

# Do we need a philosophy of marine science?

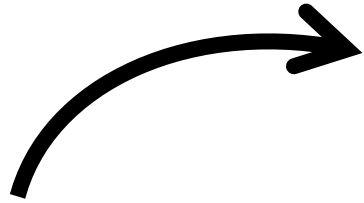
Elis Jones

Technical University Munich





“Understanding the role of value in coral reef science”



Bertrand Lab



“Key concepts in marine biogeochemistry”



Public Science Lab



Konrad Lorenz Institute for Evolution and Cognition Research

“Theorising the Blue Economy”



# Disclaimers

- Focus is mostly on philosophy for this talk
- Marine *science* doesn't really exist
- The ocean is very important

In the beginning there was physics...

‘I have some five or six volumes on my book shelves which include the misleading words "philosophy of science" in their title. In actual fact each of these volumes is a philosophy of physics, many physicist-philosophers naively assuming that what applies to physics will apply to any branch of science.’

Mayr, E. (1969) ‘Footnotes on the Philosophy of Biology’, *Philosophy of Science*, 36(2), pp. 197–202.

Why philosophy of biology? (According to Mayr)

- Upsets generalisations from other sciences (*negative*)
- Provides basis for new philosophical insights (*positive*)

**Now:**

- Philosophy of: earth sciences, biochemistry, immunology, cancer...
- Will/should other subjects follow the ISH model?

ISHPSSMB ?

# Philosophy of Marine Biology

Public group · 6.2K members

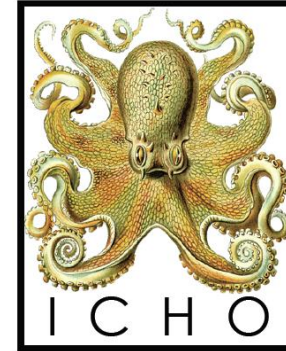


## About

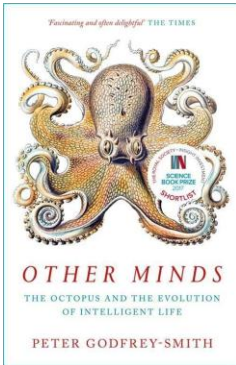
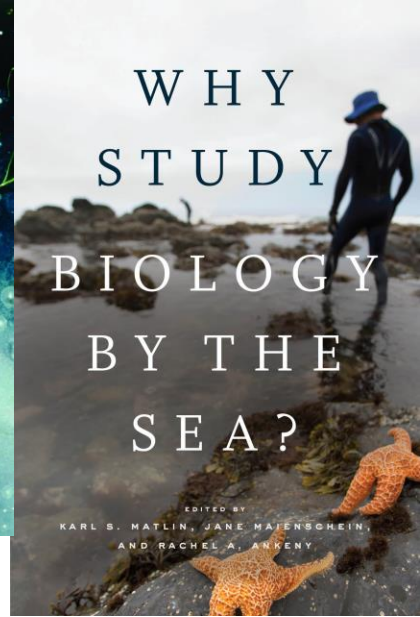
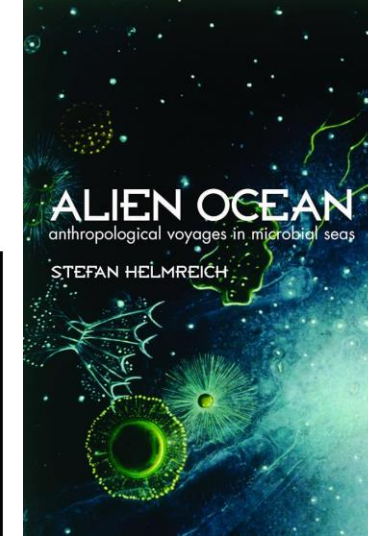
Marine Biology is full of metaphysically deep questions: Do fish swim? Are whales fish? What about seaweed? What is it like to be a duck? Are marine biologists marine creatures? Are there otter minds? Does Cod exist? [See less](#)



THE UNIVERSITY OF CHICAGO  
MARINE BIOLOGICAL  
LABORATORY



International Commission of  
the History of Oceanography



8ish ISH talks:

- Today - Oceans and Deserts (x2); Marine microbes (Tamar Schneider); limnology (Pier Luigi Pireddu)
- Weds - Deep Sea Technology (Cathryn Newton); Gaia and the Ocean (Pablo Lima)
- Cf. Pradeu, T. 2017. *Thirty years of Biology & Philosophy*.



