



University  
of Gdańsk

Offshore  
Wind Energy



# UNIVERSITY OF GDAŃSK

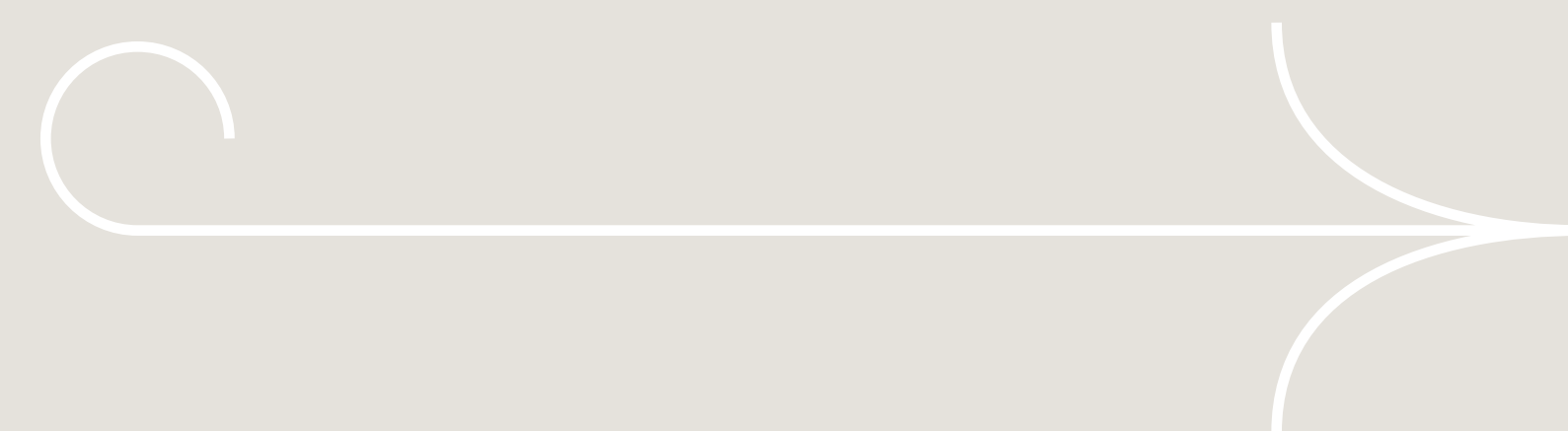
*Your development partner*

