CMMR
Center for Maritime and Marine Research

Afrapportering: Accelerating the Green Transition of the Blue Economies

Applicant information:

Duration: December 2021 - August 2025

The aim of the project summerized from application

The maritime industry is faced with the challenges of ensuring a green transition, and for this a work force with technology and green transition knowledge is necessary. One of its goals is to create awareness of the maritime industry among our students satisfying the maritime industry's need for trans-disciplinary students with technical training as well as knowledge of innovation and the green transition. The primary purpose of the project is to accelerate the transition to a sustainable blue economy via enhanced industrial collaboration. For the blue economy, the project will: 1) create partnerships between RUC and the maritime industry, 2) create awareness of the sector among students and graduates, 3) increase knowledge sharing between RUC and the sector, 4) iterate innovation concepts toward novel products, services, and business models in the sector, and 5) develop pathways to transition to a sustainable blue economy. The project will establish at least 30 projects linked to the maritime sector with further development on 5-10 of them for implementations in relevant companies or start-ups. Through the strengthening of the collaboration between RUC and the maritime industry, the identification and employment of talented students with tech and sustainability skills is increased, serving as a basis for the future collaboration as the project mature.

Project progress report

The project was running from mid December 2021 to August 2025. The period was extended due to illness.

Maritime Partnerships

During the period of the project RUC engaged in two partnerships within the maritime industry.

- December 2022 RUC and Everlence (MAN energy solutions) signed a partnership agreement.
- January 2024 RUC and DFDS signed a partnership agreement.

(a) Everlence signing partnership with RUC

(b) DFDS signing partnership with RUC

Figure 1: Partnership agreements

Maritime industrial PhD project

During the period we have started 3 maritime PhD students at maritime companies

- Agnieszka Sivertsen on Algorithms and AI for Energy efficient liner shipping stowage started in Marts 2022 and graduated June 2025 with SeaLytix.
- Bugvi Benamin Magnussen on AIS Data Driven Ship Behavior Modelling started Marts 2022 with Torm. Estimated to graduate september 2026
- Nikolaj Blæser on Predicting Shipping Market Dynamics started September 2022 with Torm Estimated to graduate September 2026

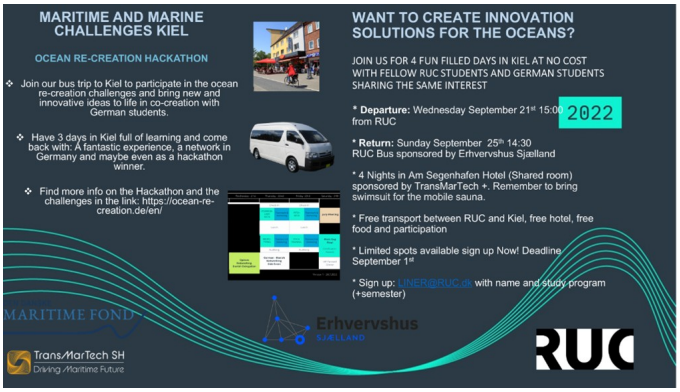
Events engaging with maritime companies

We have during the period had several activities for students to engage with companies and for companies to engage with Roskilde university. We gave listed the activities for each year.

2022

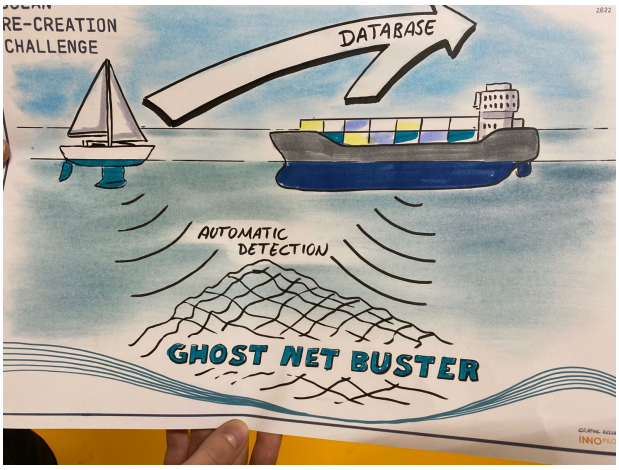
- Pizza night for RUC students where Scandlines, Kalundborg havn, Man Primserv, Insatech and Danish Maritime Authority presented
- Participation in Maritime Hackathon in Kiel with TransMarTech and Region Sjælland
- Mega Trends Audit event with Matthew Spaniol in Collaboration with Danish Maritime
- Digital Tech Summit: Future of Maritime Interactive Session with Matthew Spaniol

(a) Pizzanight at RUC



(b) Trip to TransMarTech Hackathon in Kiel

Figure 2: Maritime student events



(a) Solutions for winning Hack

(b) Winning group

Figure 3: Maritime student events

2023

- Matchmaking Event with presentations from DFDS, MAN energy solutions and SEAVIS
- Matthew Spaniol in paneldebate on 'maritim sikkerhed i et digitalt lys' at Digital tech summit.

2024

- Presentation Digital tech summit Line Reinhardt + Rune Jensen + A. Sivertsen: How to use data for the maritime green transition process
- Matthew Spaniol Presentation to Waterbourne TP: future of shipping
- Matchmaking Event with presentations from MAN Energy solutions and Wärtsilä
- Matthew Spaniol host sustainable shipping in course transition strategies workshop for industry

2025

- BlueTech Hackathon at RUC with Danish Maritime Authority and DFDS
- Scenarios for the future of maritime workshop for industry by Matthew Spaniol.
- The futures of maritime track at foreshadow conference
- Presentation on impact of maritime case on student perceptions the Academy of Management Conference by Matthew Spaniol
- Maritime center presentation at the Leeds Maritime operations session

Figure 4: MatchMaking event 2024

Figure 5: Everlence at Matchmaking 2025.

