

Biomimetic for improvement multiphysics coupling

Abstract

After billions of years of evolution on this planet, biological surfaces exhibit almost perfect multifunctional interfaces to adjust to harsh environment. Inspired from naturally fascinating features, people attempt to change a passive surface into a smart structure. The goal of the PhD is to explore how additive manufacturing combining with smart materials can generate new class of bioinspired device.

Introduction & goal of the PhD

Many inspirations in biological science world strike exciting opportunities in material science and led to a range of biomimetic and other advanced functional materials for engineering and medical applications. The self-controlled smart behavior of these systems make their individual functional components sense and process the environment and take necessary actions, similar to a living creature. This smart action is referred to a progressive change of material internal structure and chemical composition at a macroscopic interval of time. The dynamic internal structure results in varying constitutive properties and viewed as an adequate response of the material to external loading (mechanical, magnetic, light, etc.). The slow-rate evolution of constitutive properties of the materials is often affected by non-elastomechanical nature, such as phase transitions, chemical reactions, diffusion and other kinetic processes at the atomic scale. The main goal of this work is development of one principally new multi-physics materials able to adapt at different environment

PhD profile

We search PhD-student with open mind, that able to work on different field (material, electrical, mechanical, applied physics).

Key words: 4D printing, smart material, surface interface, multiphysics coupling

PhD supervisors

Dr. Pierre-Jean COTTINET et Dr. Jean-Fabien CAPSAL

Univ-Lyon- INSA Lyon -LGEF

8 rue de la Physique

69621 VILLEURBANNE

France

Pierre-jean.cottinet@insa-lyon.fr

Jean-fabien.capsal@insa-lyon.fr

<http://lgef.insa-lyon.fr/>