GAME
GLOBAL APPROACH
BY MODULAR EXPERIMENTS

GAME - Global Approach by Modular Experiments
An innovative programme in research and education in the marine sciences

Mark Lenz & Annette Tempelmann

GEOMAR

GAME stands for **G**lobal **A**pproach by **M**odular **E**xperiments

GAME is a programme for the worldwide implementation of identical experiments across geographical and climatic boundaries

GAME combines research and student training in marine ecology

GAME is based at GEOMAR since 2002

GAME
GLOBAL APPROACH
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GAME aims at…

- Studying marine global change
- Running global experiments
- Training students
- Networking scientists
- Boosting international collaborations
- Transferring knowledge & building capacities

GAME invites…

- MSc students worldwide…

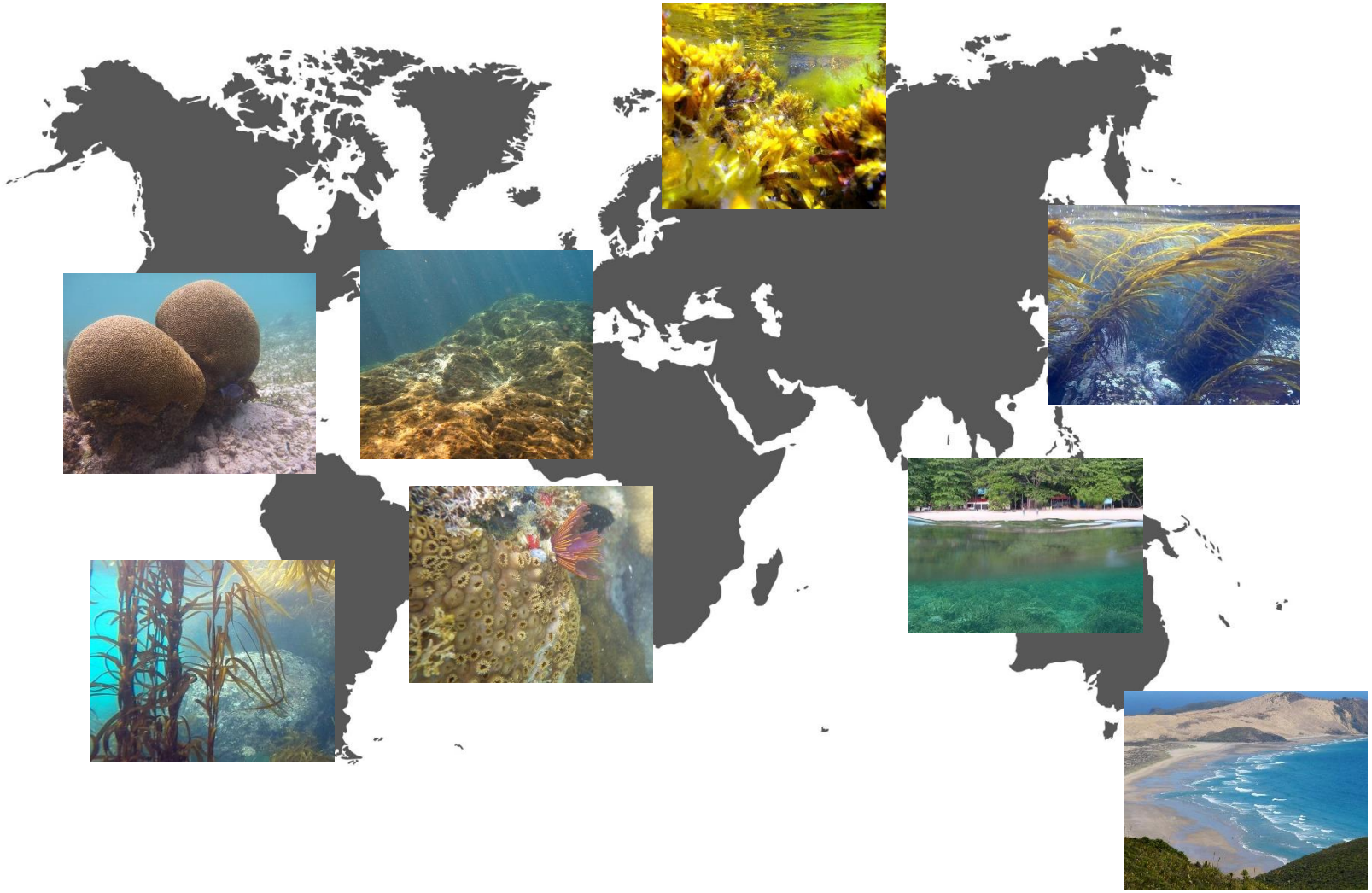
- …from biology, ecology or related life sciences