## Zawartość

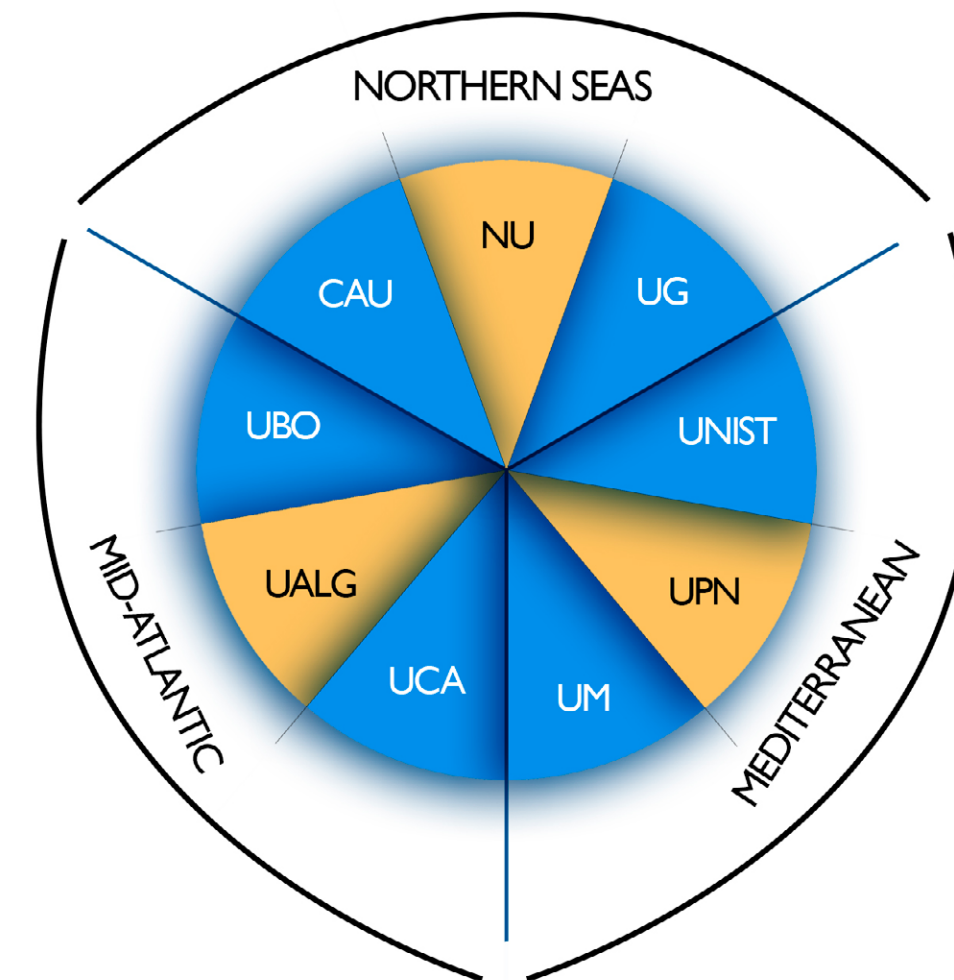
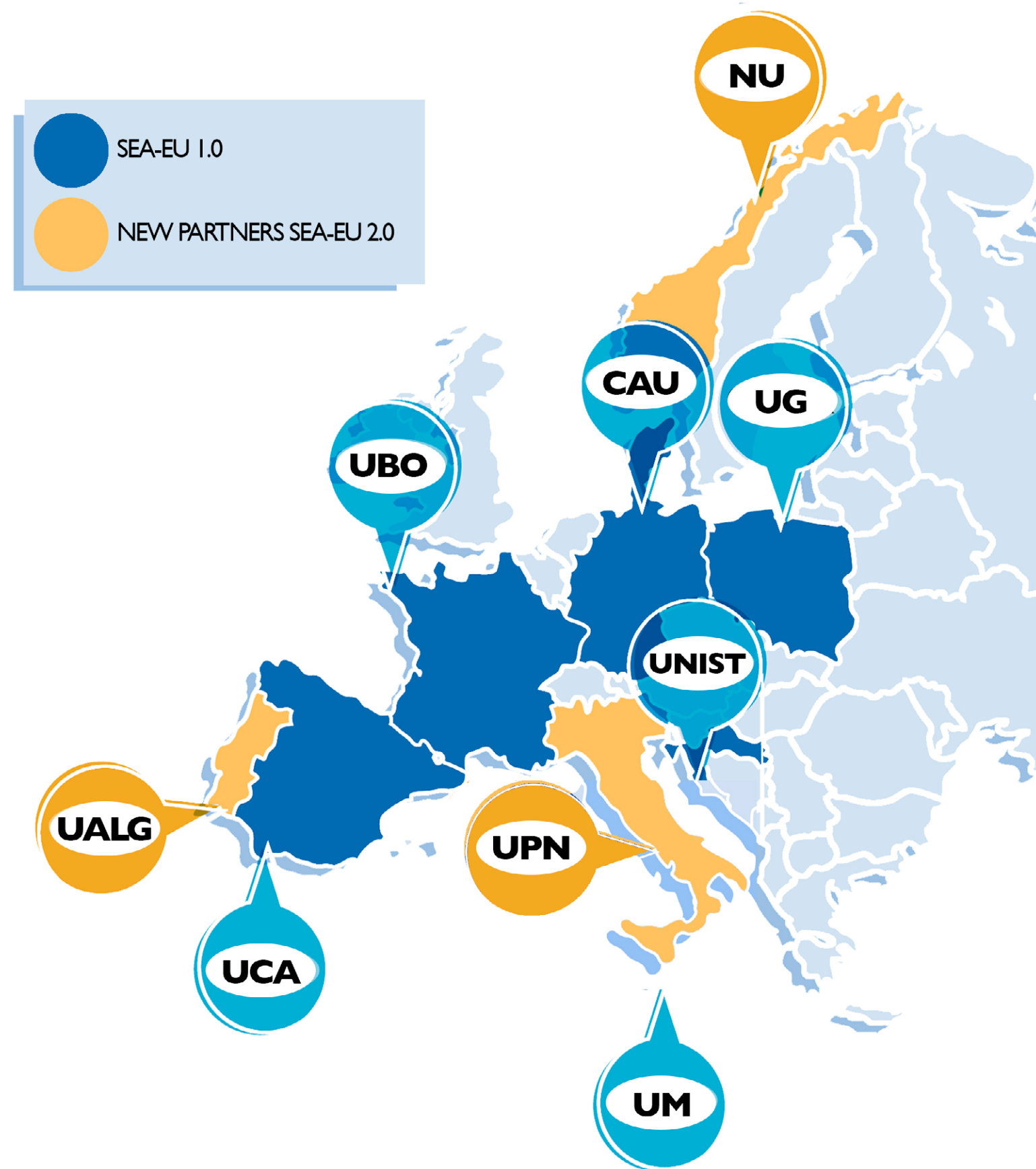
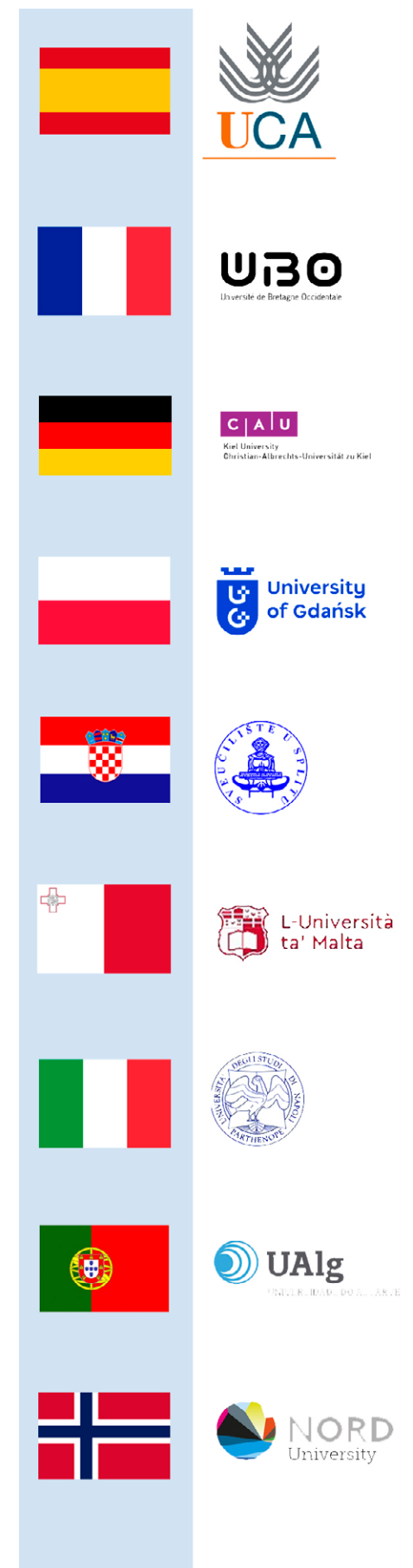


