





*a MISTRA funded research programme*

## STAKEHOLDERS

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**MISTRA**

**CHALMERS**



UNIVERSITY OF GOTHENBURG



## SHIPPING IS – IN ITS BASIS – A SUSTAINABLE MEANS OF TRANSPORTATION

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- 90% of all trade to and from the European Community and almost 80% of all goods shipped in and out of the United States – are made by ships
- 30,000 ships over 1000 gross tonnes in the world
- Shipping has low demands on infrastructure
- Shipping can transport large amounts of goods with low consumption of energy

*(Ahlbom and Duus, 2007 Clean Shipping Criteria)*



## ENVIRONMENTAL CHALLENGES FOR THE SHIPPING INDUSTRY

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- Greenhouse gases
- NO<sub>x</sub>, SO<sub>x</sub>, particulate matter and PCAs
- Antifouling
- Oil discharges and bilge water
- Lubricants
- Boiler and cooling water treatment
- Cleaning agents
- Ballast water

*(Ahlbom and Duus, 2007 Clean Shipping Criteria)*



## OUR VISION

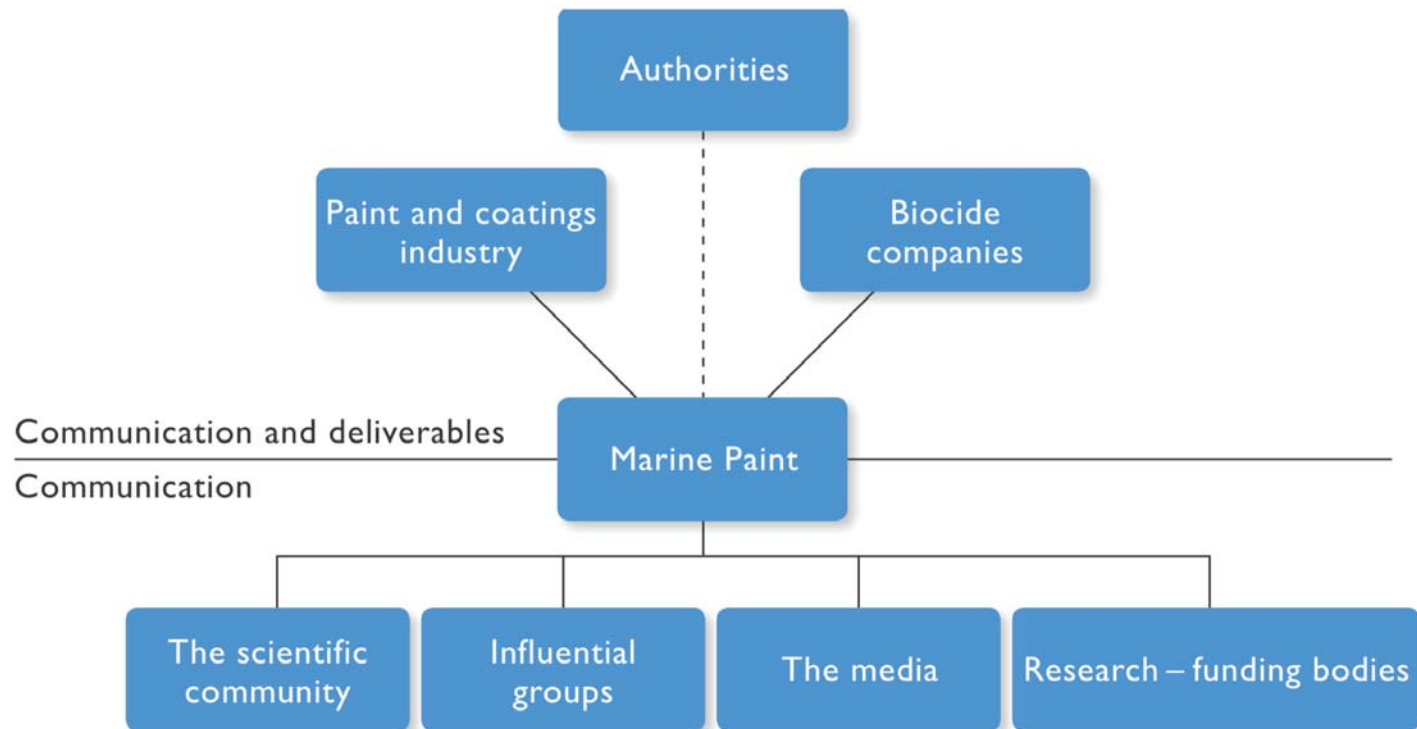
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- To contribute to reduce the environmental impact of biocides originating from marine coatings, through pioneering multidisciplinary research