- Research institutes with a marine focus

- Scientists to supervise research projects

- Sponsors to support young scientists

Modular research at the global scale



Separating a universal signal from the system specific noise

Modular research at the global scale

Separating a universal signal from the system specific noise

The GAME network

With currently 41 partners in 31 countries

The GAME team concept

GAME can currently host 20 students per project

Ten of them come from the GAME partner institutes

Ten come from German universities

GAME has 286 alumni of which the majority is still active in science


GAME
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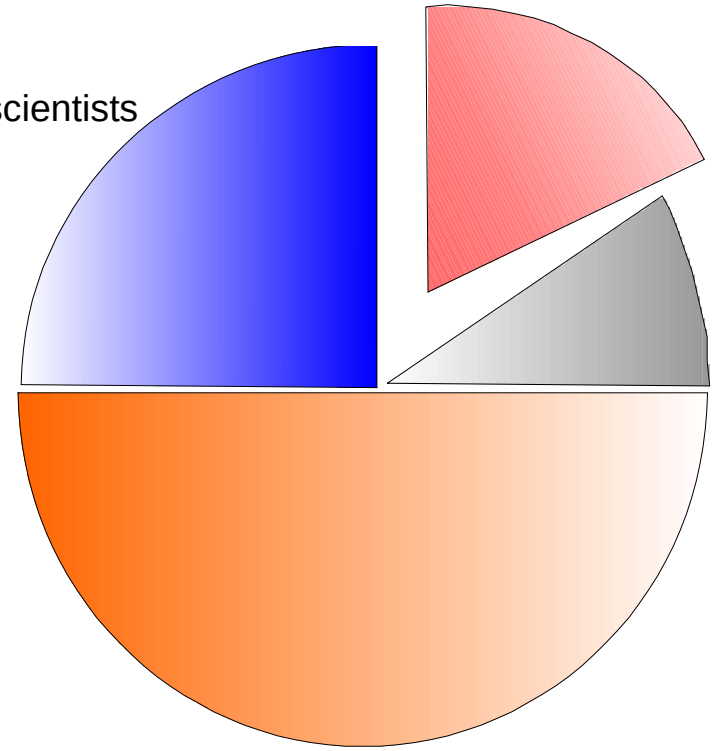
Planning, preparing, conducting, analysing

Planning:
GEOMAR and science partners
January to February

Analysing:
Students and GEOMAR scientists
October to December

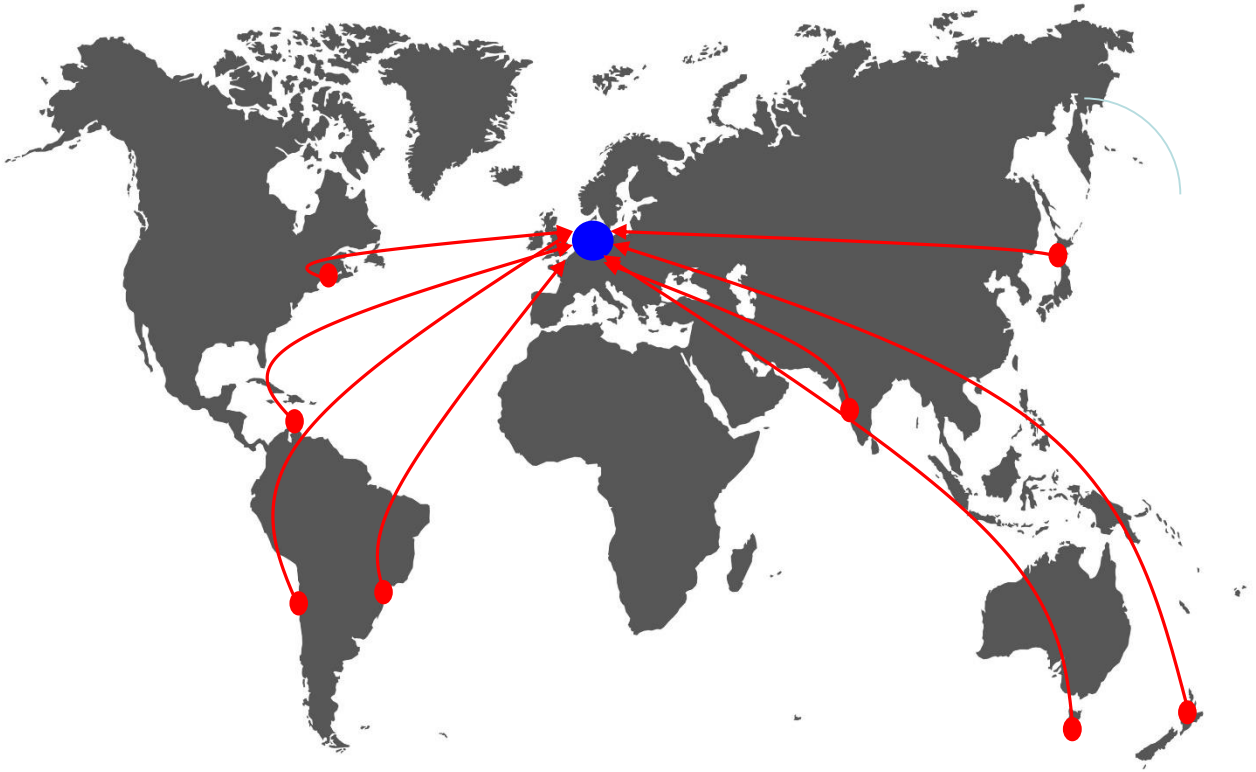


Preparing:
Students and GEOMAR scientists
March

Conducting:
Binational teams at partner institutes
April to September

Preparing

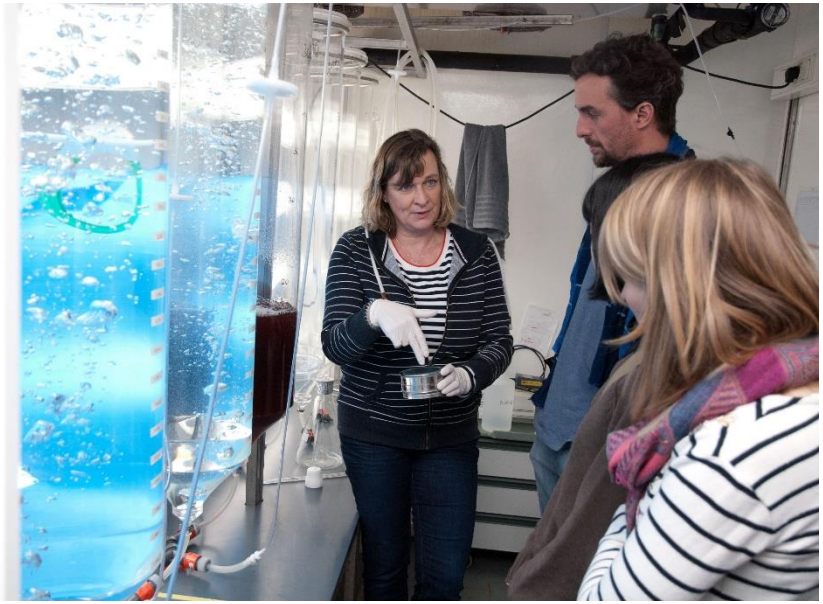
Introductory course with a multinational team of young researchers at GEOMAR



