



## **Yan Wang-Duffort - Experienced Researcher No.3**

### **Developing the field of mollusc shell production as a model for Biomimicry**

Our modern day society uses natural resources -1.6 times faster than the Earth's systems can renew them. This puts a strong demand on the development of new materials with a reduced ecological footprint: that is, materials whose production puts a lower strain on the Earth's rare raw materials and energy resources.

Natural materials exhibit remarkable combinations of stiffness, light weight, mechanical strength, and toughness which until today are still unmatched by manmade materials. Mollusc shells are an excellent example of such high-performance natural material. Nacreous layer in shell is more than 1,000 times tougher than the chemically precipitated counterpart, aragonite.

Over the past few decades, significant efforts were undertaken in the material research community to understand the microstructure and mechanisms behind these mechanical performances. Many biomimetic concepts have been realised for a variety of applications, especially to improve mechanical properties. However, functional biomimetic and bio-inspired materials have mainly been produced on a laboratory scale, and their synthesis on an industrial scale with direct technological applications and in a cost-effective way is still very limited.

My project is to bring together the existing technological/industrial applications inspired by shell biogenic mineral, in order to provide an overview of development of bio-inspired technology, and also to identify gaps in the fundamental research and industrial production. Then by collaborating with CACHE partners, I will investigate potential biomineralization knowledge for industrial application.

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