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EUNICoast

The European University of Islands, Ports and Coastal Territories!

ABSTRACT BOOK

Preprints

EUNICoast ONLINE WORKSHOP

Erasmus Blended Intensive Programme

27th SEPTEMBER 2024

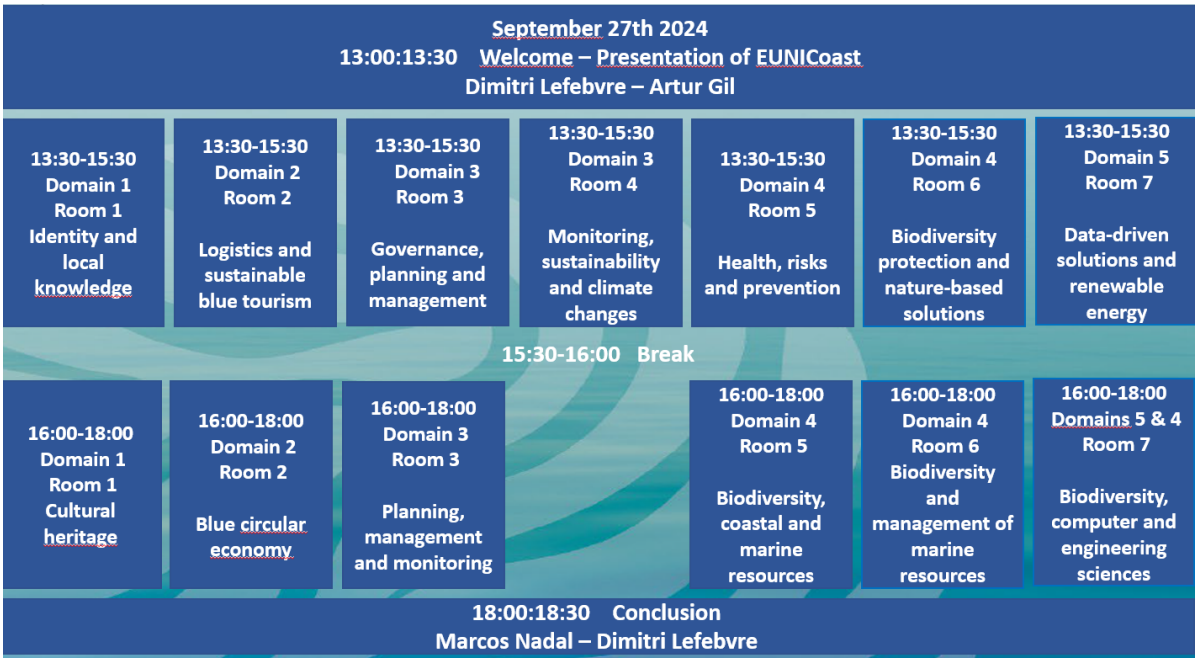
Conference chairs

Artur Gil – Uac
Dimitri Lefebvre – ULHN
Marcos Nadal – UIB

Program Committee

Claudia Crosio – UNISS
Sandrine Danger – ULHN
Marta Villalba Lázaro – UIB

Programme at a glance



1.10 pm – 1.20 pm: Plenary session - brief presentation of the history, narrative, and objectives of the EUNICoast project: Prof. Dimitri Lefebvre, Deputy vice-president Quality and International Cooperation in Research, Université Le Havre Normandie - EUNICoast coordinator

1.20 – 1.30 pm: Pleanary session - brief presentation of the domains and hubs and introduction to the program of the conference: Prof. Artur Gil, Vice-Rector for Science, Innovation, and Knowledge Transfer, University of the Azores

6.00 – 6.30 pm: Closing session – Brief presentation of the second part of the BIP at UIB: Prof. Dimitri Lefebvre and Prof. Marcos Nadal Roberts, Vice-Rector for the strategic planning, internationalization and cooperation, University of the Balearic Islands