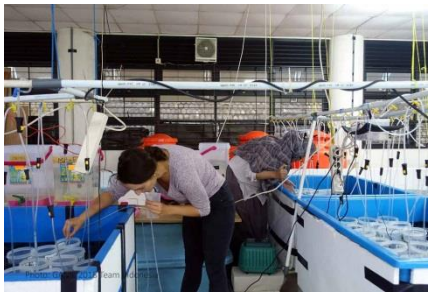
Introductory course

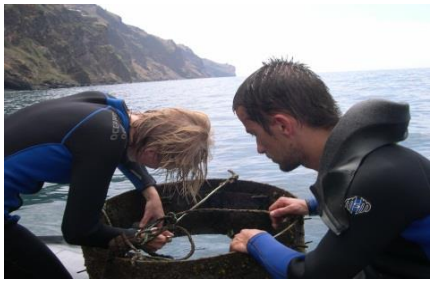
- Background and literature review
- Formulating hypotheses
- How to design a successful experiment?
- Running a test experiment
- Standardizing materials and methods
- Standardizing data protocolling and storage
- Basic biostatistics and how to use R

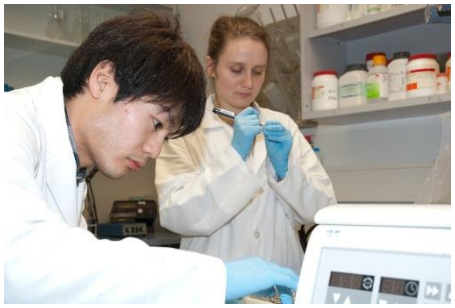
Introductory course

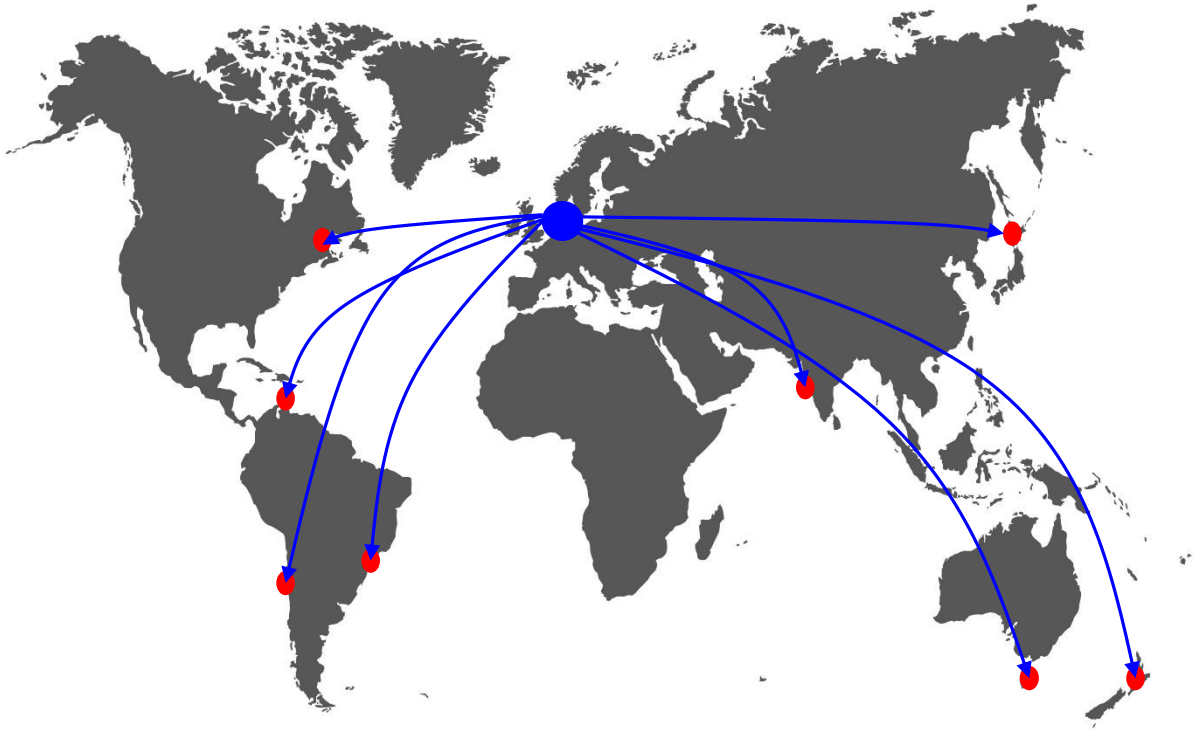


Running experiments

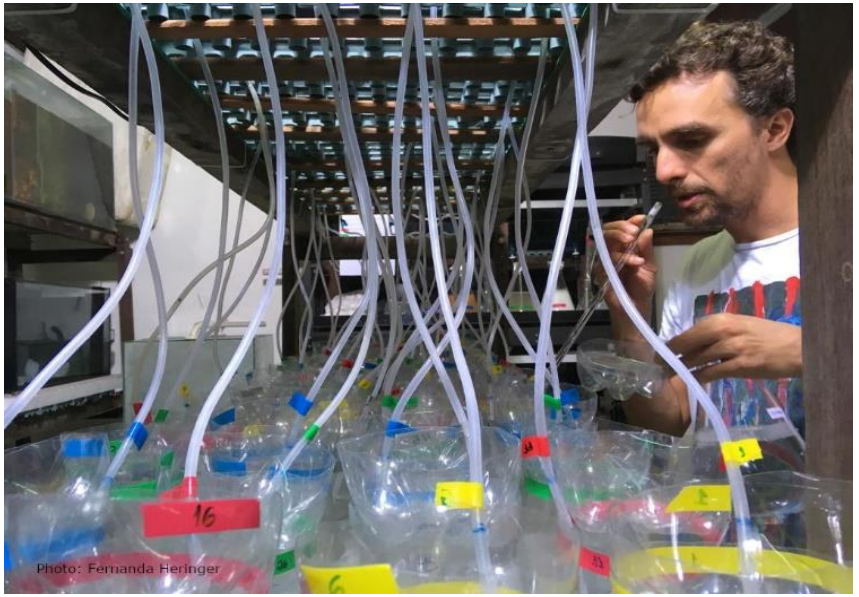


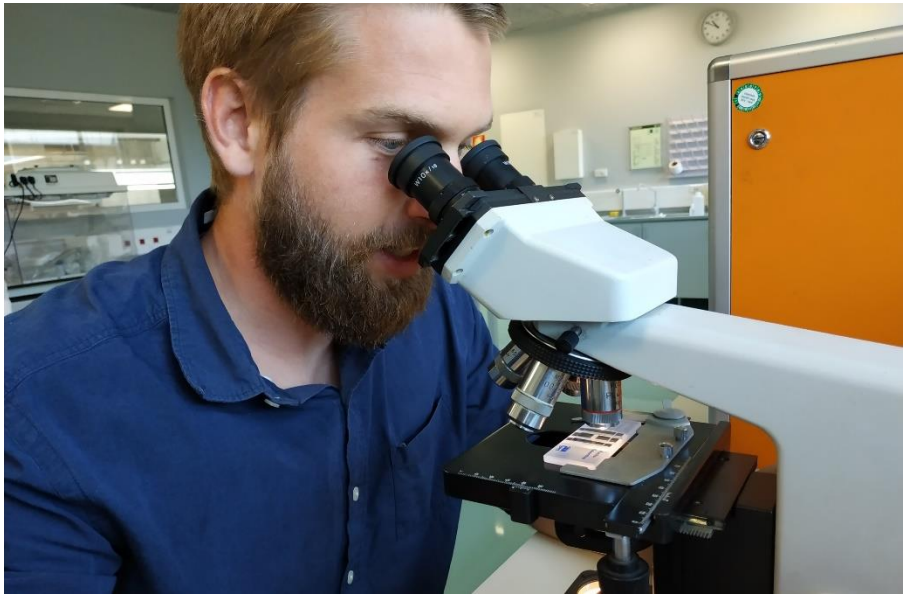






Running experiments





The GAME research focus: Global change in marine systems

