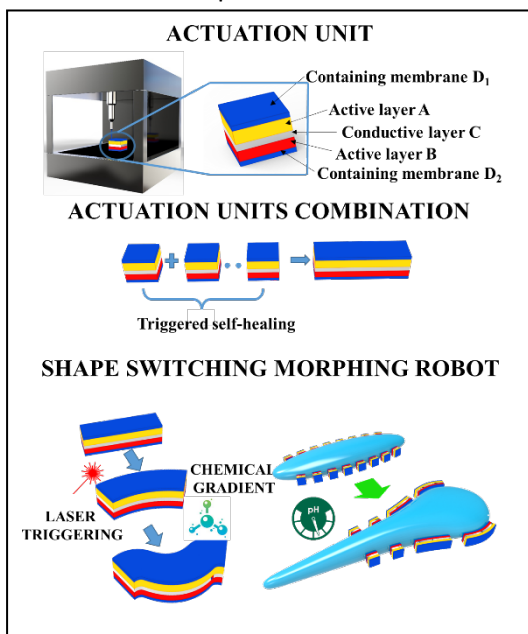

MAPWORMS PROJECT

MAPWORMS (European EIC Project, duration 4 years) aims at challenging traditional robotics concept by proposing robots inspired by simplified forms of [Marine Annelida](#), able to perform tasks in response to environmental stimuli and to adapt to the environment with a shape-morphing strategy. Smart shape-memory hydrogels, able to respond to different stimuli (ion species, chemicals, light, pH, etc.), represent the building blocks in this new generation of morphing robots. By combining smart reactive hydrogels with nonreactive elements, actuation units able to transduce stiffness variation into geometrical changes will be developed.

The successful candidate will work (based on his/her background and research interests) on one of the following research topics:

- bioinspired modular shape morphing robots design and development by employing shape memory hydrogels and smart printing strategies. Smart actuation units based on DNA-hydrogels responsive to external stimuli will be developed. Their combination with non-reactive structural elements will be investigated towards worm-inspired modular robotic structures;
- mathematical and computational modelling of the adaptation to the environment through burrowing, protrusion of body parts and morphological changes of Annelida and of bio-inspired robotic replicas.



MAPWORMS involves two different research areas of the Institute: "Medical robotics and regenerative medicine" (under the supervision of Prof. Arianna Menciassi) and "Mathematical and computational modeling" (under the supervision of Prof. Antonio De Simone). The successful candidate will work at the intersection between the two areas with a personalized research program based on the background and interest of the candidate.

Candidates interested in this Scholarship, should select "MAPWORMS" as research topic and Prof. Arianna Menciassi and/or Prof. Antonio De Simone as Supervisor(s) during the application procedure. For further information, please refer to Prof. Arianna Menciassi (arianna.menciassi@santannapisa.it) and Prof. Antonio De Simone (antonio.desimone@santannapisa.it).