

Maritime research organisations

This is an overview over maritime research organisations in Norway. Only research organisations or research groups which are working specifically within maritime research are included. These groups/organisations must also have a link where to find additional information. The information is collected from Internet and/or supplied by the organisations themselves.

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Universities and research institutions

[NTNU-Department of Marine Technology \(IMT\) \(Trondheim\)](#)

The Department of Marine Technology (IMT) at NTNU educates and conducts research about methods and techniques that facilitate the assessment and development of technical and operational solutions for Norway's biggest export industries: oil and gas extraction at sea, ship technology with corresponding equipment industry, fisheries technology and aquaculture technology.

The department also conducts research into newer developments; including offshore renewable energy (wind, wave, and current), coastal infrastructure such as floating bridges, and marine robotics for mapping and monitoring the ocean environment, including polar regions.

The research and education at IMT emphasize the development of environmentally friendly and energy-efficient solutions within these areas.

- Application/focus areas:
 - Oceanography
 - Wave-induced motions and strongly nonlinear loads
 - Structural load effects
 - Abnormal loads and accidental load effects
 - Slender marine structures
 - Ship operations
 - Propellers and propulsion
 - Renewable energy propulsion
 - Marine operations
 - Aquaculture facilities
 - Very large floating structures
 - Deep-sea mineral mining
 - Wind, current, and wave energy production
 - Structural design
 - Underwater robotics
 - Ocean science
 - Risk and safety management of marine systems
 - Multi-level design of complex marine systems
 - Design and verification of complex energy systems
 - Sustainable development of shipping in Arctic waters
- Research disciplines:
 - Marine Hydrodynamics, Marine Structures, Marine Engineering, Marine Cybernetics, Safety and asset management, Design of marine systems, Aquaculture and marine resources
- Services:
 - Collaborative research
- No of researchers: 180
 - 61 professors (20 full+ 7 associate + 2 assistant+17 adjunct + 5 ass. Adj+10 emeritus)
 - 9 researchers, 11 postdocs and ca. 100 PhD candidates, financed by IMT and/or AMOS

NTNU- Department of Ocean Operations and Civil Engineering (Ålesund)

The Department of Ocean Operations and Civil Engineering is aiming to be an international knowledge and innovation hub in the field of maritime operations. This involves education and research in ship design and marine equipment as well as in the operations of vessels. Maritime operations can be regarded as the interplay between technology, human factors and business. In many cases it is in the interfaces between these areas that the inspiration arises to innovate and discover new solutions.

- Application/focus areas:
- Research disciplines:
- Services:
- No of researchers:

Experts NTNU

Some topics:

- [Navigation and vessel management](#)
- [Ships and marine constructions](#)
- [Robots and robotics](#)
- [Radar, antennas, depth sounder](#)
- [Shipbuilding](#)
- [Risk and safety](#)

Universitetet i Tromsø - Advanced maritime ship operations

The scientific aim of the research group in advanced maritime ship operations, is directed towards a determined striving to be a highly competent team, by using new knowledge and experience. The aim is to create scientific values within the field of advanced maritime solutions in order to benefit the development within advanced ship operations.

Advanced maritime operations is today an emerging academic field, where the implementation of autonomous or semi-autonomous control, support and maintenance systems is an attractive solution to increase the operational performance and provide safer environment for the values on-board the ships, whether it is staff, passenger or cargo to be transported.