1. Does environmental stress impair the capacity of macroalgae to defend against consumers (2003, 2007, 2008, 2011)

The GAME research focus: Global change in marine systems

2. How do stress and disturbances influence the diversity of marine benthic communities? (2004, 2005, 2006)

The GAME research focus: Global change in marine systems

3. Are invasive species more tolerant towards environmental stress than native species ?(2009, 2010, 2012)







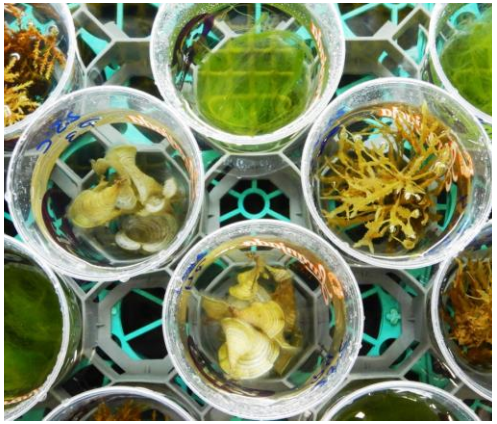

The GAME research focus: Global change in marine systems

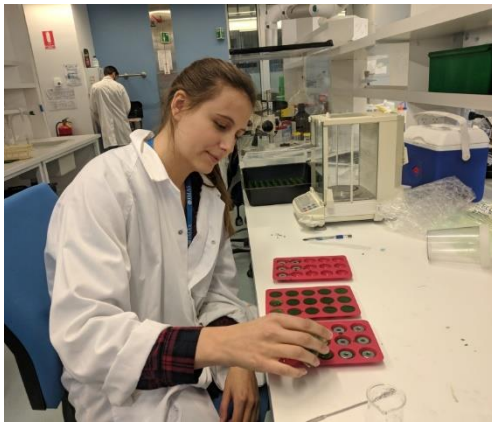
4. Do microplastics harm marine invertebrates?