Domain 1: 1.30 – 3.30

Identity and local knowledge

Title: Blue Education as a driver for local ecological knowledge empowerment

Martina Gaglioti
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This contribution is based on some bottom-up initiatives conceived both in Europeand beyond to address the main environmental challenges linking scientific background with local ecological knowledge in the final goal to enforce the contribution in the blue education mission, both in formal and informal contexts. The field work performed intercepted different contexts both in Italy and in Kenya linking different perspectives and cultural backgrounds to effectively contribute to the delicate mission of blue education and shape the future steps of this crucial segment of the ongoing Ocean-related efforts.

Title: The identity and Distinctiveness of the Classified Sites: the case of the Azores Archipelago

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The preservation of immovable cultural heritage is an ongoing challenge, especially in island regions where natural and human factors can accelerate the degradation process. The Azores Archipelago, located in the heart of the Atlantic Ocean, stands out for its unique characteristics, where the sea, nature, and culture blend together. The archipelago, in perfect harmony with the ocean surrounding each of the nine islands, showcases a rich and unique landscape and cultural heritage on each island.

The sea exerts a profound influence on the way of life in the Azores, shaping its culture and economic activities. The nature of each island, with unparalleled beauty sculpted by volcanic activity, provides a unique landscape heritage. Each community preserves and perpetuates its cultural values, keeping its identity and traditions alive, which makes the Azores a unique place.

This coexistence in perfect harmony with human interventions includes classified ensembles that range from historical buildings to unique cultural landscapes. These classified ensembles are fundamental to the region's identity and economy, particularly through cultural tourism. However, the conservation of these sites faces significant challenges due to adverse environmental conditions, such as high humidity, seismic activity, and coastal erosion, as well as the pressure of urban development.

Title: Azorean whaling. The identity and cultural heritage of whaling on the islands of Terceira, Graciosa and S. Jorge.

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Memory is a complex and peculiar mental structure. It not only allows the recording of events but also their subsequent recall, depending on the impact it had on the subject's social and mental structures, whether individual or collective, and is influenced by the individual's pre-conceived references, combined with emotional and affective factors, which serve as a trigger for the awakening of previously recorded memories. Therefore, some episodes are preserved and others forgotten because memory is neither static or linear, it is constructed and reconstructed consecutively in a dynamic way and Man only allowed to remember what takes a symbolic and affective value, which makes sense, which is common. or serves as a cohesion factor.

In the context of collective manifestations, the people memory is nothing more than a reminder, conscious or not, of a lived and mythologized experience, which constituted their identity and which distinguishes them in a positive way from others. They are heroic accounts of their origins, their deeds and their stories that are perpetuated and continually manifested over time by descending generations, through commemorative rites that remember the past.

The result of this mythification is the continuous commemoration of collective events that make up symbols that, in turn, are collectively built and made aware and translated into a high sentimental value and sense of belonging, both local and national, due to the meaning they assume at an identity, memorial and heritage level. This is the case of Azorean whaling and its impact on the identity construction of the Azoreans who participated in or keep memories of the golden times in which the whale was the torment, but also the sustenance of its people.

Highlighting the fight against the titan of the seas, in contemporary times the memory of this labour remains alive in the people of the islands Terceira, Graciosa and S. Jorge, in the continuous cultural manifestations that make it an indelible landmark of their collective identity. On these islands, whalers are honoured, sea regattas are held, sperm whales are defended, itineraries are remembered, boats are restored, *lookout's posts* are preserved and the sea is respected.

Not only these past labours are remembered, but for the tourists and locals, the history and memory are rewritten and the heritage of this activity is valued, which, across the entire archipelago, is definitely a landmark of the Azoreans identity and their maritime past.