University of Gdańsk - Overview.....	3
Tradition .....	4
and modernity .....	4
Projects with .....	6
a marine aspect .....	6
In mari via tua.....	7
Your development partner .....	8
Introduction.....	9
Cooperation .....	10
Educational offering.....	12
Partners.....	15
Contact .....	16

# University of Gdańsk - Overview



# Tradition and modernity



Co-funded by the Erasmus+ Programme of the European Union

At the University of Gdańsk, education in virtually all domains of academic knowledge and professional skills sought after on the labour market meets modern learning conditions in one of the biggest university campuses in Pomerania, with facilities in Gdańsk, Gdynia and Sopot, and merges with the openness to change and continuous response to the shifts in both academic and business world.

University of Gdańsk boasts significant scientific successes, strengthening its leading position, especially in the scope of maritime research and activities. GU also belongs to a prestigious European alliance of maritime universities SEA-EU (along with countries such as France, Spain, Italy, Croatia and Norway). Main mission of SEA-EU is a close cooperation with the enterprises, local authorities, researchers and academicians, aimed at development of solutions that will address the issues related to the sustainability of the economic development in. e.g., maritime areas.



UG, as the only Polish University, has at its disposal a modern research ship, the r/v Oceanograf catamaran, dedicated to the interdisciplinary research of the environment, flora and fauna of the Baltic Sea, and conduction the classes for the students.

UG researchers have tremendous experience resulting from the realization of numerous international projects covering various marine issues, in cooperation with other universities, institutions and enterprises, including e.g., collaboration in the Interreg Program - Baltic Sea and South Baltic Regions, BONUS-185, Horizon 2020, SEAPLANSACE (Faculty of Law and Administration), Baltic Pride, Baltic Heritage Routes (Faculty of Economics), Blue Platform, ECOMAP, ASSEMBLE+, COMPLETE, InnoAquaTech (Faculty of Oceanography and Geography).

Program „SEAPLANSACE - Instruments of the marine spatial planning for the sustainable sea management” (Interreg South Baltic Programme 2014-2020) realized in cooperation with: Aalborg University (Denmark), Centre for Regional and Tourism Research (Denmark), County Administrative Board of Kalmar (Sweden), EUCC - The Coastal Union Germany (Germany), EUCC Baltic Office (Lithuania), Marine Institute if the Marine University in Gdynia (Poland) and World Maritime University (Sweden) contributed to the strengthening of the competence and formation of the stakeholders’ ability to perform marine spatial planning as an important part of blue and green economy, including OWE.

SatBałtyk (Satellite Control of the Baltic Sea Environment) and eCU-DO (Electronic Oceanographic Data Sharing Centre) programs allowed the formation of the IT systems providing an unified access to the countrywide academic resources related to the oceanography.

Implementation of the Blue Platform project will allow the usage of the results of realized or finished projects of territorial cooperation related to the promotion of blue and green economy (e.g., Smart Blue Regions, Baltic Blue Biotechnology Alliance, Baltic Blue Growth, InnoAquaTech, MUSES, AquaBest, Plan4Blue, BlueWEBS, BIOCAS, BalticRIM).

Project „ECOMAP - Assessment of the Baltic Sea environment with opto-acoustic, non-invasive methods used for mapping and monitoring” has been realized by the Institute of Oceanography at UG in cooperation with both other universities and commercial enterprises: Christian-Albrechts-Universität in Kiel, Institute for Baltic Sea Research Warnemünde, Helmholtz-Zentrum für Ozeanforschung oraz INNOMAR Technologie GmbH from Germany; GEOMAR and NORBIT-POLAND from Poland; University of Copenhagen and GEUS - Geological Survey of Denmark and Greenland from Denmark.