Katerina Katopis /  
Ocean Image Bank;  
Dartmouth Electron  
Microscope Facility



Values at Sea  
Workshop  
Exeter 2023

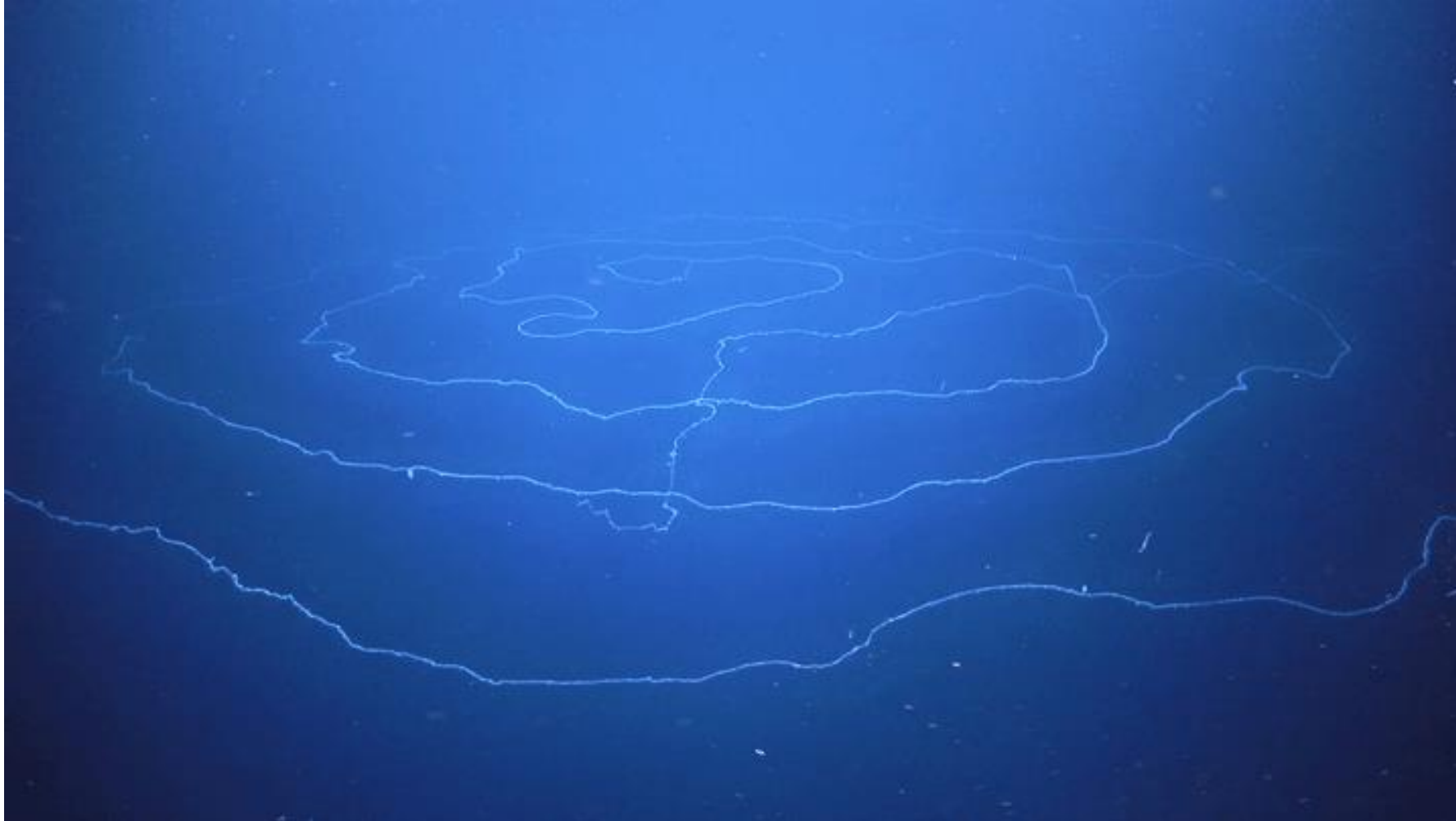


Can marine sciences be upsetting?  
(negative role)

- **Yes**

Can marine sciences provide new insights? (positive role)

- **Yes, but a bit trickier**



*Apolemia*; Siphonophore;  
2020; Schmidt Institute;  
W. Australia; 600m down;  
approx. 45m long

Why do *marine* sciences exist?