Title: The Human Dimensions of the Sea: a Teaching Course on the Social Constructions of the Maritime World

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Microcredential course that addresses the application of theoretical concepts developed by blue humanities and maritime archaeology, history and anthropology- how the sea must always be understood as a social space structured by particular forms of perceiving the environment at the cultural, symbolic, and historical levels ; a medium where certain relationships between space, knowledge, and power are generated, which have a significant impact on the interactions established between human communities and their maritime-coastal environments.

Title: The Patrimonialization of Maritime Culture: A Teaching Proposal

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Micro-credential teaching proposal whose main objective is to train those professionals, academics and university students interested in the theoretical and methodological foundations applied in the generation of maritime heritage. The proposed course is structured into three main modules that interconnect the most tangible and intangible aspects of this type of heritage, as well as the agents and discourses involved in its construction.

Title: "Education and Development in Sardinia: A Model for the Historical Analysis of Investment in Human Capital."

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This contribution aligns with the theme of "Identity and Local Knowledge" within the Eunicoast network by adopting a rather peculiar perspective: analyzing the spread of education in southern Italy, particularly in Sardinia. Here, we present the methodologies of a national research project to investigate the historical relationship between education and development. The objective of this brief communication is thus twofold: on the one hand, to present the outcomes of a five-year research effort conducted by four universities and over twenty colleagues; on the other hand, to attempt to develop our research methodology on an international level by seeking partners willing to collaborate and continue the project.
The quantitative perspective we have chosen, based on collecting data from municipal historical archives to analyze the dissemination of literacy, is believed to be useful in addressing current issues such as depopulation, loss of identity, and school dropout rates. The correlation between education and development is undoubtedly an element that deserves significant attention from the academic world, as only investment in human capital can help tackle the challenges faced by fragile contexts like islands.

Domain 1: 4.00 pm – 6.00 pm

Cultural heritage

Title: Mapping the Azorean Islands and Unlocking the Innovative Potential of Cultural and Creative Industries for Sustainable Tourism and Community Development

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The IN SITU project, a HORIZON 2020 project, focuses on the study of cultural and creative industries in European non-urban regions, one of them being the Azores. This presentation aims to explore place-based innovation of cultural and creative industries in the Azores, by identifying challenges, resources, and needs of its cultural ecosystem. This mapping was conducted using qualitative and quantitative techniques, including participatory methodologies. The process involved participatory workshops, Speak Out sessions, and focus groups, along with continuous development in online meetings, creating a network of local actors and stakeholders from various sectors.

Cultural mapping serves as a systematic process for delineating cultural resources, networks, and patterns of utilization within a community. It provides indispensable insights to guide collective strategies and planning processes, while also promoting cultural identity, and community vitality, and enhancing the sense of place and quality of life. In the context of the Azores, these activities contribute to a deeper understanding of the local cultural heritage, thereby facilitating the development of initiatives that value and preserve these resources. The integration of cultural mapping with creative tourism in the Azores presents a compelling synergy for regional development and sustainable tourism. Creative tourism, with its emphasis on creating immersive and authentic experiences, aligns with the principles of cultural mapping by valuing intangible resources. This form of tourism not only celebrates cultural heritage but also fosters local economic growth by promoting innovative tourism products and services. Thus, the Azorean communities can enrich their identities, promote cultural interaction, and reinforce local economies, establishing the region as an attractive and distinctive tourism destination.

Title: Sea food and cultural reproduction of gastronomic intangible heritage. A case study in Mallorca

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How people grow and process Seafood is mired in actions rooted in cultural traditions and social histories. Following UNESCO definition of intangible heritage, cultural aspects of food focus on traditions, social practices, symbolic processes and how the preservation of intangible heritage is communicated through generations. From this point of view, different social groups and actors are implied in a particular community.

Exploration of food takes into account social and cultural aspects of food processes and focuses on how the preservation of intangible heritage is communicated through generations, highlighting the people who continue to preserve these traditions today in a small touristic town in Mallorca.