- Application/focus areas:
 - Digitalization of the maritime industry.
 - Remote controlled and autonomous ship navigation.
 - Ship energy efficiency and emission control.
- Research disciplines:
 - Advanced data analytics and digital models for ship performance and emission control.
 - Advanced predictor and deep learning for autonomous and remote-controlled ship navigation.
 - Life cycle and cost analysis (LCCA) on maritime applications and technologies.
 - Nano-technology for maritime applications.
 - Sensors and sensor performance
- Services:
 - Contract and collaborative research
 - Research based advisory services
- No of researchers: 12

Høgskulen på Vestlandet - Maritime safety research (MarSafe)

Researching Maritime Safety & Human Factors at the Department of Maritime Studies, Western Norway University of Applied Sciences (HVL). <https://www.hvl.no/forskning/gruppe/marsafe/>

MarCATCH is a maritime research centre that has an overall focus on maritime safety. The activities within MarCATCH includes e.g. safety and welfare for passengers, usability, safety and design of ships and ship equipment, safety management, autonomy, inter-personal relations and maritime regulations.

Relevant research fields include human factors, human-machine interface (HMI), computer science, control technology and electrical engineering, naval architecture, ocean technology and various social science field such as social anthropology, organization and management, law, etc.

MarCATCH takes a systemic perspective, and the research programs MarSafe and AITES are strongly connected to the maritime centre.

- Application/focus areas:
 - Our research is human-centred and system-oriented. We regard the human as the most important part of the system. We perform most of our research in the field and in close collaboration with the shipping industry.
- Research disciplines:
 - The MarSafe research group is cross- disciplinary and the members have backgrounds within nautical science, engineering, law, safety science, and social sciences including anthropology and psychology.
- Services:
 - Research based advisory services – providing information and expertise to regulators in issues regarding for example safety management, fatigue, manning
 - Advisory role for maritime unions
 - Contract research for maritime organisations
- No of researchers: 24
 - 4 full professors, 4 associate professors, 7 associate professors II, 5 PhD students.

Høgskulen på Vestlandet – Department of Mechanical- and Marine Engineering (IMM)

The research and development at the Department of Mechanical- and Marine Engineering (Western Norway University of Applied Sciences) is strongly connected to experimental testing in the MarinLab located in Bergen, <http://www.hvl.no/om/marinlab/>. The department cooperates with local industry in both Bergen and Haugesund. Collaboration with NORCE as well as with the Department of Physics and Technology at the University of Bergen (UiB) is increasing. The mechanical department located in Haugesund is working on the EU project DECOM Tools “Decommissioning of offshore wind parks” <https://northsearegion.eu/decomtools/>.

The main interests are related to renewable and environmentally friendly solutions for marine vehicles, structures and operations.

- Application/focus areas:
 - Ship resistance and motion reduction
 - Motion response in waves

- Offshore operations
- Loads on structures during offshore operations
- Offshore fish farm hydrodynamics and construction
- Tidal- and wind turbines
- Foil technology for renewable energy and hydrofoil work boats
- Renewable fuels for ships and ferries, biofuels and hydrogen
- Research disciplines:
 - Hydrodynamics, Marine Engineering, Marine machinery
- Services:
 - Collaborative research

No of researchers: 8

[Molde University College – \(HiMolde\) & Møreforskning Molde AS \(MFM\)](#)

[HiMolde](#) is a specialized university with a high focus on logistics.

The Department of Logistics comprises 55 employees. Contact details could be found here:

<https://www.himolde.no/personer/log/>.

[MFM](#) is a research institute partly owned by HiMolde doing commissioned research. Several of the research groups comprise members from both MFM and HiMolde, and function as a unified research environment.

The most relevant research groups for maritime research are:

- a. [Logistics](#) – Logistics solutions for supply, production and distribution. Value chain analyses.
 - b. [Engineering Logistics](#) – Manufacturing networks and industrial clusters, Global value chains and sourcing strategies, Enabling technologies in manufacturing networks, Industry 4.0
 - c. [SCM and Information Systems](#) – Integrated Logistics and Information Systems, IoT, ERP
 - d. [Transportation Research Group](#) – Transport policy and appraisal, Transport flow modelling, Freight and logistics
- Application/focus areas:
 - Logistics solutions for supply, production and distribution. Value chain analyses
 - Manufacturing networks and industrial clusters, Global value chains and sourcing strategies, Enabling technologies in manufacturing networks, Industry 4.0
 - Integrated Logistics and Information Systems, IoT, ERP
 - Transport policy and appraisal, Transport flow modelling, Freight and logistics
 - Research disciplines:
 - Transport Economics, Logistics, Supply Chain Management, Mathematical Optimization
 -
 - Services:
 -
 - No of researchers:55 at HiMolde, 10 at MFM

Universitetet i Sørøst-Norge – Institutt for maritime operasjoner

The institute offers education in shipping and logistics, nautical, marine technical operations, maritime management and nautical operations (phd).

