MASTER BIOSURF
BIOMIMICRY AND SURFACE ENGINEERING
From Lotus effect to climate change

OBJECTIVES
To train scientists in materials science and surface engineering through a new transverse approach to biomimicry and ecological transition.
Cross-disciplinary approach to biomimicry: biomimicry and ecological transition, manufacturing and functionalization of surfaces, digital science.

SCIENTIFIC FIELDS
- Biomimicry
- Surface Engineering
- Tribology
- Bio-inspiration
- Surface manufacturing
- Eco-conception
- Materials Science
- Physics
- Climate change
- Numerical computing

PREREQUISITES
- Bachelor of Science
- Preferably in Physics, Chemistry, Mechanics, Engineering Science, Materials Science

- Master in Materials Science and Engineering
- 4 semesters taught in English at École Centrale de Lyon
- Including 3 months of project and 6 months of Internship
- A theoretical learning based on numerous practical activities and internationally renowned laboratories

Plus d’infos : www.ec-lyon.fr/en/academics
TRAINING CONTENT

Biomimicry courses | Numerical science and mathematics courses | Surface & Material Engineering courses

S1
- Mathematics
- Biology / Living systems
- Probability and statistics
- Computing for Engineers
- Materials & Mechanical Engineering
- Physical Measurements
- Biomimicry: theory and interdisciplinarity

S2
- Intercultural studies
- Polymers and eco-conception
- Tribology and Bio-inspired surface engineering
- Surface Manufacturing I: High temperature processes
- Surface characterization I: Optics & photonics for engineers
- Language (French for foreign students or English for French students)

S3
- Tactile Perception Engineering
- Climate Change
- Numerical Methods I: Macroscale (FEM)
- Numerical Methods II: Nano / microscale
- Surface Manufacturing II: 3D additive processes
- Surface Characterization III: Tribology
- Biomimetics and SURFAB Project
- Numerical Methods II: Mesoscale
- Surface Manufacturing III: Surface Engineering - Mechanical and ultrashort laser processes
- Surface Characterization IV: Characterization of surfaces and nanostructures
- Numerical Methods IV: Advanced numerical methods

S4
- Internship + Thesis

WIDE-RANGE OF SKILLS TO BE ACQUIRED

- Working effectively in the field of Surface Engineering with a bio-inspired approach
- Project management: in academic or in industrial research teams
- A grasp of complex problems with multi-disciplinary aspects
- Innovation: ability to solve problems and to manage risk, ability to think creatively and critically, use of research techniques
- Training a new generation of scientists taking into account ecological transition, climate change and biodiversity within high-level scientific projects

MAIN OPPORTUNITIES

INDUSTRY

PHDS AND SCIENTIFIC CAREERS
BIOSURF prepares students for further study at the doctoral level.

CONTACT
- Pr. Stéphane VALETTE
  Program manager
  stephane.valette@ec-lyon.fr