



## BIOMIMETIC SOLUTIONS WORKSHOP NATURE INSPIRES TECHNOLOGICAL ADVANCEMENT

### BIO-INSPIRED INNOVATIONS

Are you looking for new and innovative ways to improve your product or solve a technical problem? Do you want to improve efficiency or stand out in a crowded market? Then, a personalized Biomimetic Solutions Workshop in your company could be the answer!

Evolution over the past three billion years has generated a diversity of biological solutions to all kinds of natural challenges. Biomimetics (or bionics/bio-inspiration) describes the transfer of natural models or principles into technological advancements and products. Biomimetics can function as a strategic concept to create highly innovative and sustainable biomimetic solutions throughout all industries.

The feet of a gecko are a prominent example for an application of biomimetics for industry purposes. The biological mechanism behind its functioning was examined carefully to understand the cause for its adhesive behavior.

Once it was determined that tiny hairs are involved and make use of van der Waal forces, this working principle was abstracted, transferred and applied to a variety of applications.

Developments range from robots able to walk along almost all smooth vertical surfaces to the Gecko-Tape developed by Nitto Denko in 2010. Gecko-inspired adhesives have prevailed on the market due to their added benefit of being reusable without leaving any sticky residue behind while providing similar adhesion strengths compared to conventional tapes.



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Other successful examples are the lotus effect demonstrated by the hydrophobic surface of lotus plant leaves that are nowadays used in paints said to self-clean, and the skin of sharks presenting a riblet structure that can provide about 7% of reduction in drag.

This structure is applied particularly to increase the hydrodynamic functions of swimsuit fabrics and was already used by the company Speedo®.

### KEY FACTORS

Nowadays many technology sectors are driven by environmental legislation and the rising societal awareness for sustainability to produce outstanding, energy-efficient and ecofriendly products. Digitalization, Industry 4.0 and the newest trend „Biological Transformation of Manufacturing“ are pushing companies to escape their traditional ways of design and manufacturing and instead use bio-inspiration to shift to bio-intelligent strategies. Within projects like AIRCOAT and BIOINSPACED, the biomimetic experts at Fraunhofer CML have put their knowledge to good use to facilitate the implementation of biomimetics into industry projects.

Therefore, we at CML and our Biomimetic Solutions Workshop can make this change possible for you too, allowing your company to set your product on the forefront of technology.

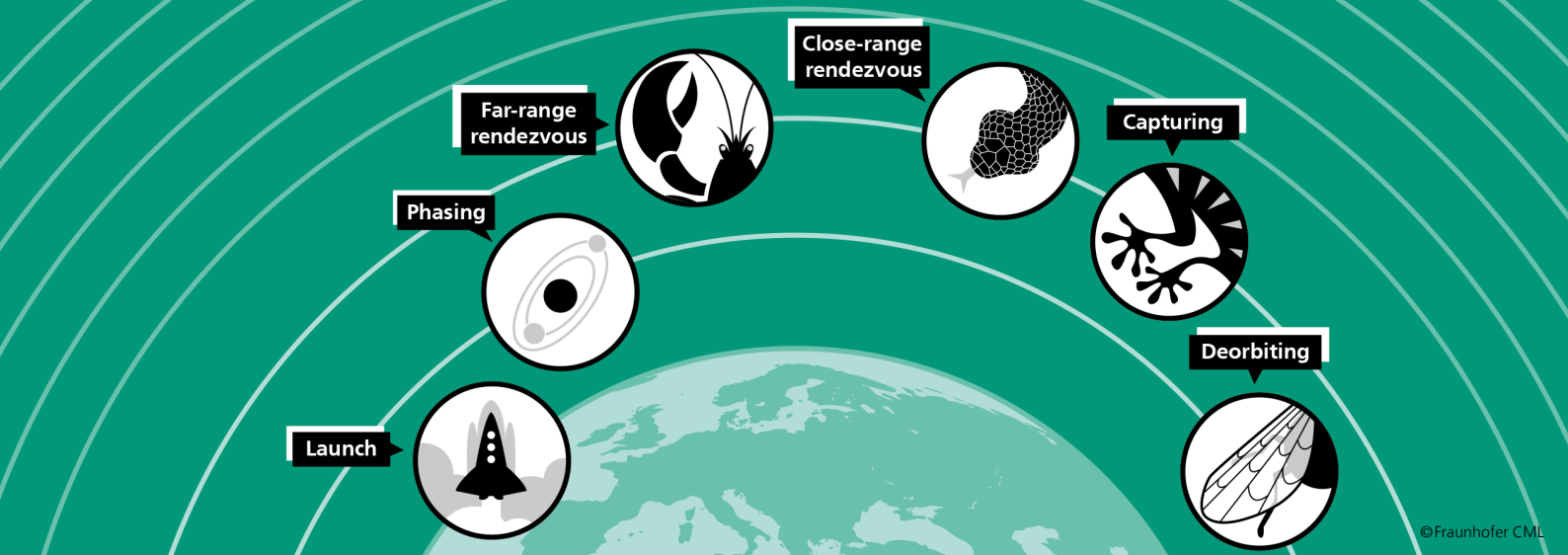
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# IMPRESSUM