(2013, 2014, 2016, 2019)

The GAME research focus: Global change in marine systems

5. Does latitude determine the resistance of marine ecosystems towards warming? (2015, 2017, 2018)

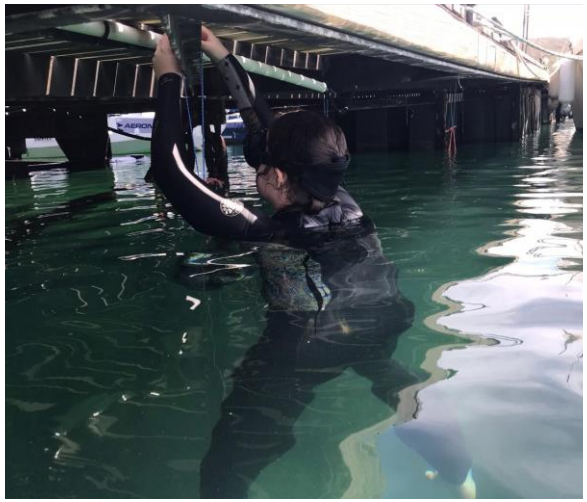




The GAME research focus: Global change in marine systems

6. Does plastic debris alter the structure, diversity and functioning of mussel beds? (2020)



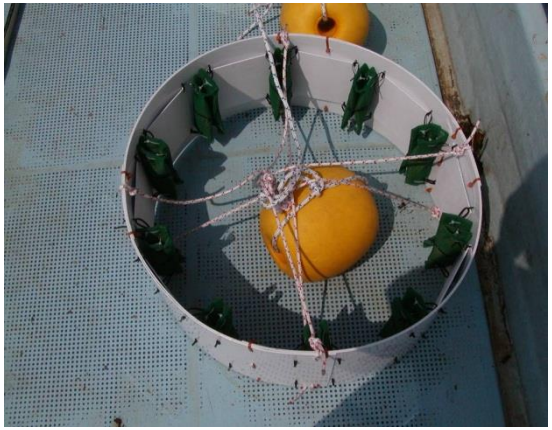


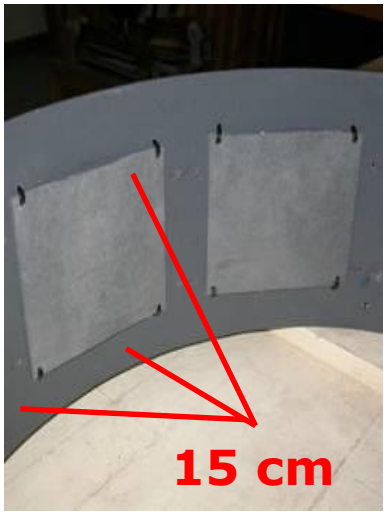

The GAME research focus: Global change in marine systems

7. Does light pollution affect marine benthic organisms? (2021, 2022, 2023, 2024)

