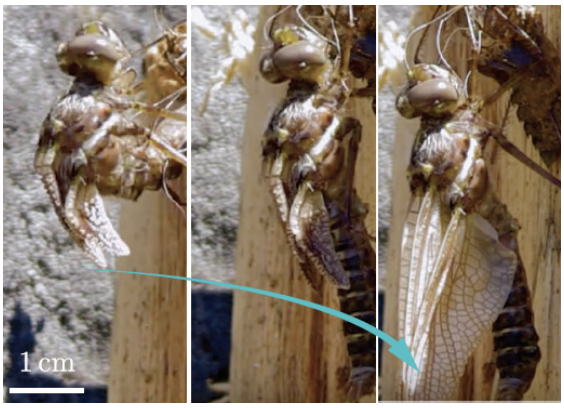
POSTDOC POSITION

BioInspired Actuation and Shape Morphing in soft structures.



LAB

IUSTI, MARSEILLE, FRANCE

jmarthelot.weebly.com

FUNDING

2-year postdoc position

starting in January 2020

CONTACT

Joel Marthelot (joel.marthelot@univ-amu.fr)

Context. Unlike traditionally rigid machines, compliant soft-functional materials have infinite degrees of freedom. In biological systems, the shape and motion control often rely on network systems: nonlinear phenomena can be achieved by the integration of elementary unit that presents a very simple actuation mechanism. The main goal of the Soft BioInspired Actuation group in IUSTI is to identify and rationalize these actuation strategies, and to develop technological applications by mimicking their functions.

Objectives. When a dragonfly emerges from its cocoon, its wings expand in a couple of minutes, prompted by the injection of hemolymph in a network of folded veins. The goal of the project is to design soft robots mimicking this biological behaviour and capable of evolving rapidly from a folded state to a deployed functional shape. Combining fast prototyping and mathematical modeling we aim to provide insights into the parameters that govern this physical process, explaining how the inflation of an individual vein, organized in a network, guides the expansion of a structure. Motivated by biology, this project has the potential to accelerate the distribution of soft robots into our daily lives from compliant medical devices to developable wings for ultra light drones.

Profiles. Candidates with either Physics or Engineering backgrounds and research achievements in the general area of soft/compliant mechanics or fluid mechanics are welcomed to apply. The following areas of experimental expertise are particularly welcomed: rapid prototyping, micro-fabrication, material science and mechanical testing. In addition, an appreciation for scaling analysis, theory and computation is a plus. The proposed research is interdisciplinary by nature, spanning organismic biology, theoretical mechanics, materials science and engineering.

Environment. IUSTI is located in Marseille, France. The candidate will join one of the leading French department in fluid and solid mechanics with opportunities for strong interactions with local and international collaborators. In particular, topology optimization and theoretical description will be conducted in close collaboration with Dr. Cédric Bellis from LMA in Marseille and Prof. P-T Brun in Princeton University.

Applications received by October 15, 2019 will receive equal consideration.