



"The truth is, natural organisms have managed to do everything we want to do without guzzling fossil fuels, polluting the planet or mortgaging the future."

—Janine Benyus, *Biomimicry*

The Problem



Image Credit: Lightman David

Every industry that operates near water shares the same frustration. **Adhesives and sealants, used to build, repair, and maintain their most critical infrastructure, fail the moment surfaces get wet. AdheSyn aims to engineer a protein-based underwater adhesive inspired by one of nature's most underrated engineers: the mussel.**

Our solution aims to be **non-toxic, biodegradable, and designed for environments where other adhesives fail.**

\$1.8B

valuation global marine sealants market actively seeking non-toxic, wet-surface alternatives

#1

cause of subsea infrastructure failure is adhesive and coating breakdown in wet environments

2030

deadline by which major toxic marine antifouling compounds are banned under international regulation

The Science

Think of AdheSyn as a biological superglue.

Mussels cling to wave-battered rocks using specialised proteins that bond to almost any surface when wet. We've identified a method to recreate this mechanism: by fusing the mussel's adhesive proteins with a self-assembling structural protein from bacteria, **we produce an adhesive nanofibre that outperforms every protein-based underwater adhesive ever reported by 1.5 times.**

No high-temperature processing. No formaldehyde. No toxic byproducts.

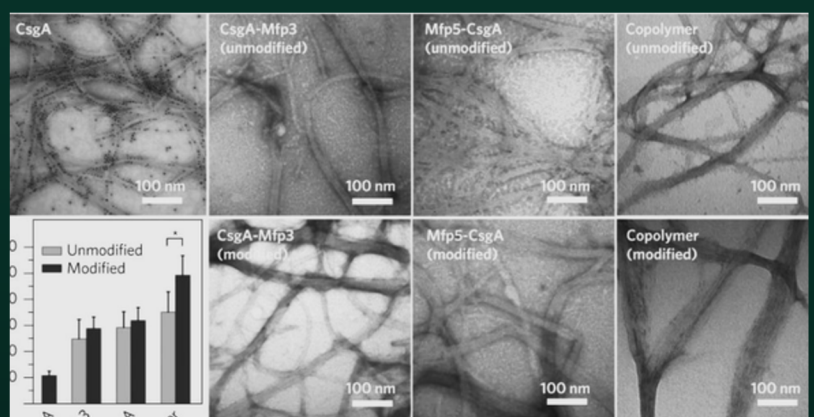


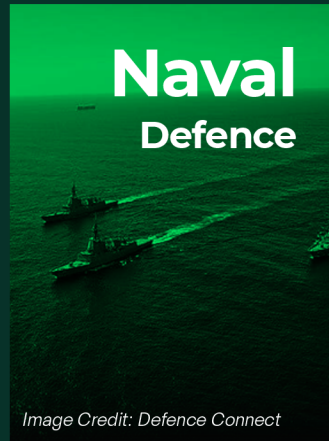
Figure 1. Transmission electron microscopy images of the fusion protein nanofibres, unmodified and DOPA-modified. The modified copolymer (bottom right) shows significantly thicker, more interconnected fibres, directly corresponding to the superior adhesion performance shown in the graph. Adapted from Zhong et al.

It is simply a precision-engineered protein that is sustainably produced and optimised using AI to find the highest-performing combination.

Wet-active · Biocompatible · Biodegradable · Reversible · Sustainable



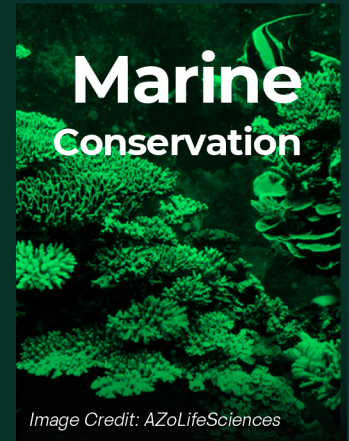
Sealing subsea pipelines and offshore platform components without dewatering



Performance-certified adhesives for the Royal Australian Navy's infrastructure



Attaching shellfish and pysters to cultivation ropes without mechanical fastening



Coral reef restoration and aquatic animal care by avoiding harmful chemicals

Sponsorship/Partnership Opportunities

AdheSyn is seeking partners across sectors where durable, sustainable adhesive technologies have real-world relevance, including:

1. Marine and maritime operations
2. Naval and defence contractors
3. Offshore energy
4. Aquaculture and coastal industries
5. Sustainable materials and advanced manufacturing

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We are seeking funding to support key milestones and operational costs associated with our project:

1. Travel and accommodation
2. Event participation
3. Team materials and uniforms
4. Operational project costs
5. Conservation and community engagement initiatives

Who We Are



Sofia
Prilutskaya



Akanksh
Sanctis



Angela
Anil



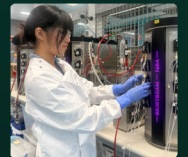
Colby
Marinic



Lewis
Hastie



Lily
Nidea



Priscilla
Chang

We are **AdheSyn**, and our team brings together students from biotechnology, biochemistry, and chemical engineering backgrounds, reflecting the interdisciplinary nature of synthetic biology and translational biotechnology.

We are excited to undertake this project not only as a seven-month synthetic biology challenge, but also as an opportunity to explore a commercially viable platform beyond the competition timeline!