International cooperation allows to fully utilize the abilities related to the developed and derivative solutions for the economy in the Baltic Sea region, and to the innovations in this area. Additionally, it contributes to the creation of a platform allowing sharing of the results between partners and other stakeholders, as well integration of knowledge and expertise in the entire Baltic Sea area.



# Projects with a marine aspect

## **SatBałtyk** PLN 5.1 mln

Satellite control of the Baltic Sea environment

## **Pharmarine** PLN 2.6 million

Investigating the effects of ocean-current transported pharmaceuticals used in human therapy on marine organisms

## **Comarine** PLN 2.3 million

Investigating the environmental impact of CO2 leakage from a storage site under the seabed

## **Birds and mammals of the Baltic Sea** PLN 2.1 million

Protection of marine mammals and birds

## **Seaplanspace** PLN 1.8 mln

Maritime spatial planning instruments in sustainable maritime management

## **eCUDO** PLN 1.7 million

Electronic Oceanographic Data Sharing Centre

## **ArcheoBalt** PLN 1.5 million

Innovative archaeotourism - a new "green" archaeological route in the southern Baltic Sea region

## **Baltic Heritage Routes** PLN 1.5 million

Development of tourism infrastructure based on the cultural heritage in the South Baltic Sea area

## **NonHazCity** PLN 1.4 mln

Innovative solutions for minimising emissions to and from the Baltic Sea

## **Ecomap** PLN 1.3 million

ECOMAP - Assessment of the Baltic Sea environment with opto-acoustic, non-invasive methods used for mapping and monitoring

## **Combine** PLN 1.1 million

Strengthening combined transport in the Baltic Sea region

## **AquaVIP** PLN 1.0 million

Career development platform in aquaculture in the South Baltic Sea region

## **Buffer** PLN 0.8 mln

Benthic coastal buffer against climate extremes and eutrophication

## **Tetras** PLN 0.6 million

Technology transfer towards recirculation systems in aquaculture

## **Offer** PLN 0.6 million

Offshore wind energy in the South Baltic Sea Region

## **Focus** PLN 0.4 million

Growing the blue economy through e-learning courses using R&D products and virtual mobility



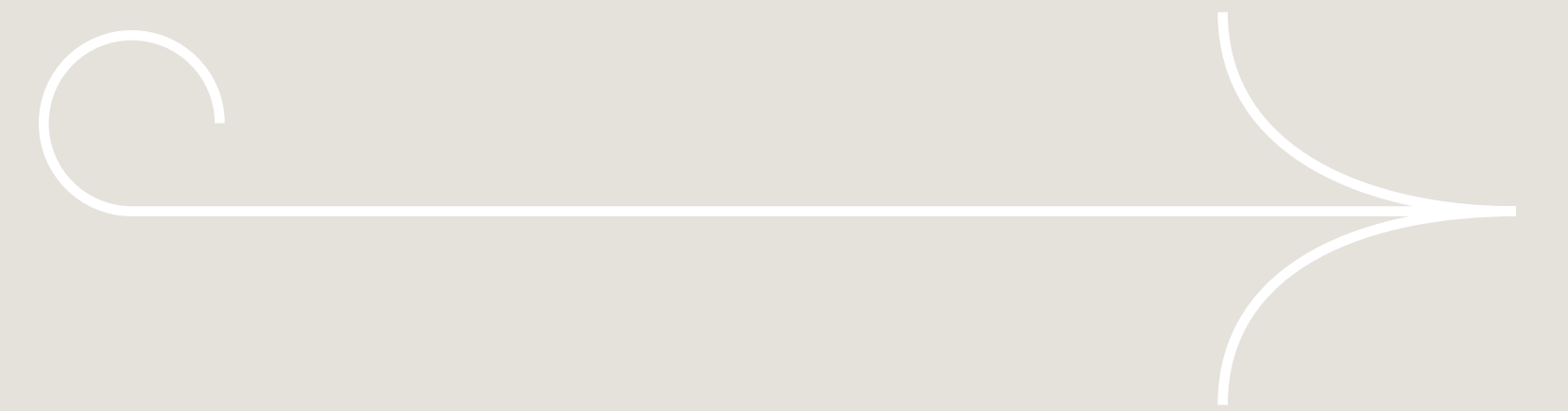
The University remains faithful to its first motto from 1970 - *in mari via tua* („your way in the sea”). Marine authority of the University is built by internationally renowned research stations and the academic course, specializations and research related to the marine issues and Baltic coast that respond to the dynamically changing business world.

Conversely, offshore wind energy sector is an enterprise of an extraordinary potential, implementation of which is scheduled for the next several decades. It is estimated that this industry can create several dozen thousands of workplaces and secure tax revenues equal to more than a dozen billion PLN within ten years. Development of the offshore wind energy in Poland requires education of the specialist personnel in many domains, not only technical ones, what opens new opportunities for the cooperation between the business and academic worlds in the area of the research and educational projects. **University of Gdańsk approaches this issue in a strategic manner, and thanks to its experience and openness to changes it becomes a future partner for the enterprises and institution of the OWE sector.**



in mari  
via tua

# Your development partner







**University of Gdańsk is a signatory of the Sector Agreement for the Development of the Offshore Wind Energy in Poland - *Polish Offshore Wind Sector Deal***

The objective of the Agreement is to introduce and implement common actions aimed at the development of the offshore wind energy in Poland based on the maximization of the participation of Polish entrepreneurs in the supply chain for the offshore wind farms constructed in the Polish exclusive economic zone „**local content**”. Within a large and steadily growing group of signatory one can also find:

- universities
- research and development institutes.