- Historical and sociological reasons, or contingencies, e.g. fisheries, marine stations, scuba (see Values at Sea)
- Physical constraints (lack of access, different affordances)

Is the ocean a fundamentally different kind of environment (to land)?  
Does it warrant own whole set of (meta)disciplines?

Commonly invoked differences:

- Fluidity – movement, dimensions, connections (Steinberg & Peters)
- Also darkness, sound, nutrients, gases, dryness, size



# Is the ocean fundamentally different?

*J. theor. Biol.* (1991) **153**, 425–436

## Can Ecological Theory Cross the Land–Sea Boundary?

JOHN H. STEELE

*Woods Hole Oceanographic Institution, Woods Hole, MA 02543, U.S.A.*

*(Received on 12 December 1990, Accepted on 1 January 1991)*

JOURNAL  
OF  
THE ROYAL  
SOCIETY  
**Interface**

*J. R. Soc. Interface* (2008) **5**, 135–150  
doi:10.1098/rsif.2007.1089  
Published online 11 July 2007

REVIEW

## A biophysical perspective on dispersal and the geography of evolution in marine and terrestrial systems

Michael N. Dawson<sup>1,\*</sup> and William M. Hamner<sup>2</sup>

<sup>1</sup>*School of Natural Sciences, University of California, Merced, CA 95344, USA*

<sup>2</sup>*Department of Ecology and Evolutionary Biology, University of California, Los Angeles, CA 90095-1606, USA*

Opinion

Cell  
PRESS

## Marine and terrestrial ecology: unifying concepts, revealing differences

Thomas J. Webb

Department of Animal and Plant Sciences, University of Sheffield, Sheffield, S10 2TN, UK

- Statistical difference, patches of similarities
- Perspective matters in comparisons:
  - Pelagic vs benthic
  - Aeroplankton
  - Whales and trees
- **Some generalisations do hold**
- But benefits from comparisons, new, smaller-scale insights

# Is the ocean fundamentally different?

## C:N:P = 106:16:1



Woods Hole Oceanographic institution

### AMERICAN SCIENTIST

AUTUMN

SEPTEMBER 1958

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THE BIOLOGICAL CONTROL OF  
CHEMICAL FACTORS IN THE  
ENVIRONMENT<sup>1</sup>

By ALFRED C. REDFIELD

May be different, more variable, stoichiometric ratios in soil (Cleveland, C. C., & Liptzin, D, 2007. *Biogeochemistry*)

