

# Innovating Surface Engineering: Advances in Surface Prototyping and Laser Finishing

## **Sabri Alamri**

Fusion Bionic GmbH, Dresden, Germany

[sabri.alamri@fusionbionic.com](mailto:sabri.alamri@fusionbionic.com)

## **Biography**

Sabri Alamri is a materials scientist and mechanical engineer creating functional surfaces with laser-based micro- and nano-textures. His work focuses on precision micromachining technologies, particularly Direct Laser Interference Patterning (DLIP), to tailor surface properties across metals, polymers and glass. In the last years, his research emphasizes advanced glass processing and finishing, enabling functionalities such as anti-glare, anti-soiling, and controlled optical behavior through bioinspired microstructures—without relying on coatings.

Following his PhD, he co-founded in 2021 Fusion Bionic to industrialize scalable laser-based surface treatments for applications in optics, semiconductors, and advanced materials. Since then he's Head of Products and Technology.

## **Abstract**

This presentation connects natural surface phenomena with advanced laser-based material processing, demonstrating how bioinspired micro- and nanostructures—such as those found on lotus leaves or moth eyes—can be engineered onto technical materials.

A special focus is placed on micro- and nano-scale surface processing and finishing, where tailored surface structures enable, for example, anti-glare, anti-reflective, and anti-soiling functionalities by controlling light scattering and surface topography—without the need for additional coatings. Fusion Bionic's laser-based approach enables deterministic, chemical-free structuring across a wide range of materials, offering scalable and sustainable alternatives to conventional techniques such as sandblasting, coating deposition, or chemical etching.

Application examples highlight the versatility of these surface technologies in industrial and high-tech sectors, including optical components, sensor systems, photovoltaic modules, medical devices, and automotive surfaces, where multifunctional performance and durability are critical.