Running experiments…

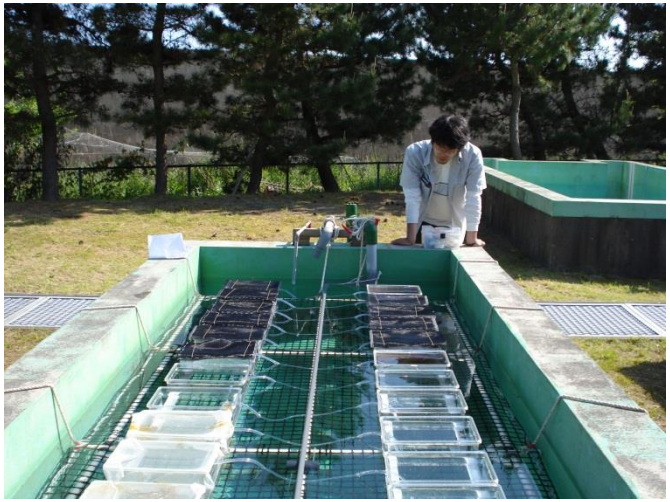
…in situ

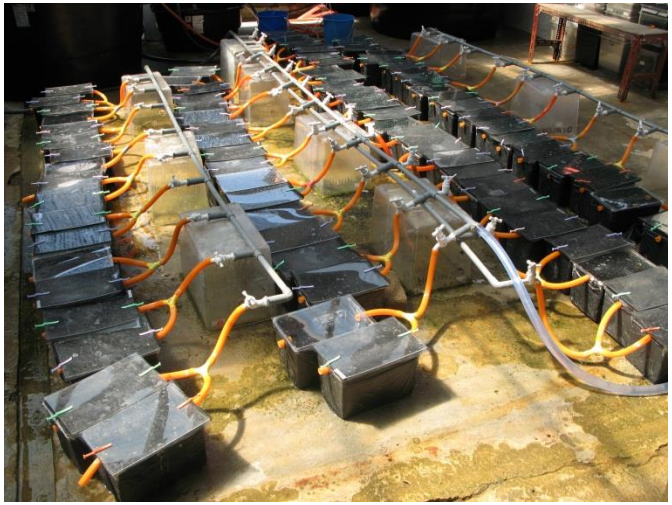




Running experiments…

…in mesocosms

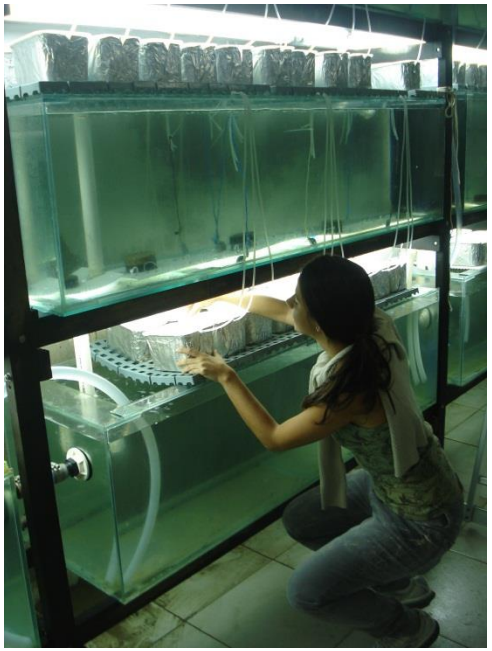




Running experiments…

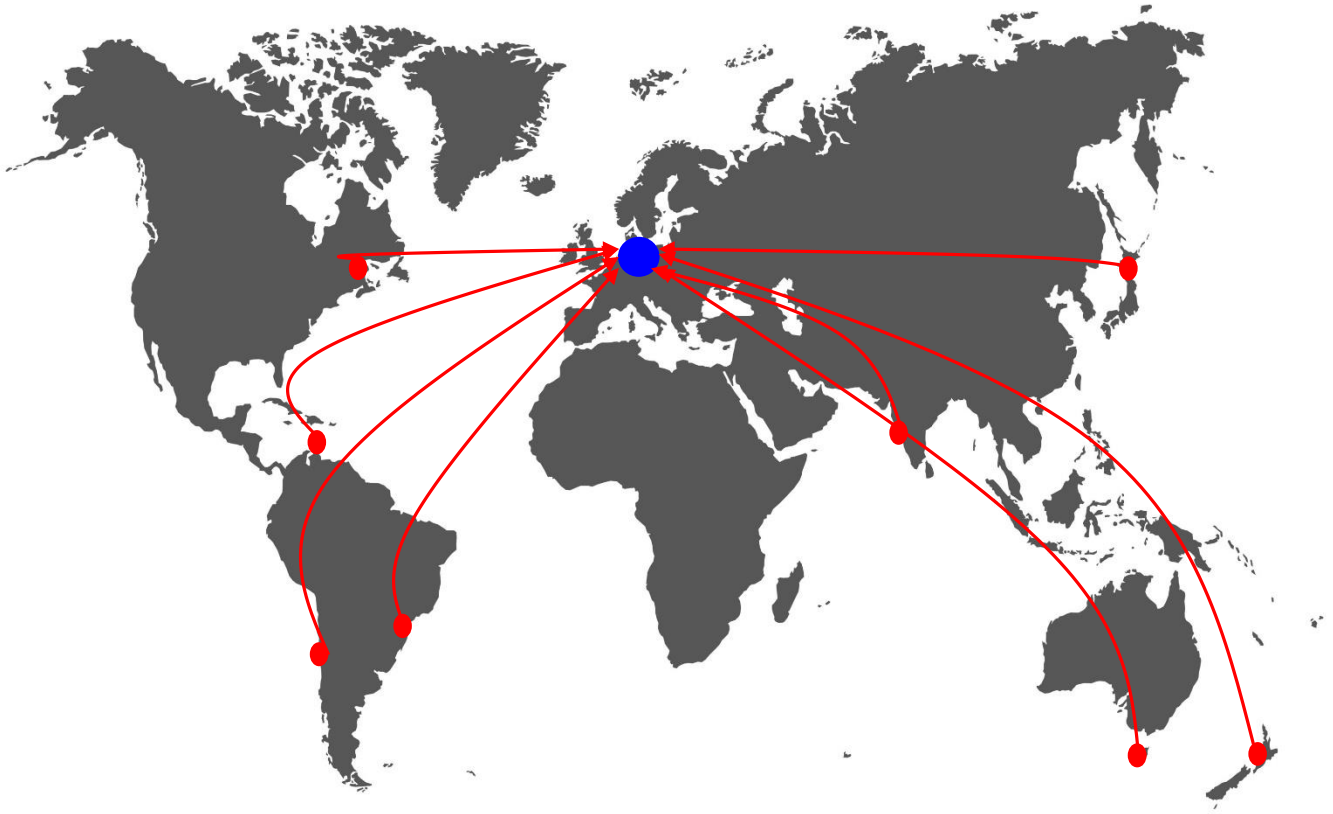
…in the lab

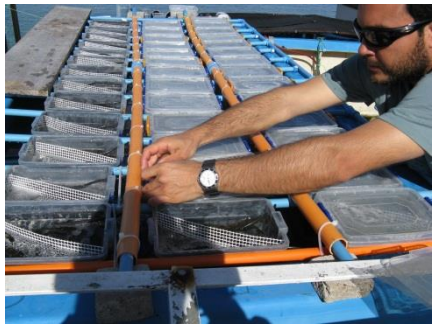




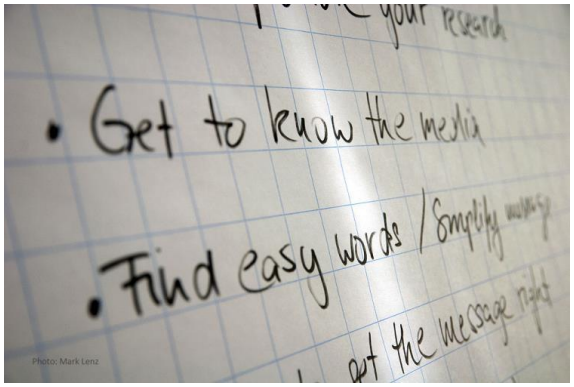
Analysing

Analysis course with all teams at GEOMAR





Analysis course

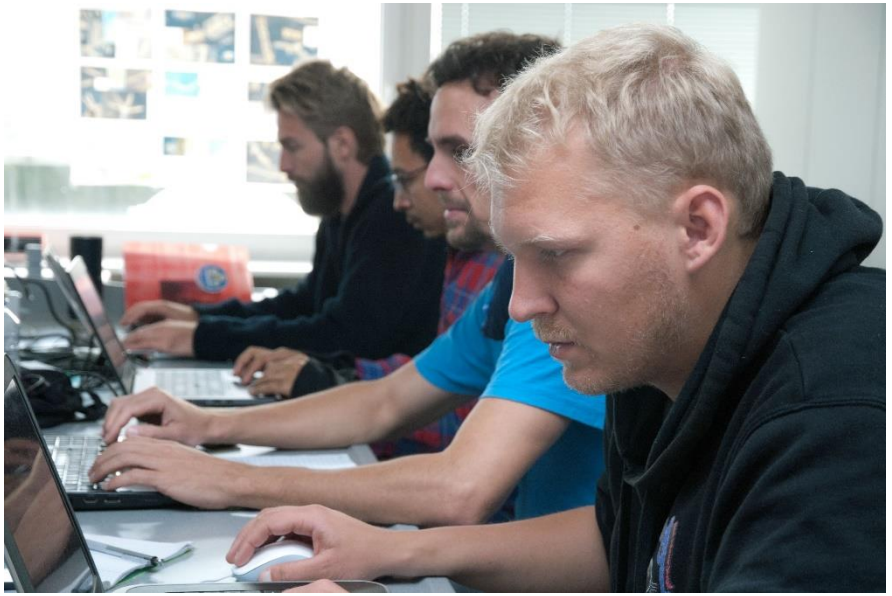


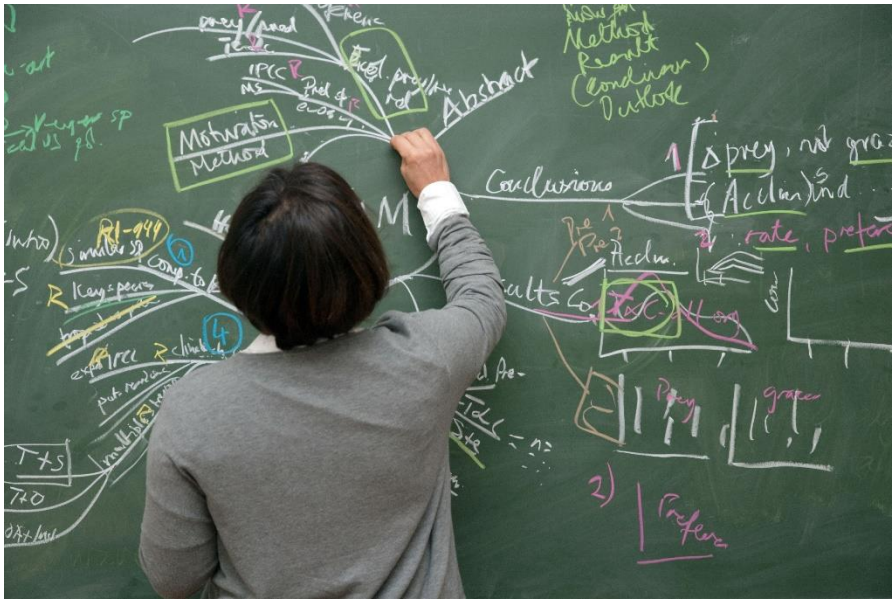
- Advanced biostatistics