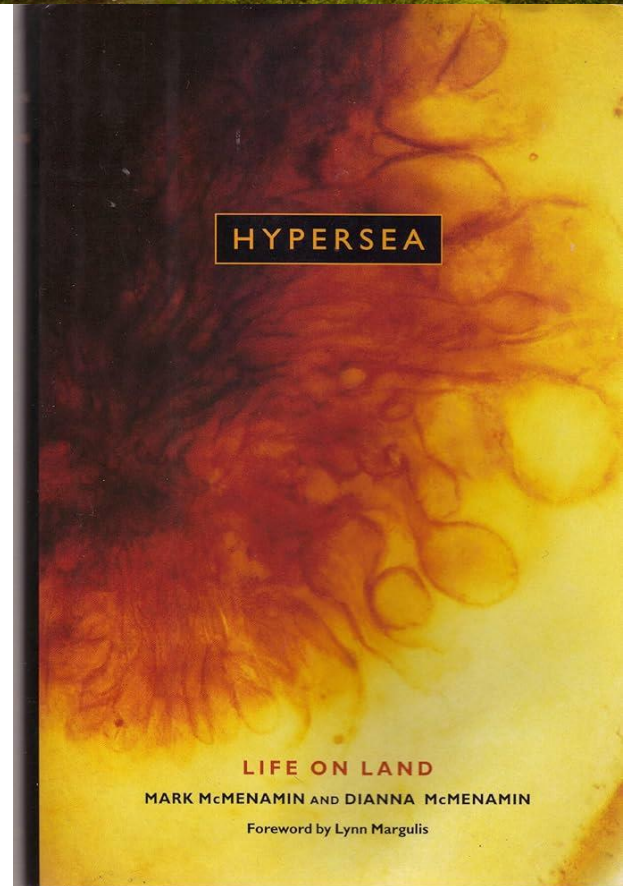
# Implications: individuality

## Organisms & ecosystems

- Individuating environments (Hutchinson)
- Symbiosis in the ocean
  - Hypersea, ocean metabolism, marine microbial interactions
- Marine environments may help us think about other topics
- Connection to process philosophy; debates about laws/regularities in biology; nature of evolution



Image: Simon Pither



Do generalisations from other sciences hold at sea?

- **Sometimes**

Can marine sciences produce new philosophical insights?

- **Yes**

Do we need a 'philosophy of marine science'?

**Open question...**

~~ISHPSSMB~~

# Conclusion

## **Marine sciences play an important role in a (productively) disunified future philosophy of science**

- Patchwork of disciplines, drawing on examples from across the sciences
- Examples from ocean; but also systematic investigation, relations to other areas (e.g. soil science; reefs/forests; microscopes/scuba)
- Connections - research environments (EJPS), comparative philosophy (JGPS)

### Marine sciences...

- Relevant to old questions, generalisations (e.g. individuality; symbiosis...)
- But also interesting angles (relation of physical and disciplinary boundaries; individuation of biomes(?); acoustic science, sensory systems)

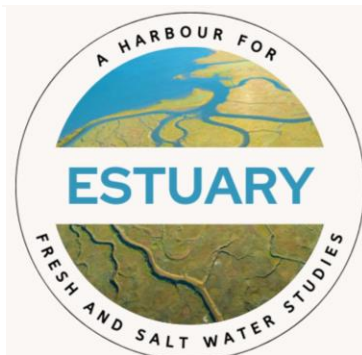
**Thanks:** Vincent Cuypers; Samantha Muka; editors, reviewers, authors of ‘Values at Sea’ special issue; Bertrand Lab; ISHPSSB organisers; Jose Canada, Sebastian Ureta, Jackie Ashkin, Francesco Colona; Woods Hole HoB seminars; Estuary Group; Leighton Jones; Francois Papale, Louis-Patrick Haraoui, Lachlan Bartrop; TUM Philosophy and History of Science and Technology group.

**Future marine hpss conference sessions?** -- Come and find me if you work on marine topics!

**Papers:** Jones, E., and Cuypers, V., (Forthcoming). ‘Marine constraints as philosophical opportunities: the Krogh principle and the benefits of philosophical engagement with the sea’. *History and Philosophy of the Life Sciences*.

Jones, E., and Bertrand, E., (Under Review). The concept of metabolism in ocean biogeochemistry: departures, consistencies, and implications.

**Online Discussion Group:**  
estuary-harbour.com



**Marine Mailing List:**  
groups.google.com/g/  
marinesciencestudies



**Contact:**

marinesciencestudies.co.uk  
elis.jones@tum.de

**Podcast:**

VALUES  
AT  
SEA



**Special Issue (Values at Sea, HPLS)**

**Artistic Value as a New Paradigm to Promote Ocean Conservation**

Juliette Bessette & Thierry Pérez

ORIGINAL PAPER | Open access | 02 July 2025 | Article: 33



**Seeing the unseen: problematic narratives and the microbial worlds of the deep-sea**

Teun Joshua Brandt

ORIGINAL PAPER | Open access | 01 July 2025 | Article: 32

Stazione Zoologica Anton Dohrn  
History  
and  
Philosophy  
of the  
Life  
Sciences  
2014

**Do corals dream of simulated seas?**

Damien Bright

ORIGINAL PAPER | Open access | 27 May 2025 | Article: 26



**The Bay of Porto Paone: the first “tiny underwater nature reserve” in the Gulf of Naples (1960–1966)**

Alessandra Passariello

ORIGINAL PAPER | 17 March 2025 | Article: 17

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