- Visit to Maritime event at SDU

(a) Working on bluetech hacks

(b) Winning group

Figure 6: Maritime student events

Student projects

1. Optimizing stowage while reducing ballast water, education: 2nd Semester project International Naturvidenskablig bachelor company DFDS
2. Traffic congestion prediction at port of Aarhus through AIS data Master Thesis Computer Science, Dansih Maritime authority
3. Fleksibilitet i Port Safetys LifeLadder, 2nd sem HUMTEK bachelor, Port Safety
4. Optimizing stowage while reducing ballast water, 2nd semester Natural science bachelor.
5. Project on maritime piracy Social science bachelor
6. Nuclear energy in maritime 1, HUMTEK bachelor projects, Seaborg
7. Nuclear energy in maritime 2, HUMTEK bachelor projects, Seaborg
8. Smart cabins on cruiseships, HUMTEK bachelor, DFDS
9. Seafloor Mapping, Digital transformation, SEAVIS
10. Green Labelling for transportation of goods, HUMTEK bachelor, MRA
11. Decarbonization of shipping, HUMTEK bachelor, Everlence
12. Food waste at sea, TEKSAM bachelor, DFDS
13. RoRo vessel stowage with crew breaks, Bachelor Natural Science, DFDS

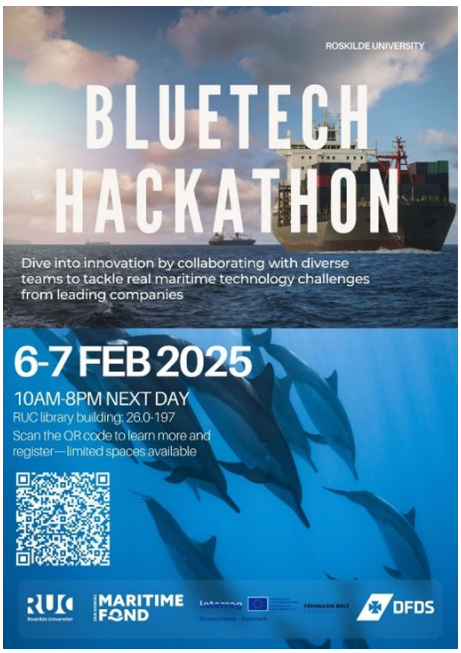


Figure 7: Blue tech hackathon

14. Learning to guide Variable Neighborhood Search applied to the Liner Shipping Network Design Problem with Deep Q-Network-based and Asynchronous Proximal Policy Optimization based Reinforcement Learning, Computer science thesis, Maersk
15. Maritime Revenue management 1, Digital transformation, Revman Consulting
16. Maritime Revenue management 2, Digital transformation, Revman Consulting
17. Maritime learning, Digital Transformation, Aprendio
18. Internship project with Everlence, Bæredygtig Omstilling master
19. Green sailing approaches analysis with AIS data and CM port, Natural science bachelor
20. + more projects supervised by others

Other maritime initiatives toward students

We have in the project also worked on introducing maritime theme in different courses and other initiative to encourage student activities in the area. We have listed some of them below

- Started constructing a video Project case directory
- AP Møller Mærsk is used as the live case in the course Strategic Foresight In Organizations including interviews for student data and an in-class visit from the strategy team.
- Live case with port of Kalundborg and with port of Vordingborg as a student activity including excursions to the site and meetings with management.

Billede 44: Test of LifeLadder

Figure 8: Stress test of Life latter at FabLab

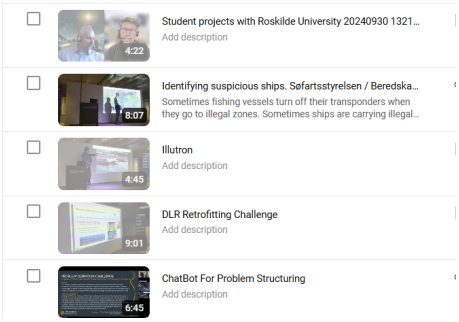


Figure 9: Video teasers for maritime projects.

Conclusion

Many maritime student projects have been conducted and at least one project (the one with Port Safety) has resulted in development of new/improved products within the company. Port Safety, a company in Roskilde, collaborated with RUC's FabLab on improving the product. The students prototyped ladder flexibility modules that lead to major breakthroughs, eventually resulting in significantly increase company potential. Long after the projects have ended, they continue to return to RUC to use FabLab and offer new student challenges.

During this project many maritime companies have visited Roskilde University and Roskilde university has become more visual for companies we are also aware that

some Roskilde University students taking part in the activities have been offered jobs at maritime companies. Roskilde University has successfully gained visibility in the maritime area and this has resulted in two partnership contracts (DFDS and Everllence). Getting students engaged in the maritime sector required a lot of resources and we managed to have 20+ projects - close to 30 when counting PhDs project as part of this activity. Although engaging students was more challenging than expected, the students who engaged in maritime activities were happy with the activities and outcomes. The periscope was not used in the extend planned as the students were more interested in more incremental project work closer related to the business current situation. RUC FabLab has successfully been used by companies and students in creating Maritime innovations.

The conclusion is that there is a big potential for RUC students within the maritime industry and that the knowledge at RUC on green transition and sustainability is very relevant for the maritime industry. The competences of RUC within maritime operations has become more apparent to the industry even though there is still a long way and the possibilities of the maritime sector has become apparent to students.

(a) Students at matchmaking

(b) Pizza night students

Figure 10: Students at activities