# DEEP-SEA SCIENTIST SPOTLIGHT

# RONNIE GLUD

## MARINE BIOGEOCHEMIST

Dr. Ronnie Glud is a Professor of Biogeochemistry and Microbial Ecology at the University of Southern Denmark and the Center Leader of HADAL, a globally-renowned hadal research center. He earned his Masters and PhD in Microbial Ecology from Aarhus University. His research focuses on biogeochemistry, understanding how microbial communities contribute to global carbon and nitrogen cycles in deep-sea and polar ecosystems. Dr. Glud has participated in 51 research expeditions, published more than 250 research papers, and is recognized as a world leader in hadal science.

### What do you study? What techniques do you use in your research?

I am a biogeochemist, and I study interactions between microbial life and carbon cycling in the oceans. This include effects of climate changes and anthropogenic forcings. The techniques depend very much on the specific environment we are targeting; Sea-ice, coral reef, coastal regions, deep-sea settings and the deepest parts of the global ocean – the Hadal zone. But one important approach is to use autonomous instruments that work as small robots and realize measurements and experiments noninvasively in complex or very challenging environment.

### What made you want to become a scientist? How did you find your field?

I am a curious person and have always been attracted by the unknows and by nature. Since I was a child, I have loved being in the nature; collecting plants, shells, rocks and animals that I nurtured in my small aquaria. On top of that I loved travelling and was fascinated by the "white areas" on the globe and reading books on past explorers. I think I was attracted to **biogeochemistry as it is an area spanning three classical research disciplines and basically trying to understand how nature functions**. And why the oceans? I simply think it has been a deep fascination of aquatic life and as child I had countless aquaria in my small room.

# ADVICE & LESSONS FROM DR. GLUD

### Other than your studies in Marine Biology, what experiences have helped you build skills that you use to study the deep oceans?

**Interactions and collaborations** with great colleagues and friends - whether it is working in the laboratory, on joint expeditions or discussing data and interpretations have been fundamental for my development as a scientist. Explorations of the deep ocean is an international team effort and good synergetic and inspirational networks are essential for success.

### Clarifying Misconceptions

One misunderstanding is fostered by the vastness of the deep ocean: we have only in very recently began to understand the important fact that **the deep sea is vulnerable and is already show changes in response to human activities.**

### My Advice to Future Scientists

The same as for any other scientific discipline -

**be curious!**

For more on Dr. Glud's work, visit:
https://www.sdu.dk/en/forskning/hadal

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### What was your first science experiment?

I think my first real experiments that lead to a scientific publications was the understanding and quantification of photosynthesis in microbial biofilms using novel microsensor techniques. The work showed that these unappreciated microbial communities were of great importance for food web structures in many shallow aquatic environments.

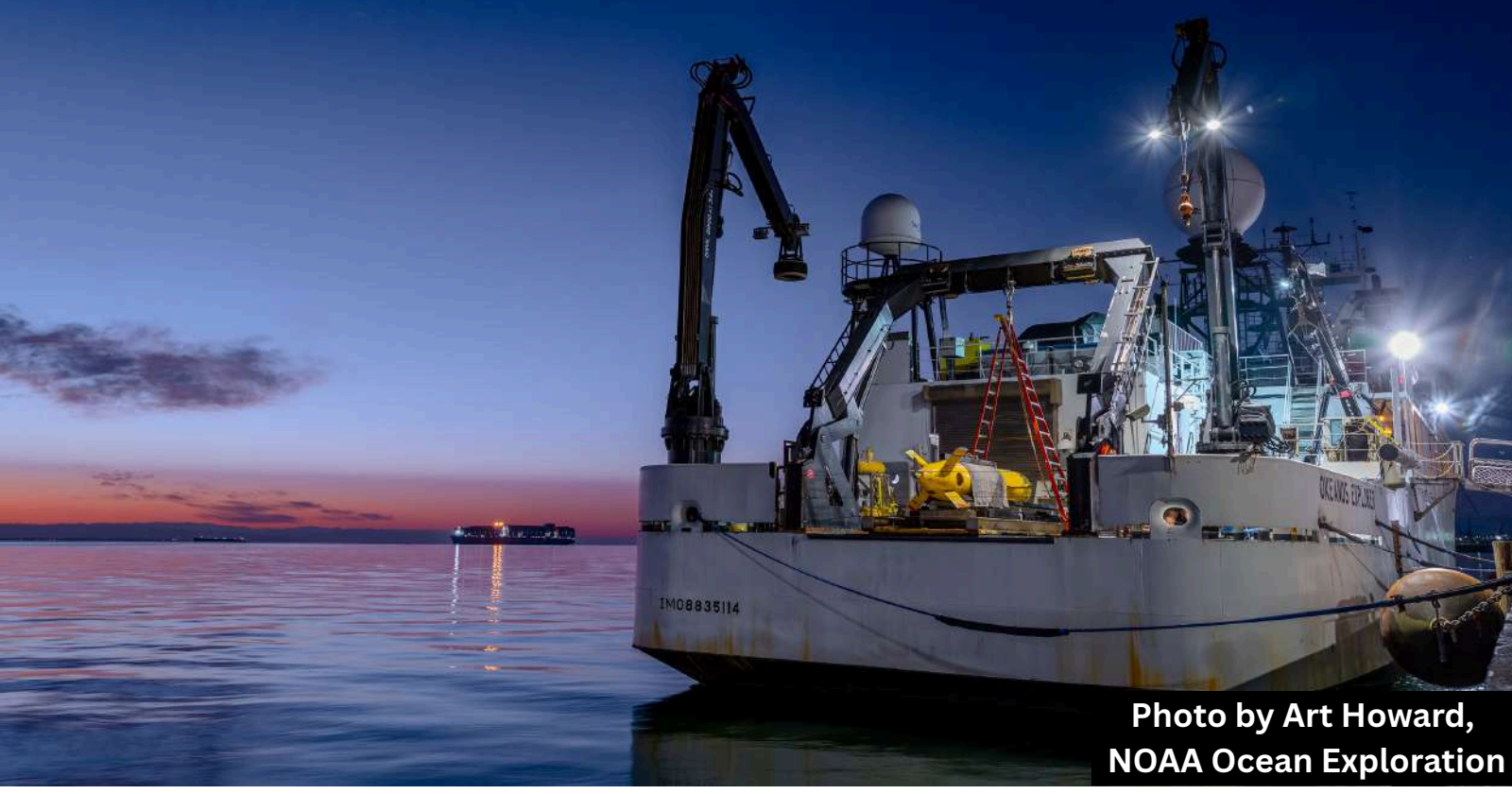


Photo by Art Howard, NOAA Ocean Exploration

### Is there a research project, moment of discovery, or science experience that you're most proud of being a part of?

There have been many moments of personal revelations in my career experiences that intrigued me and further sparked my curiosity. Some highlights include: i) the understanding of gas dynamics in **melting sea-ice** and how that interrelate with oxygen and carbon dioxide dynamics, ii) the importance of **microalgae in sediment for sustaining life** in coastal ecosystems, iii) and that the **deepest parts of the global ocean collect organic material** and are **hot spots for microbial life flourishing at extreme hydrostatic pressure.**

### Why is it important to study the deep seas? What motivates you in your work?

**The deep-seas cover more than 60% of the planet and processes in the deep sea are fundamental for the function of Planet Earth**. Yet most of the deep ocean is still unexplored. Nearly every deep-sea expedition uncovers new species, and frequently we also discover entirely new ecosystems that function differently from what we know on land or from shallow water environments.

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