One example of biomimetic concepts implemented into an active debris removal mission scenario in the project BIOINSPACED

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# BIOMIMETIC SOLUTIONS WORKSHOP

## OUR SERVICES FOR NEW PRODUCT DEVELOPMENT

WE ORGANIZE A PERSONALIZED WORKSHOP FOR YOUR COMPANY AND HELP YOU TO FILTER YOUR SPECIFIC BIOMIMETIC SOLUTION FROM NATURE'S VAST AMOUNT OF IDEAS.

### YOUR BENEFIT

The team at Fraunhofer CML can help uncover nature's potential for solutions individually tailored to your needs and support the development of your customized bio-inspired innovation. With your own biomimetic solution, you get to exploit a unique niche in the market and set yourself apart while being more sustainable and cost efficient.

### STEP 1



WE INTRODUCE THE CONCEPT OF BIOMIMETICS AND HOW IT CAN BE USED TO SEARCH FOR INNOVATIVE AND GREEN SOLUTIONS.

### STEP 2



WORKING ALONGSIDE PROFESSIONALS FROM YOUR COMPANY, WE ADDRESS YOUR SPECIFIC CHALLENGE AND COLLECT EMERGING IDEAS, THOUGHTS, COMMENTS AND REMARKS.

### STEP 3



WE EVALUATE RESULTING IDEAS AND CONCEPTS BASED ON THE EXPERT KNOWLEDGE AT CML AND DELIVER AN ELABORATE ANALYSIS OF SOLUTIONS.

### STEP 4



WE PROVIDE A PROFESSIONAL RECOMMENDATION ON THE BEST SOLUTION TAILORED TO YOUR SPECIFIC NEEDS.

### PROJECT EXAMPLES



**AIRCOAT stands for AIR-induced friction reducing ship COATING.**

Inspired by the specific surface topology of a tropical water fern, *Salvinia*, a novel ship hull coating is being developed that reduces frictional resistance and thus greenhouse gas emissions. In addition, it limits the attachment of fouling, avoids the release of biocide substances and decreases noise pollution. AIRCOAT is a Horizon 2020 EU funded project promoting a passive air lubrication technology with the potential to revolutionize the ship-coating sector.

[www.aircoat.eu](http://www.aircoat.eu)  
[www.cml.fraunhofer.de/de/forschungsprojekte1/aircoat](http://www.cml.fraunhofer.de/de/forschungsprojekte1/aircoat)



**BIOINSPACED stands for BIOInspired solutions for SPACE Debris removal.**

Using nature as inspiration, existing and new biomimetic concepts for active debris removal are collected, investigated and assessed with the goal to develop a holistic biomimetic scenario for the detection, capture, and removal of space debris. This project is funded by the European Space Agency (ESA) and supports their 'Clean Space' Initiative to mitigate the threat presented by decommissioned satellites and defunct devices, especially in low Earth orbit.

[www.cml.fraunhofer.de/de/forschungsprojekte1/BIOINSPACED](http://www.cml.fraunhofer.de/de/forschungsprojekte1/BIOINSPACED)