**The signatories of the Agreement create a standing framework of the cooperation in the area of the development of the offshore wind energy in Poland, working towards securing economic development, and increasing the competitiveness of the Polish entrepreneurs, as well as the economic and power security of Poland, based on own, stable, zero-emission energy sources, namely the offshore wind farms.**

University of Gdańsk, as a unit of a high interdisciplinary research potential and possessing wide experience in the cooperation of both European marine universities within the framework of SEA – EU consortium and local social and economic environment, offers enterprises a support in the analyses, research, good practices promotion etc. The cooperation will allow the implementation of the R&D results, and will increase the share of Polish entrepreneurs in the supply chain for the offshore wind farms being constructed in the Polish exclusive economic zone.

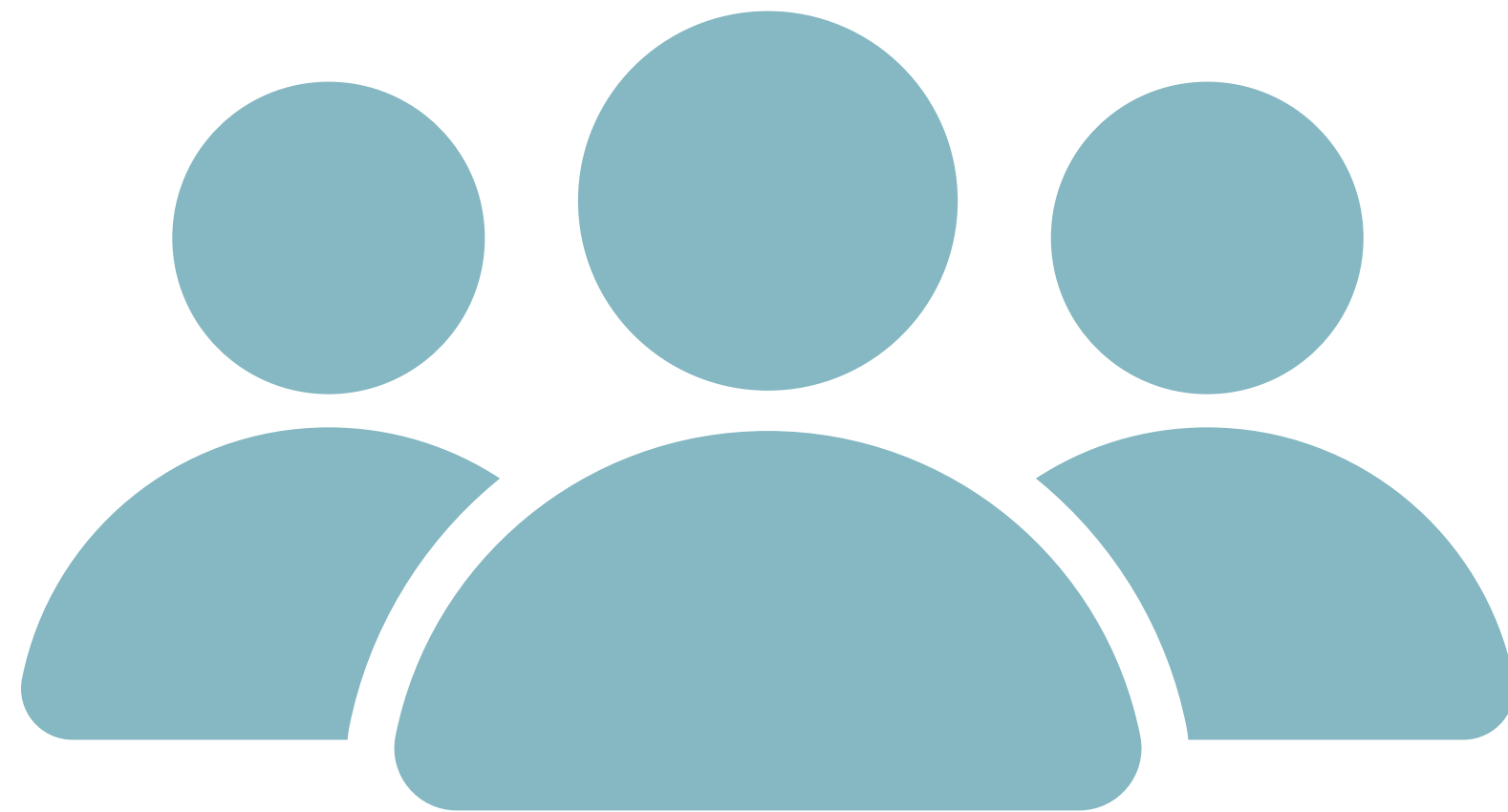
University of Gdańsk also has representation within the **Coordinating Council of the Ministry of Climate and Environment** that monitors the implementation of the Agreement and leads one of the key

task groups of the Agreement, namely Group 5 that is responsible for Public Education and is headed by UG Professor Sylwia Mrozowska, PhD, Deputy Rector for Cooperation and UG Development.

