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

- Master in Materials Science and Engineering
- 4 semesters taught in English at École Centrale de Lyon
- Including 1 research project and 8 months of internship
- A theoretical learning based on numerous practical activities and internationally renowned laboratories

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
## TRAINING CONTENT

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<tr>
<td><strong>Mathematics</strong></td>
<td><strong>Intercultural studies</strong></td>
<td><strong>Tactile Perception Engineering</strong></td>
<td><strong>Internship + Thesis</strong></td>
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<td><strong>Biology / Living systems</strong></td>
<td><strong>Polymers and eco-conception</strong></td>
<td><strong>Climate Change</strong></td>
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<td><strong>Probability and statistics</strong></td>
<td><strong>Tribology and Bio-inspired surface engineering</strong></td>
<td><strong>Numerical Methods I: Macroscale (FEM)</strong></td>
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<td><strong>Computing for Engineers</strong></td>
<td><strong>Surface Manufacturing I: High temperature processes</strong></td>
<td><strong>Numerical Methods II: Nano / microscale</strong></td>
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<td><strong>Materials &amp; Mechanical Engineering</strong></td>
<td><strong>Surface Characterization I: Optics &amp; photonics for engineers</strong></td>
<td><strong>Surface Manufacturing II: 3D additive processes</strong></td>
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<td><strong>Physical Measurements</strong></td>
<td><strong>Language</strong> (French for foreign students or English for French students)</td>
<td><strong>Surface Characterization III: Tribology</strong></td>
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<td><strong>Biomimicry: theory and interdisciplinarity</strong></td>
<td><strong>Surface Characterization II: Physics and chemistry of surfaces and interfaces</strong></td>
<td><strong>Biomimetics and SURFAB Project</strong></td>
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<td><strong>Language</strong> (French for foreign students or English for French students)</td>
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<td><strong>Numerical Methods II: Mesoscale</strong></td>
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<td><strong>Surface Manufacturing III: Surface Engineering - Mechanical and ultrashort laser processes</strong></td>
<td><strong>Surface Characterization IV: Characterization of surfaces and nanostructures</strong></td>
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<td><strong>Surface Characterization III: Tribology</strong></td>
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<td><strong>Numerical Methods IV: Advanced numerical methods</strong></td>
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## 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 studies at the doctoral level

## CONTACT

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More info