Maritime Logistics (MaritimeLog)

MaritimeLog as a part of USN, deliver research-based education programs; from BSc in nautical Sciences and Shipping & Logistics, MSc in Maritime Management to PhD in Nautical Operations (co-partnership with 3 other universities/colleges).

- Application/focus areas:
 - Digitalization in Shipping Operations & maritime and nautical systems
 - Sustainability and green thinking in maritime and nautical industry
 - City Logistics, Port & Terminals, Ship Operation management
 - Process excellence and performance management
 - Optimization of port, terminal and ship operations
 - Simulation and emulation of port, terminal, ship operations and container flow/goods flow
 - Managing risks, ships safety and legal regulation
 - The resilient supply chain and global multimodal supply chains.
- Research disciplines:
- Services:
- No of researchers:12

Training and Assessment (TARG)

The vision of the research group is focused on developing training and assessment methods (rigorous, unbiased and automated) for complex work performances such as coastal navigation, maritime operations and teamwork.

- Application/focus areas:
 - Simulator training
 - Maritime Education and Training
 - Performance assessment
 - Resource management
 - Human-machine interaction
 - Safety leadership
 - Accident Analysis
- Research disciplines:
- Services:
- No of researchers:9

Center for Security, Crisis Management and Emergency Management

The Center's purpose is research-based knowledge of security, crisis management and emergency Preparedness. The Center is an arena where practitioners and researchers from different disciplines meet and collaborate on research and development projects. The Center is regionally, nationally and internationally oriented and is perceived as useful and relevant for emergency response actors. The Center targets several sectors and represent different disciplines from the University of South East Norway. The Center helps in developing increased knowledge about risk, vulnerability, prevention and management of unwanted incidents in society. The University's expertise in emergency response management, technology and maritime safety, public health preparedness, ICT security and

collaboration between public, private and voluntary agencies, will be key areas in the Center's academic portfolio.

- Application/focus areas:
 - emergency response management
 - technology and maritime safety
 - public health preparedness,
 - ICT security and collaboration between public, private and voluntary agencies
- Research disciplines:
 - Emergency management, crisis management, collaboration, government, public policy, leadership, innovation, organizational studies, ICT, maritime
- Services:
 - Contract research
 - Collaborative research
 - Research based advisory services
- No of researchers: ca 10
 - Will differ (project based), but a core of about 10 researchers

NHH - Centre for Shipping and Logistics - CSL

Both shipping and logistics are traditional research fields at NHH. The Center for Shipping and Logistics continues and develops this field through both theoretical and empirical research related to maritime transport and logistics in close interaction with Norwegian industry. The research group comprise a broad set of interests and expertise ranging from traditional operations research and shipping economics to how companies in shipping and logistics can exploit data analytics and digitalization.