Additionally, University of Gdańsk is a member of the **Pomeranian Platform for Offshore Wind Energy Development in the Baltic Sea**, which already has more than 100 signatories, including local government units, research and business institutions, business environment units, and representatives of business from the wind energy, power, and offshore industries.

Representatives of the Sustainable Development Centre of the University of Gdańsk, along with the representatives of the Gdańsk University of Technology, Marine University, Shipbuilding Technology Centre, Industry Development Agency, Starter Incubator, Interizon Cluster and Energy Institute form the **Council for the Offshore Innovation**, tasked with e.g., **utilization of the local R&D potential** in the dialogue with the investors and employers from the offshore industry.

Researchers from the University of Gdańsk also lead the Baltic Sea Sustainable Management Group within the Platform. One of the main tasks of the group is to engage regional and local entities from the social and economic environment in the actions aimed at sustainable management of the sea, including the offshore wind energy.



**University of Gdańsk treats the offshore wind energy sector strategically**, taking into account the possibility of using the results of the research conducted at the university and the development of the potential labour market for its graduates. Wide offer of the university addresses many needs of enterprises and institutions in OWE sector.

#### **Support for planning and implementation of the offshore projects**

As a development partner we offer a full support on every stage of the project. In regard to project planning and implementation, we offer cooperation in the scope of:

- economic and financial forecasts;
- business plans and feasibility studies;
- operational, technological and economical audits;
- market analysis and comparative analyses;
- evaluation of the infrastructure projects and the social costs and benefits;
- estimation and evaluation of the influence of the variability of key project parameters;
- zoning plans for the Polish marine areas within the framework of the analysis of potential spatial conflicts.

#### **Legal expertises and consulting**

Legal area is one of the fields of cooperation between the University of Gdańsk and businesses. We offer expertises related to the international and local marine law, sea law and law of marine environment protection. Within this field of specialization, expertise and consulting offer of the University of Gdańsk includes the preparation of:

- projects of legal acts related to offshore;
- legal opinions;
- normative analyses.

#### **Support of the International Centre for Theory of Quantum Technologies**

The offer of the *International Centre for Theory of Quantum Technologies* (ICTQT) for the OWE sector includes:

- Secure communication delivered via optic technologies;
- traditional and (post)quantum cryptography;
- quantum distribution of the cryptography keys;
- quantum random number generators for securing the communication in the critical infrastructure;
- practical options for encryption of wind farms and other critical infrastructure;
- selection of quantum cryptography solutions for offshore wind farms;
- experimental estimation of the required key change times and encryption/decryption times for the communication in the wind turbine devices;
- development of the open, optical quantum communication channels shore2sea and/or air2sea.



### **Pre-investment and post-investment environmental research**

The Faculty of Oceanography and Geography of the University of Gdańsk specializes in research and environmental expertises that are very important from the perspective of marine projects and are aimed at preparation of the comprehensive report on the environmental impact on various project stages. Said research includes, but is not limited to:

- bathymetric, sonar, magnetometric, and ROV studies;
- detection of the geological structure and shape of the seabed;
- testing of the chemical parameters of the seawater and seabed sediments, including the microplastics marking in the marine samples;
- biodiversity studies that encompass the assessment of the number and distribution of benthic organisms, marine mammals, ichthyofauna or sea birds;
- study of the marine environment hydrodynamics.

Faculty of Biology of the University of Gdańsk has at its disposal a professional staff and research and academic equipment allowing the environmental expertises related to both terrestrial and marine areas. Faculty of Biology personnel have a long-time experience in the scope of pre-investment and post-investment research related to the offshore projects, specifically related to:

- biodiversity studies of the coastal habitats of the plants and animals (vertebrates and invertebrates, including birds and bats), taking into account the species status (protected and endangered, but also foreign or invasive);
- studies of sea bird and bats migrating across the Baltic Sea;
- studies of the natural habitats diversity, including the degree of preservation, resources and protection possibilities;
- environmental monitoring (post-delivery monitoring), as well as supervision of the natural environment.

Faculty of History - Institute of Archaeology - specialises in research and expertise in protecting archaeological and cultural heritage.

These include:

- archaeological site queries,
- field research,
- assessments of investment and infrastructure interference in conservation zones,
- counselling on the preservation of archaeological and cultural heritage.

### **Economical and managerial support**

Another area of specialization of the University of Gdańsk are the issues related to strategy, project value or monitoring of the projects stages, as well as those related to the position of OWE in the social and environmental ecosystem. As Your future partner, we offer:

- research and expertises related to the formulation of the offshore farm strategy and its monitoring;
- research related to the value measurement, international good practices and general finance and economical project assessment;
- research related to the monitoring and auditing, as well as the efficiency assessment of the project;
- analytical support in the supply chain management and logistic aspects;
- analyses and expertises for the OWE sector in the context of the responsible business, environmental aspects and macroeconomic environment.