Food systems are complex phenomena regarding biological and psychological dimensions, although it can be studied from a sociocultural perspective since food culture is an intrinsic aspect of identity. As sociocultural acts and beliefs, food practices relate to particular groups and since they define everyday communal relationships, food culture becomes an intrinsic aspect of identity. What's more, seafood is not only a group of diverse edible fishes but cultural processes of products whose origins are based on a living complex where some traditional fishing knowledge still remains despite the modernization processes and the fragility of oral memories.

The description is based on qualitative field research carried out during summer 2020. The main instruments were semi-structured face to face interviews involving fishermen, their wives, and fishmongers, as a way to know cultural representations and daily life habits and practices.

Title: Environmental sustainability and circularity of resources in building sector

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This contribution investigates the integration of New European Bauhaus principles and European Communications to promote environmental sustainability and resource circularity in building sector within historical and coastal settlements. Starting from general data coming from European and international surveys, focused on reducing waste and limiting resource consumption, the study advocates for the adoption of circular economy strategies, particularly within the building and construction sector to find and ensure new living conditions in preexisting settlements. The approach centers on the efficient use of raw materials by assessing and mapping existing structures and materials coming from pre-existing settlements. By doing so, the study aims to extend the lifecycle of building components through reuse, refurbishment, and recycling, ultimately lowering the demand for new resources.

This method was firstly piloted in small villages in Sardinia, where the rich architectural and historical heritage offered a valuable opportunity to implement and test sustainable refurbishment practices. The success of this experiment underscores the potential for broader application in coastal settlements across Europe, where similar challenges of preserving cultural identity and landscape while ensuring environmental responsibility are faced. The approach not only contributes to resource efficiency but also fosters the development of aesthetically pleasing and culturally sensitive living spaces, in line with the New European Bauhaus vision of uniting sustainability, inclusion, and beauty in urban and rural planning.

Title: Community development and the transformative mission of Universities

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European as well national and international Higher Education (HE) policies acknowledge the need for a reframing of relationships between society, science and innovation which implies inclusive governance to ensure co-responsibility. Public and Community Engagement with Research, as well as Open Science are main components of increasing efforts aimed to this end.

Growing financial and operational support to such components requires a two folded effort on the side of researchers and HE Institutions (HEIs): 1. Develop a better understanding of science-society dynamics and their implications for HEIs; 2) Foster the transformative role of HEIs by identifying and implementing the institutional and political strategies needed to this end.

Literature acknowledges that a great diversity of practices falls within most widely accepted definitions of Public and Community Engagement of HEIs and evidences an increasingly vague definition of terms and expressions (Weingart et alii 2021). In this respect, the paper will provide a conceptual focus on transformative community engagement and its practical implication for institutional change of universities.

The expression “transformative engagement” will be framed to refer to community-university relations explicitly aimed at engendering genuine societal change. Hence the reference to the transformative mission of universities to affirm the societal role of these institutions.

Title: Relations between Sardinia and the other islands of the central western Mediterranean during the Bronze and Iron Ages

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Relations between Sardinia and the other islands of the central-western Mediterranean during the Bronze and Iron Ages consist of rare exchanges of materials, while the closest aspect is the similarities established between the dry-stone architectures.
The contribution intends to focus on the direct relationships between the islands, but also on the so-called indirect ones, i.e., represented by similarities and analogies in monumental stone buildings and funerary structures and, albeit to a lesser extent, with ceramic and metal artefacts.
Such contacts are an important indicator in relation to the navigation over short and long distances that islands necessarily had to practise in order to establish trade and cultural relations cultural relations both with other insular territories or with continental territories.

Title: Gastronomy of the Azores islands: food as a cultural and identity mark.