## OUR TARGET GROUPS

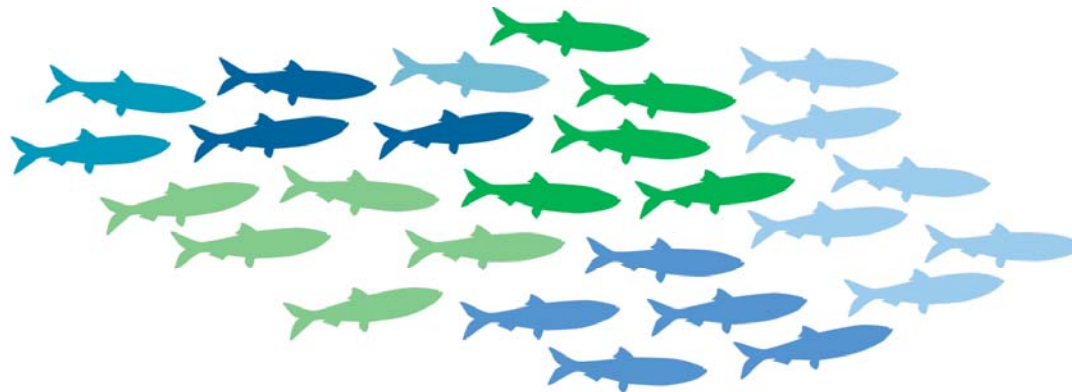
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## RESOURCES

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- 6 researchers from Plant and Environmental Sciences, University of Gothenburg
- 5 researchers from Department of Cell and Molecular Biology, University of Gothenburg
- 5 researchers from Department of Applied Surface Chemistry, Chalmers University of Technology
- 5 researchers from Department of Zoology, University of Gothenburg
- 3 researchers from Department of Marine Ecology, University of Gothenburg
- 2 researchers from Department of Chemistry, University of Gothenburg
- 1 researchers from Norwegian Institute for Water Research





## RESEARCH FACILITIES

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- Laboratories at the university and at Chalmers in Göteborg
- The Sven Lovén Centre for Marine Sciences at Kristineberg and at Tjärnö



## SOME OF OUR RESULTS I

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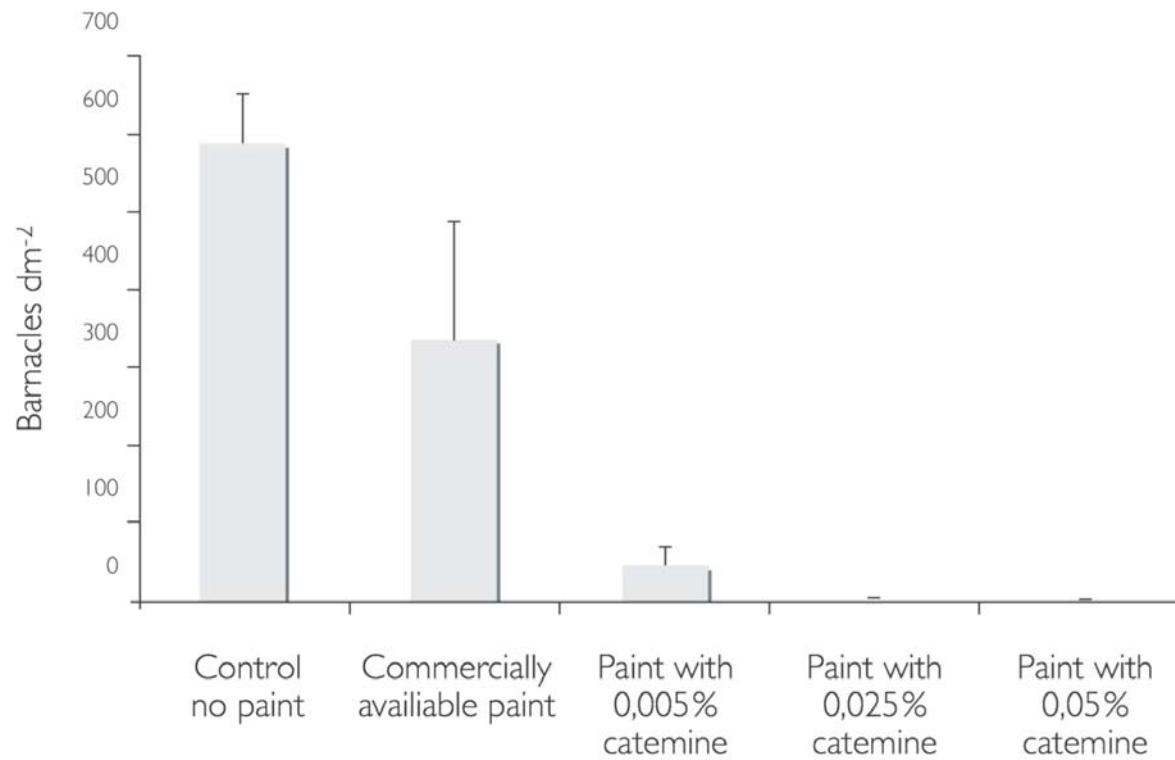
- We found a substance that effectively hinders barnacles to settle



