

## BIOMIMETICS IN MARINE TECHNOLOGY

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### ABSTRACT

Similar to many others, the marine technology sector nowadays facing the challenge to comply with novel emission legislations (e.g. IMO MARPOL), decarbonisation targets (e.g. EU Green Deal) or environmental protection acts (e.g. EU Marine Strategy Framework Directive). Together with the rising societal awareness for sustainability to produce outperforming, energy efficient and eco-friendly products the sector is in deep need for innovative solutions.

Three billion years of evolution have produced a multitude of biological solutions to all kind of challenges from optimized manoeuvrability of humpback whale flippers, vibration reduction in seal whiskers, low drag bodies in manta rays, underwater air trapping in water ferns to friction reduction in shark skin, see also [1]

Setting aside the latest paradigm of Industry 4.0 and Digitalization the newest trend „Biological Transformation of Manufacturing“ predicts a biological transformation of industrial value creation by morphing traditional manufacturing via bio-inspiration and bio-integration to bio-intelligent manufacturing, see also [2]

Biomimetics or bio-inspiration is the transfer of natural models into innovative technical applications by means of analysing working principles of nature’s best examples and transferring the core mechanisms into technical applications without necessarily copying them. Biomimetic Marine Technologies transfer these natural templates to create highly efficient and sustainable solutions for e.g. ship hulls, wind turbines, bridge pillars, sailing boats and autonomous underwater vehicles.

This session will focus on biomimetic solutions – but is not limited to – for Maritime transport, Marine and offshore structures, Marine renewable energy devices and Maritime robotics that were studied with experimental or numerical methods. The session will include 1) topics that investigated novel biomimetic solutions with a potential for the marine technology sector as well as 2) studies of biomimetics effects already applied on marine vessel and structures.

### REFERENCES

- [1] Perricone V., Santully C., Rendina F. Langella C., Organismal Design and Biomimetics: A Problem of Scale. Biomimetics 6, 56, 2021.
- [2] Neugebauer, Reimund, and GRUEN. Biological Transformation. Ed. Reimund Neugebauer. Springer Vieweg, 2020.