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Gastronomy is associated with a basic human need, but it also has a very relevant cultural and identity involvement. To study the gastronomy of any region is to explore the relationship between cuisine and society, because food and the way it is cooked or tasted reflect a historical period, the community in question and the societal or civilizational habits themselves. On the Azores islands, History and Geography have contributed to building a society that has maintained, until the present day, the heritage brought by the first settlers and the lessons learned from outsiders who passed through or with migrations. All of this has left deep traces in the island's food, from typical dishes to conventual and traditional sweets. Azorean gastronomy is now a hallmark of these islands and a cultural heritage of great tourist interest. We intend to analyze the persistence of the Azorean History and Culture in local gastronomy, based on sources, bibliography and the reaserch made by the TASTE Project team (a partnership between CEEAplA and CHAM – University of the Azores.

Domain 2: 1.30 pm – 3.30 pm

Logistics and sustainable blue tourism

Title: Water Consumption and Tourism Development

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Water is a key resource for the tourism sector. Accordingly, hotels place written messages in their rooms aimed at saving water. Research on behavioral interventions to promote water conservation among hotel guests have been mainly focused on towel reuse, with only a few studies aimed at nudging guests to reduce water consumption. Research on interventions to encourage in-room water conservation behaviors through boosts – fostering people competences to exercise their own agency – is even scanter. We examine the impact of informative messages – such as, water scarcity at the destination and best practices to reduce water consumption at hotel bathroom – on hotel guests' water consumption.

Data related with room water consumption was collected via digital meters. We conducted a field experiment in Majorca, during the summer 2022 and 2023, at 14 identical hotel rooms equipped with digital water counters. In the treatment rooms, guests were exposed to the designed informative message. In the control condition, rooms had no water saving information. The results show that the informative message (vs. no information) had no impact on water savings. Moreover, a post-stay survey showed that the intervention had no effect on guests' hotel perceptions. Our findings show some limits of behavioral interventions, and in particular of boosts; and give rise to some provocative research questions on when and how information can promote a more sustainable guest behavior. The results have relevant implications for managerial and public policy. The results can be used in order to adapt in room messages to make a more effective effect on tourist behavior related on water consumption. This issue is highly relevant at those destinations with sever fresh water problems, characteristic shared by many tourist destinations in the world.

Title: Site evaluation of coastal-marine-based tourism activities in the Azores

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The Archipelago of the Azores has a high potential for tourism differentiation at an international level due to its distinctive and unique characteristics and natural beauty. Seascapes have high biological diversity, ecological and economic connectivity, and aesthetic and cultural value, although seldom subjected to assessments. Additionally, marine geological heritage has been only occasionally exploited by Azorean companies, mainly because there is a lack of data about underwater geodiversity, geological heritage, and its valuation, for recreational purposes. This study aimed to analyze visitors' perception regarding the importance of seascapes' features and their value, more specifically: a detailed and full characterization of selected coastal and underwater trails for tourism and a valuation of seascapes for tourism and conservation purposes, including visitors' perception regarding the seascape features. In the context of species conservation and ecosystem protection, it is important to increase users' and stakeholders' knowledge of the natural value of the assets to promote sustainable use of the ocean and marine life. A questionnaire and interview-based surveys were designed to assess the users' perceptions (scuba diving operators, tourists, and local users) regarding coastal-marine-based tourism and its attributes. Each site was analyzed based on a general score and individual criteria, highlighting the features that are more valuable at each site (e.g., biodiversity, geodiversity, geological features).

Title: The Sustainable and Blue Yachting

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The maritime tourism sector has a marked importance for achieving the objectives of the Blue Economy, especially in island regions such as Sardinia. As mentioned in the report published by the European Union "European strategy for greater growth and employment in coastal and maritime tourism" maritime and coastal tourism generates approximately 180 billion euros of GDP, thus representing the largest maritime activity in Europe. Therefore, it requires a sustainable approach from an economic and environmental point of view (European Commission 2014). Cold ironing, a sustainable and innovative approach to the marine management, improves energy efficiency and reduces emissions within ports (Brundu et al., 2023). In this matter, the Regional Plan of the Network of Tourist Ports (PRRPT) of Sardinia is seen as a tool for the development of Yachting of the island (Regione Sardegna 2020). Thus, by placing sustainability and the protection of the environmental heritage at the center of its policy, the PRRPT, is seen as a strategic factor of economic growth (Regione Sardegna 2023). Furthermore, Yachting represents a good part of luxury tourism as well (Brundu et al. 2018; Nautica Editore 2018). Thus, this research, which is focused on the Sustainable and Blue Yachting Tourism, will offer innovative strategies for the sustainable conversion of nautical tourism related to Yachting in Sardinia.