## SOME OF OUR RESULTS II

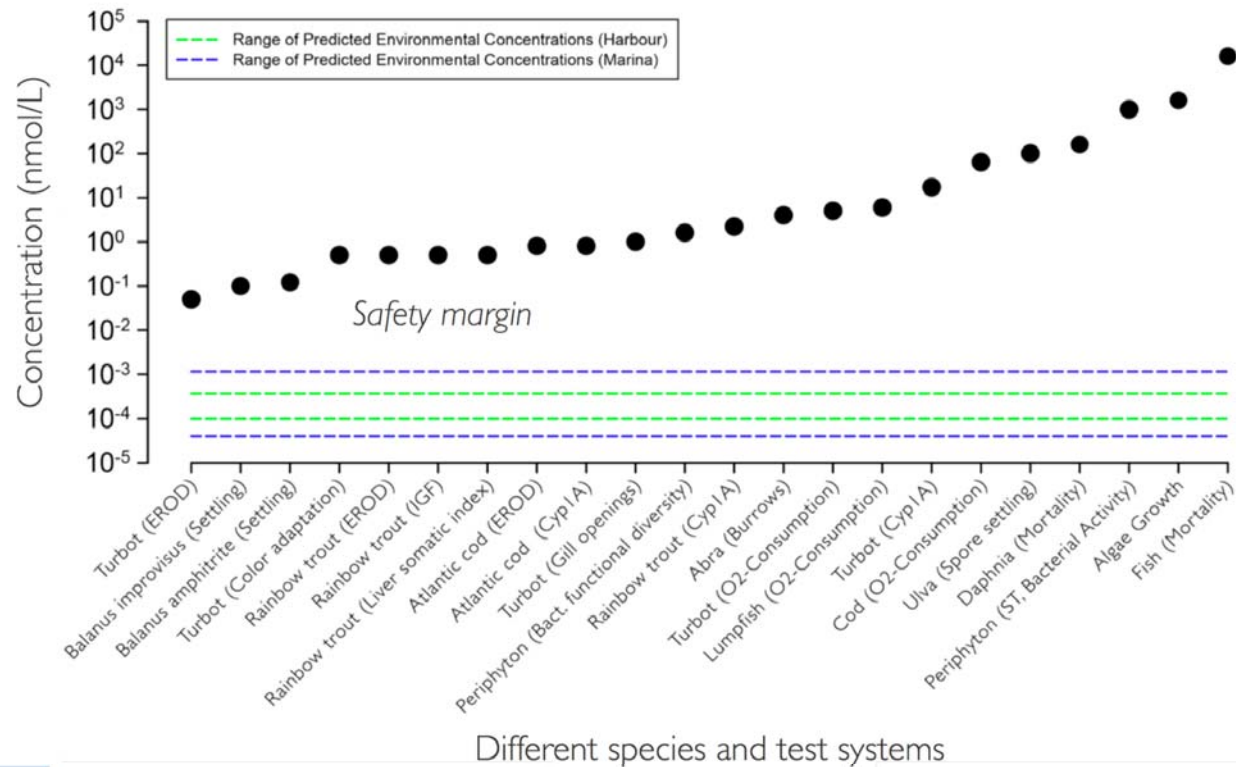
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- We found a substance that effectively hinders barnacles to settle