- Application/focus areas:
 - Green shipping and energy efficiency
 - The logistics of autonomous vessels
 - Freight derivatives and risk management
 - Optimization of technical and commercial ship operation
 - Maritime big data and analytics
 - Maritime history
- Research disciplines:
 - Management science, Operational Research, Econometrics, Shipping economics
- Services:
 - [Applied research projects](#) with industry partners
 - [Students master theses](#) relevant to companies,
 - Talks at conferences and seminars,
 - Annual [shipping conference](#) for the industry,
 - [Executive programmes](#) (Executive MBA in shipping, planned)
- No of researchers: 15
 - 8 professors, 1 Post. Docs, 4 PhD students, 2 professor emeriti and 1 affiliated researcher, 1 post doc and 1 PhD student at SNF (see [below](#))
- CSL contact person – professor [Stein W. Wallace](#) (stein.wallace@nhh.no)

Experts at NHH

Selected topics:

- [Shipping, transport and logistics](#)
- [International economics](#)
- [International Business](#)

SNF – Shipping and logistics

The Shipping and Logistics Research Program at SNF comprises of both theoretical and empirical maritime transport and logistics research in close co-operation with the Norwegian and international maritime industry. Having leading scholars in both economics and operations research within the group sets us apart from more technically-focused groups at other institutions in Norway and internationally. We believe that the most challenging questions and innovative research will arise where the two areas intersect – such as optimizing decisions under uncertainty subject to more realistic models of market uncertainty.

- Application/focus areas:
 - Autonomous vessels
 - Applications of smart digital contracts in shipping
 - Energy efficiency and emission from shipping
 - Maritime big data and analytics
- Research disciplines:
 - Economics, Management science, Contract Theory , Stochastic optimization
- Services:
 - [Applied research](#) with industry partners
 - Shipping seminars for the industry
- No of researchers: 3
 - 1 researcher, 1 post doc, 1 PhD student, 9 affiliated professors and 3 PhD students at NHH (see [above](#)).
- Contact person: Programme director and professor [Roar Ådland](#) roar.adland@nhh.no

Experts at SNF

- Shipping Economics
- Energy Economics
- Commodity Markets
- International trade

Scandinavian Institute for Maritime Law (University of Oslo)

The Institute is internationally renowned for its expertise in Maritime, Offshore, Petroleum and Energy Law. The Scandinavian Institute of Maritime Law includes two departments and one center; Department of Maritime Law, Department of Petroleum and Energy Law, and Center for European Law. The areas within maritime law department are:

- Application/focus areas:
 - Contracts in maritime law
 - Liability in maritime law
 - Safety at sea covering environmental issues
 - Infrastructure in the transport sector
 - Aquaculture

- Research disciplines:
 - Energy Law, Environment Law, Insurance Law, Law of the sea, Maritime Law, Contract Law, Marine Insurance, The Arctic, Legal regulation of the aquaculture industry, liability issues relating to autonomous shipping.
- Services:
 - Contract research
 - Collaborative research
 - Research-based advisory services
- No of researchers: 30

SINTEF Ocean

SINTEF Ocean is engaged in research and innovation related to the ocean space for national and international industry. SINTEF Ocean's ambition is to continue Norway's leading position in marine technology and biomarin research.

The maritime areas are mainly maritime transport systems, maritime energy systems, numerical and experimental hydrodynamics.

Maritime Transport Systems

The *Maritime Transport Systems* group possesses interdisciplinary expertise in research, innovation and analysis. Our activity focuses on issues related to logistics and digital shipping. Within logistics, we focus on design and management of maritime value chains, fleet optimization and ship concept analyses, while autonomous solutions for ships, applied maritime communication and digital information processing are our focus areas in digital shipping.

- Application/focus areas:
- Research disciplines:
- Services:
- No of researchers:

Maritime Energy Systems

The *Maritime Energy Systems* group has a long tradition in the work of improving the efficiency of combustion engines, developing new combustion engines, developing gas engine technology, measuring and characterizing emissions to air. We also focus on non-traditional and new fuels, hybrid energy systems that include batteries and fuel cells, emissions to air and sea from energy systems. Our focus areas are aimed at the future zero and low emission energy systems for ships.