Title: From seaside to landside: optimizing the port operations

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Cargo management in port logistics involves a complex sequence of operations, from the ship arrival/departure to the cargo entrance/exit of the terminal and the connection to the hinterland. Efficient processing of each operation and good coordination between each layer of the network are critical to strengthening the attractiveness of a port, particularly in terms of waiting time. In this presentation we consider three illustrative problems. The first one is the berth allocation problem which consists in assigning a quay position and a time interval for each ship so as to minimize the total downtime. Variants including additional features such as uncertainties on the ships' arrival time, or the joint assignment of cranes are also addressed. The second problem also focuses on the berth allocation, coupled with vehicle flows management for ro-ro terminals. Finally, the last problem deals with the optimization of containers transportation from/to the hinterland considering the truck appointment system (capacity of the terminal gates). For each problem, we propose an optimization model, before presenting the methods as well as a reflection on the integration of the computed solution in the global port logistics chain.

Title: The Geography of Touristified Territories

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The outbreak of the 2008 crisis triggered important socio-economic changes. That crisis was fixed, among others, through the intensification and expansion of the spatial logics of tourism, a process known as touristification. In parallel, platform capitalism has been spreading ever since. The combination of platform capitalism and touristification has led to a dramatic transformation of many spaces around the planet. Some authors therefore speak of a process of Planetary Touristification. The tourism commodity frontier has not only spread to new spaces that previously were not previously touristic, but has revolutionized the already existing touristic spaces. In addition, inequality was another dimension that intensified with the 2008 crisis. Thus, touristification and inequality are two parallel processes that have been highlighted in recent years, and especially in 2024, with growing social discontent. This social discontent crystallizes particularly in conflicts around housing in touristified areas.

The COVID-19 pandemic caused the worst touristic crisis in history. This was due to the disruption of global mobility and human concentration. These are fundamental conditions for tourism. However, the COVID-19 crisis illustrates another fundamental issue: the social metabolism of touristified spaces. Social metabolism refers to the provision of natural resources, their transformation and their disposal in the form of waste. The interruption of global mobility affected international trade and, especially, islands highly specialized in tourism production struggled to cover imports of basic goods. The coroncarisis, like any capitalist crisis, was therefore a moment in which social contradictions emerged. In the case of the most highly touristified areas, particularly islands, those contradictions could be summarized as follows: on the one hand, an extreme high dependence on foreign tourist flows for the functioning of the monetary economy; on the other, an extreme dependence on imported materials for the functioning of the social metabolism. A major social problem was the increase in inequality, and even poverty, in those areas that were already very unequal. As a result of these contradictions, highly touristified spaces could be defined as intensively vulnerable. Finally, according to authors such as Johan Röckstrom and his colleagues, the COVID-19 crisis and its impacts will be dwarfed by the potential impacts arising from the translimitation of the planetary boundaries.

Title: How to prolong the tourism season? Challenge Inventory study among small and medium-sized entrepreneurs in the Northern Baltic Sea region

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This challenge inventory report gives an insight into how entrepreneurs perceive challenges and opportunities in regards to seasonal variation in tourism business in coastal areas of Finland, Sweden, Åland Islands, Estonia, Latvia and Lithuania. The purpose of the Light in the Dark SME Challenge Inventory is to find out which challenges small and medium-sized enterprises (SMEs) in the Northern Baltic Sea Region face and to find out what kind of visions businesses have about future tourism products and activities, especially during off-season. Which solutions or new ideas can the entrepreneurs foresee? The challenge inventory also seeks to identify activities needed by key stakeholders, e.g., DMOs and business support organisations and other supporting service providers, in order for the SMEs to create new successful service products outside the traditional summer season.