## SOME OF OUR RESULTS III

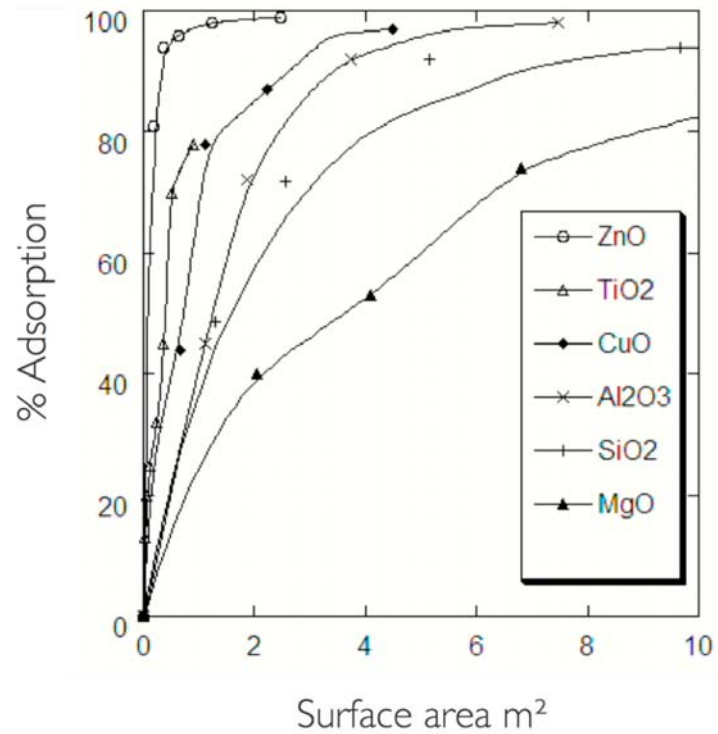
- We found a substance that effectively hinders barnacles to settle, which has a sound environmental profile



## SOME OF OUR RESULTS IV

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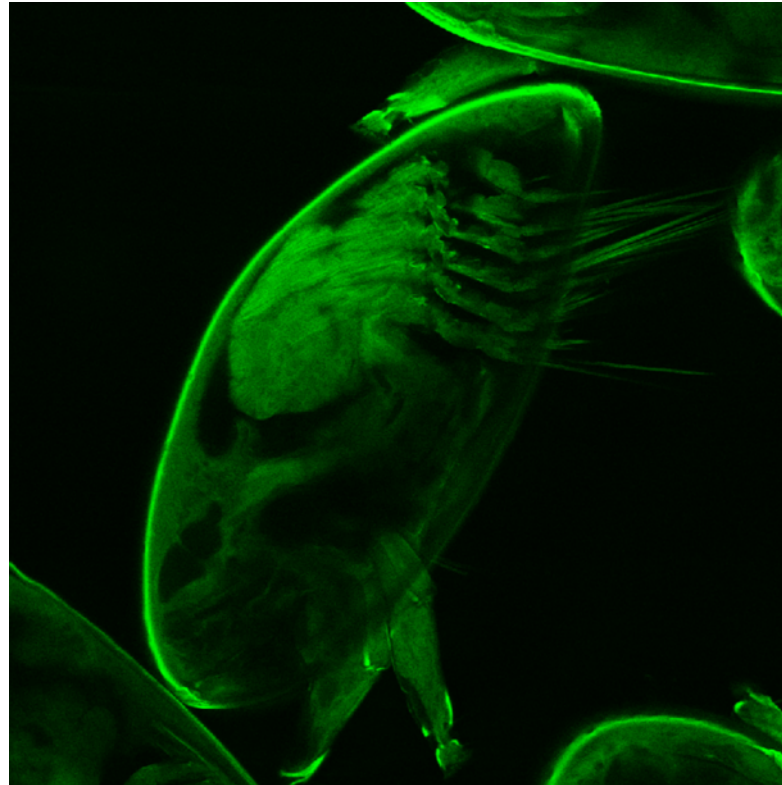
- A concept for paint formulation – based on nanotechnology



## SOME OF OUR RESULTS V

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- We know a target organism in details – down to gene level
- And we know the mode of action of our first substance



## A WAY TO THE ENVIRONMENT

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- Via the collaboration with the company I-Tech our research results are now taken to the market and use in the environment



## FOULING IS NOT MERELY BARNACLES

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



- Our present focus in research is to generate knowledge on how to hinder all kinds of fouling





## WE WILL USE NOVEL AND EMERGING SCIENCES

- By combining the science of mixtures, microcapsule technology and basic understanding of the fouling organisms we will deliver: Recipes for commercially and environmentally optimized marine paints

							
	<i>Balanus</i>	<i>Mytilus</i>	<i>Hydroid</i>	<i>Bryazoa</i>	<i>Ciona</i>	<i>Ulva</i>	<i>Periphyton</i>
<i>Biocide 1</i>							
<i>Biocide 2</i>							
<i>Biocide 3</i>							
<i>Biocide 4</i>							
<i>Biocide 5</i>							
<i>Biocide 6</i>							
<i>Biocide 7</i>							
<i>Biocide 8</i>							

## RESEARCH STRATEGY AND DELIVERIES

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