- Application/focus areas:
- Research disciplines:
- Services:
- No of researchers:

The **Numerical and Experimental Hydrodynamics group** work in the interaction between the use of numerical tools and the hydrodynamic laboratories at Tyholt in Trondheim. The research groups possess expertise related to hull design and propulsion, sea properties and manoeuvring. Research related to surface treatment of the hull for the improvement of resistance properties, propulsion and optimization of hull for the best performance in a seaway, are all important issues being worked on. In addition, seaworthiness related to equipment and personnel, as well as manoeuvrability both at sea and in port important topics. The research groups perform both model experiments and numerical calculations, as well as develop hydrodynamic software for both internal and external use.

- Application/focus areas:
- Research disciplines:
- Services:
- No of researchers:

Forvarets forskningsinstitutt – maritime systemer

- Application/focus areas:
 - Maritime surveillance
 - Underwater sensor systems
 - Seafloor Mapping
 - Mine-hunting
 - Unmanned underwater vehicles
- Research disciplines:
- Services:
- No of researchers:

Unmanned underwater vehicles:

FFI has over 25 years built up considerable expertise in unmanned underwater vehicles (AUVs). FFI has always had a strategic cooperation with the Norwegian company Kongsberg Maritime (KM) and this has resulted, among other things, in the product HUGIN AUV. FFI also collaborates closely with the Norwegian Navy on concepts for operation, use and experience of AUV.

Militarily, the main focus of the AUV development has been mine hunting. For the civilian sector surveying for the offshore sector, inspection of pipelines and search for casualties has been central.

FFI has high-level disciplines in the field of control autonomy for AUV, advanced processing of sonar data, automatic analysis of AUV sensor data, navigation and energy supply. Together, these research groups make up about 20 people, with typically just over 10 man-years targeting AUV development.

Other research organisations

DNV-GL TECHNOLOGY & INNOVATION

Strategic Research Programmes:

Maritime

The Maritime Transport Program focuses on how shipping can become safer and greener, and how this will affect and drive our business in the future. We have a long-term research perspective and our main focus is on understanding how technology developments will affect the shipping industry in the future.

- Application/focus areas:
 - Digitalization of the maritime industry
 - Remote controlled and autonomous ships
 - Decarbonization of shipping
 - Environmental loads on ships
- Research disciplines:

- Mechanics, thermodynamics, hydrodynamics, structures, techno-economics, data science, statistical methods and artificial intelligence, cybernetics, computer vision, communications technology and political science
- Services:
 - Collaborative research
- No of researchers: 18

Ocean Space

This is a cross-disciplinary research program focusing on the sustainable growth of ocean-based industries. The group addresses sustainable growth, efficiency in operations and control with risks in the Aquaculture value chain through new technologies and digitalization. It also explores opportunities for growth in new ocean values chains while preserving the health of the ocean. The program collaborates with external partners and internally across research programs and business development units in DNV GL. It also handles DNV GLs strategic partnership with the UN Global Compact Action platform for Sustainable Ocean Business.

- Application/focus areas:
 - Barrier Management in Aquaculture
 - The interface between new technology and fish welfare
 - Governance, regulations, industry frameworks and standards
 - The blue economy and the Sustainable Development Goals – opportunities and solutions
- Research disciplines:
 - Risk management, data analytics, environmental system analysis, biology and veterinary medicine
- Services:
 - Collaborative research
- No of researchers: 4

Digital Assurance

The Digital Assurance program develops methods and systems which will enable more efficient and effective testing, inspection and certification services, master the assurance of complex cyber-physical systems to ensure their safe, secure and efficient use, and contribute to responsible governance of digital technologies.

- Application/focus areas:
 - Simulation technology for efficient cross-industry sharing and collaboration
 - Assurance of complex cyber-physical and AI based systems
 - Autonomous systems and vehicles
 - Drone-based inspections and computer vision
 - Emerging digital technologies
- Research disciplines:
 - Computer science, cybernetics and robotics, complex systems, risk analysis, artificial intelligence, computer vision, socio-technical systems, governance, human dimensions & ethics.
- Services:
 - Collaborative research
- No of researchers: 17