University of Gdańsk has a rich education offer encompassing the first-cycle and second-cycle studies, as well as the postgraduate studies, that is available to entities related to the energy industry to educate personnel for the purposes of the enterprises in the OWE sector.

- **Administration** - at the Faculty of Law and Administration at the University of Gdansk, an education in the field of administration is conducted within three-year first-cycle studies (bachelor's degree) and two-year second-cycle studies (complementary master's studies). During their studies, students acquire the knowledge and skills necessary in public administration and the private sector, allowing them to pursue careers in national and local government bodies, as well as non-governmental organisations and offshore sector enterprises.
- **Applied physical oceanography** – 2nd cycle studies practical program at the Faculty of Oceanography and Geography, planned to be launched in the academic year of 2023/2024. The curriculum has been created in cooperation with the OWE sector entities. Graduates will be prepared to work in the offshore industry enterprises engaged in the activities related to the planning, running, maintenance and management of the projects in the open sea and coastal zone.
- **Archaeology** (I and II cycle studies) graduates possess knowledge, skills and competencies in general and practical issues related to protecting archaeological and cultural heritage. Graduates acquire knowledge of, e.g. field research methodology, cultural heritage protection, underwater archaeology and the application of GIS in archaeological research.
- **Biology** (1st and 2nd cycle) – program realized by the Faculty of Biology. It provides valuable skills and competences, such as: conducting and documenting research, practical utilization of the organism systematics and specialist terminology, expertises related to plant and animal life, understanding the interactions between the living organisms and abiotic environment, knowledge and ability to properly

select research methods, techniques and tools to laboratory analyses and field work, working experience in modern laboratories. Graduates of Biology program will be prepared for work in biological, medical and industrial laboratories, biotechnology companies, research facilities, institutions dedicated to shaping and protection of natural environment, ecology education centres, field research stations and in education.

- **Business and ecological technology** (2nd cycle) – an interdisciplinary program realized at the Faculty of Economics and aimed at providing the graduates with the interdisciplinary knowledge, skills and competences related to the economic sciences, environmental protection and ecological technology. Business and ecological technology studies prepare graduates for employment in the enterprises, organizations and institutions operating in the ecological industry. Future graduates acquire knowledge in the field of economics and ecology, as well as the skills and social competences allowing them to use the acquired knowledge in economic practice.
- **Computer Science** (first and second-cycle studies) at the Faculty of Mathematics, Physics and Computer Science - The studies prepare graduates to work in the IT industry in roles related to software development and designing computer system. Graduates have a solid foundation in algorithms, Big Data, artificial intelligence, and applications of mathematical methods in computer science. At the master's level, there is an opportunity to graduate in an area related to the development and implementation of mathematical models of marine wave phenomena used in the design of wind farm infrastructures. The widespread use of IT tools and the need for research and development of innovative solutions in the offshore industry offer significant employment opportunities for graduates in this sector.



- **Education for the sustainable development, Offshore Wind Energy post-graduate studies** – realized at the Sustainable Development Centre at the UG. Education is aimed at the transfer of knowledge related to the offshore wind energy, global energy security, and the tools required for development and management of the potential presented by the offshore wind energy.
- **Environmental protection** (1st and 2nd cycle) or the inter-faculty course (Faculties of Chemistry, Biology, Oceanography and Geography). Graduates receive an interdisciplinary knowledge, skills and competences related to the general and practical issues related to the environmental protection, specifically marine environment. They are also specifically equipped to analyse and assess the environmental impact of the most important natural processes.
- **Geology** - studies in this field of study make it possible to acquire knowledge allowing to understand geological, biological, chemical, and physical processes occurring in nature at present and in the past, to master the ability to obtain information necessary for the interpretation of causes and effects of geological processes and to analyse data using statistical methods. Laboratory and field classes develop skills in performing geological measurements and observations, preparation of specialized geological documentation, organization and conducting of basic work, e.g., for the needs of construction, exploitation of useful minerals, and environmental protection, including the seashore. In 2021, the studies received a positive evaluation score from the Polish Accreditation Commission.
- **International Economic Relations** (1st and 2nd cycle) – program conducted at the Faculty of Economics within the international transport and marine trade specialization. Interdisciplinary curriculum merges the economic, finance and management courses, preparing the graduates to work in an international environment.
- **Law** - at the Faculty of Law and Administration of University of Gdansk, an education in the field of law is provided in the form of a five-year master's degree programme. During their studies, students acquire knowledge and skills necessary in legal professions and allowing them to pursue legal careers in the offshore enterprise sector.
- **Marine hydrography** (Engineering 1st cycle studies, practical profile), an inter-university program (Faculty of Oceanography and Geography at UG, Polish Naval Academy of the Heroes of Westerplatte in Gdynia). Graduates are prepared to conduct hydrographic works that include e.g., bathymetric and sonar surveys in the coastal zone, ports, open waters and landlocked bodies of water, necessary to conduct any operations at sea.
- **Marine OFFSHORE sectors (MSO)** – 2nd cycle program, realized at the Faculty of Economics in partnership with the regional self-government and Grupa Energa S.A., RWE Offshore Wind Poland and BOTA Technik companies, and addressing the demand for the education of the analytical and managerial staff possessing skills required to operate on the innovative offshore sectors market. This program allows graduates to acquire unique competences needed to work with public and private entities in the field of preparation and implementation of the offshore sector projects. Graduates receive knowledge in the field of economics, functioning and organization of the business operation in the marine areas (i.e., offshore oil and gas, offshore wind energy, marine and coastal tourism, aquaculture and fisheries, commercialization of the marine biotechnology and research, interpreting the results of environmental reports for the marine projects, marine economy, rules of sustainable development, marine spatial planning, logistics and supply chains in the offshore marine sectors, specifics of locational decisions and selection of the areas for marine projects, business model resulting from the economic and financial ties between the local and international enterprises and institution, operational and strategic management, as well as planning and realization of the projects in the marine offshore sectors.
- **Mathematical Modelling and Data Analysis** (first and second-cycle studies) at the Faculty of Mathematics, Physics and Computer Science. An interdisciplinary field combining mathematics, physics, and computer science. Graduates possess skills in constructing mathematical models for many current global problems, design, and performance of numerical calculations, using modern data processing techniques and applying appropriate statistical methods.