- Data analysis and visualization

- Interpreting the global data set
- Communicating science: scientific writing, posters, talks, media competence

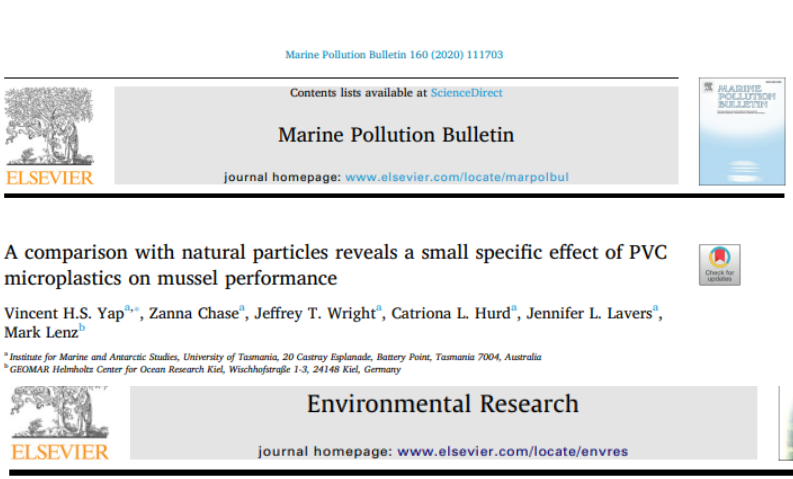
- Interactions with supporters, trustees, students…
- Presenting the results at German universities

Analysis course





So far, 53 peer-reviewed papers emerged from GAME projects



Marine Pollution Bulletin 160 (2020) 111703

Contents lists available at ScienceDirect

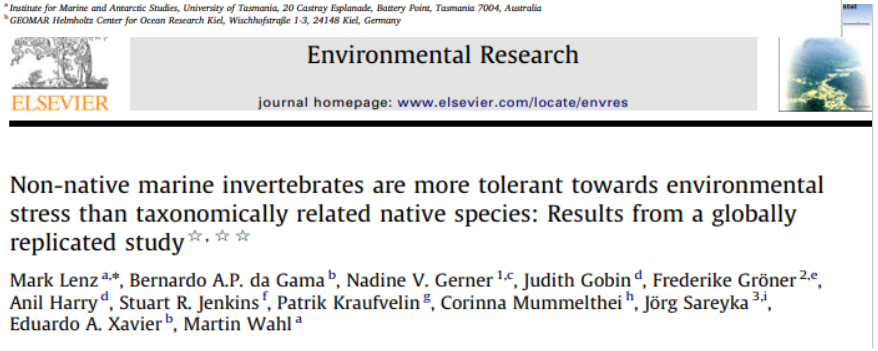
Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul

A comparison with natural particles reveals a small specific effect of PVC microplastics on mussel performance

Vincent H.S. Yap[a,*], Zanna Chase[a], Jeffrey T. Wright[a], Catriona L. Hurd[a], Jennifer L. Lavers[a], Mark Lenz[b]

[a] Institute for Marine and Antarctic Studies, University of Tasmania, 20 Castray Esplanade, Battery Point, Tasmania 7004, Australia
[b] GEOMAR Helmholtz Center for Ocean Research Kiel, Wischhofstraße 1-3, 24148 Kiel, Germany

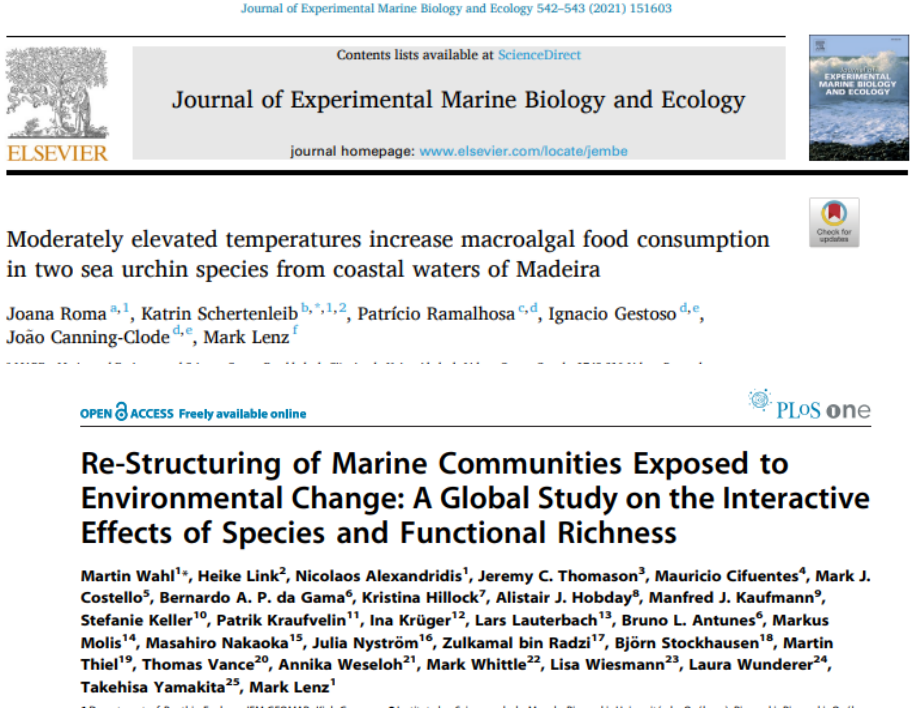


Environmental Research

journal homepage: www.elsevier.com/locate/envres

Non-native marine invertebrates are more tolerant towards environmental stress than taxonomically related native species: Results from a globally replicated study ☆, ☆☆

Mark Lenz[a,*], Bernardo A.P. da Gama[b], Nadine V. Gerner[1,c], Judith Gobin[d], Frederike Gröner[2,e], Anil Harry[d], Stuart R. Jenkins[f], Patrik Kraufvelin[g], Corinna Mummelthei[h], Jörg Sareyka[3,i], Eduardo A. Xavier[b], Martin Wahl[a]



Journal of Experimental Marine Biology and Ecology 542–543 (2021) 151603

Contents lists available at ScienceDirect

Journal of Experimental Marine Biology and Ecology

journal homepage: www.elsevier.com/locate/jembe

Moderately elevated temperatures increase macroalgal food consumption in two sea urchin species from coastal waters of Madeira

Joana Roma[a,1], Katrin Schertenleib[b,*,1,2], Patrício Ramalhosa[c,d], Ignacio Gestoso[d,e], João Canning-Clode[d,e], Mark Lenz[f]

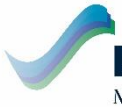
OPEN ACCESS Freely available online

PLoS one

Re-Structuring of Marine Communities Exposed to Environmental Change: A Global Study on the Interactive Effects of Species and Functional Richness

Martin Wahl[1]*, Heike Link[2], Nicolaos Alexandridis[1], Jeremy C. Thomason[3], Mauricio Cifuentes[4], Mark J. Costello[5], Bernardo A. P. da Gama[6], Kristina Hillock[7], Alistair J. Hobday[8], Manfred J. Kaufmann[9], Stefanie Keller[10], Patrik Kraufvelin[11], Ina Krüger[12], Lars Lauterbach[13], Bruno L. Antunes[6], Markus Molis[14], Masahiro Nakaoka[15], Julia Nyström[16], Zulkamal bin Radzi[17], Björn Stockhausen[18], Martin Thiel[19], Thomas Vance[20], Annika Weseloh[21], Mark Whittle[22], Lisa Wiesmann[23], Laura Wunderer[24], Takehisa Yamakita[25], Mark Lenz[1]

We thank our supporters:



Outreach

www.geomar.de/go/game

www.facebook.com/GAME.GEOMAR

www.oceanblogs.org

www.instagram.com/game_geomar

www.youtube.com (GAME + GEOMAR)

GAME FAQs

To participate in GAME…

…you do not need to be a marine biology student

…you do not need to enroll at Kiel University

You will submit your Master thesis to your home uni

Stipends for the participation in GAME are available via PROMOS oder ERASMUS+

Consumables will be paid by GAME

Apply from 12 mth to 2 mth before the start of a project

Personal interviews will be held at GEOMAR

GAME 2025: Influence of artificial light at night on the growth and performance of marine epiphytes