A long-term **cooperation between UG and businesses** resulted in the collaboration with numerous enterprises and institutions in the field of educational offer. Teachers employed at the University of Gdańsk include representatives and employees of such entities as: Omida Logistics, LPP, ING Bank Śląski, Santander Bank, Boeing, Lech Wałęsa Airport, Flex, Unilogistics, Polish Accountants Association, National Revenue Administration, Polsat Plus Arena, Bayer, State Street, Administration of the Marine Port in Gdańsk, Administration of the Marine Port in Gdynia or Public Transport Administration in Gdynia.

- **Natural resources protection** (1st cycle) – a program realized at Faculty of Biology, providing a crucial knowledge in the areas of: management of the biological natural resources in the naturally valuable regions, operational rules of local and European natural conservation networks and programs, legal, economic and practical aspects of nature conservation while maintaining the sustainable economy and biological diversity, natural resource management, plant and animal life requirements in urban areas, and the landscape architecture. Graduates receive interdisciplinary knowledge related to: endangerment of the natural resources, legal economic and practical aspects of nature conservation, while maintaining the sustainable economy and biological diversity, identification of ecosystems and plant, animal and fungi species, history of natural environment processes, methods of natural inventory, evaluation and monitoring, creation and usage of modern tools of spatial data collection and analysis (GIS), procedures of the evaluation of the project environmental impact (OOS), renaturalization and restitution of the ecosystems in naturally degraded areas, ability to receive funding from the financing sources for the environmental projects.
- **Nuclear Safety and Radiation Protection** (first-cycle studies) - an interdepartmental interdisciplinary course of study conducted at the Faculty of Mathematics, Physics and Computer Science in cooperation with the Faculty of Chemistry. The studies prepare students for shaping the nuclear safety policy and maintaining radiological protection, as well as for work within supervision and control of the trade and use of radioactive substances and ionizing radiation.
- **Oceanography** (1st and 2nd cycle) with the following specialization: biology, chemistry, physics and marine geology. The studies are conducted at the Faculty of Oceanography and Geography of UG. Graduates receive up-to-date knowledge in the field of oceanography, allowing proper understanding of the phenomena and processes occurring in the marine environment, what enables them to conduct research related to marine environment, natural environment monitoring or process modeling, as well as to see opportunities for the innovative and sustainable utilization of the natural resources.
- **Physics** (first and second-cycle studies) at the Faculty of Mathematics, Physics and Computer Science. Graduates have a comprehensive knowledge of physics, mathematics, and their applications, as well as the ability to see and independently solve theoretical and practical problems. A degree in Physics opens a wide range of career opportunities in many fields, including the broader green energy sector. Physics graduates can analyse processes occurring in nature, so their knowledge and skills are useful in interdisciplinary research committees, including the ones dealing with renewable energy sources. Physics graduates are familiar with the latest research methods, techniques, and research tools, and can select them adequately for specific research problems. As a result, graduates are prepared to work in modern scientific, research, industrial and implementation laboratories. Physicists are prepared not only to use existing tools for collecting and analysing measurement and observational data, but also to create new tools themselves, adapted to the needs of a specific project. Knowledge of physical and therefore natural phenomena also enables physics graduates to work in institutions dealing with ecology, including green energy and its promotion.
- **Post-graduate GIS studies** – Geographic Information System in its various applications, data visualization, modern cartography, creation of maps and GIS projects. Program realized at the Faculty of Oceanography and Geography of the UG. Graduates are highly qualified for the work with ArcGIS Pro environment with Spatial Analyst and Geostatistical Analyst add-ons from Esri.





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Wind Energy

Contact us 

Write us about potential collaboration