Title: “Assessment of tourism carrying capacity in world heritage coastal destinations: The case of Dubrovnik”,

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In 2023. The team of Faculty of Economics and Business, University of Dubrovnik produced analysis of carrying capacity assessment of the UNESCO World Heritage Site Old City of Dubrovnik. The analysis is based on UNESCO Sustainable Tourism Toolkit and provides comprehensive framework for management of tourist flows in protected coastal areas. The contribution will talk about advancements made in the analysis over previous efforts and their relevance for efficient destination management.

Title: Waste collection in the small ports

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The amount of waste in the seas, especially plastic, is increasing worldwide. There are many sources of this type of pollution, mainly from the shore, but also from ships and boats. Our contribution to the conference will look at how this type of pollution can be reduced. The UL FPP research team is working on the “Clean Ports" project, in which we are trying to find the best solutions for organising the collection of waste products in small ports. These harbours are very diverse, from local harbours for small fishing and recreational boats to tourist marinas. Our research area is centred on Slovenia, but we also look beyond its borders. Our main goal is to find a practical solution that contributes to a more effective collection of waste in small harbours.

The presentation at the conference will include the following:
- Review of international, EU, state and local regulations
- Analysis of waste collection from small boats in selected harbours
- Recommendations to all ports on how to standardise waste collection worldwide
- Recommendations on how to encourage small boat crews to collect floating litter from the sea rather than dumping it into the sea

Domain 2: 4.00 pm – 6.00 pm

Blue circular economy

Title: Circular economy dimensions of some Blue Economy sectors

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This presentation examines the integration of circular economy principles in critical sectors of the Blue economy, focusing on sustainable practices that optimize marine resource use. As a significant contributor to global employment, innovation, and economic growth, the Blue Economy presents substantial opportunities for local communities while alleviating land resource pressures and supporting climate change mitigation efforts. The presentation explores circular economy initiatives in fisheries, aquaculture, and coastal tourism, offering strategies to strengthen these efforts and facilitate knowledge transfer. It also highlights innovative solutions, bioproducts, and business models that promote waste-free systems and emphasizes the importance of collaboration between academia, industry, and public authorities in advancing sustainable development within coastal communities.

Title: Mapping of the value chains for a blue circular economy

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The introduction of new technologies to the market and the development and improvement of existing technologies are the result of continuous market development, increased competitiveness and progressive globalisation. The benefits of technology adoption and development can be considered both from a microeconomic perspective (of an individual company), as well as from a macroeconomic perspective - taking into account the development of the whole market or economic sector. This is not an easy task and, due to the need to map very different technology areas, requires the development of many tools adapted to different technology areas. The authors are interested in technologies related to the blue economy, such as low- and zero-emission technologies in water transport and green shipping. The current potential of Polish companies active in the field of low- and zero-emission technologies in maritime transport concerns, in particular, activities in the following areas: advisory and consulting services, design and production of port infrastructure elements, design of low- and zero-emission vessels, construction and expansion of low- and zero-emission vessels, repair and maintenance services for low- and zero-emission vessels, and design and installation of software for decision support systems for reducing energy consumption of vessels. On the other hand, in the case of green shipping, related to the construction of offshore wind farms, the analyses published so far by organisations actively involved in wind energy show that currently the companies with the greatest potential are those that form the network of domestic suppliers and sub-suppliers of developed products and services. Polish companies can already supply the market with most of the components needed to build onshore wind farms. These companies can therefore adapt their products relatively quickly to the needs of offshore wind energy. Research by the Polish Wind Energy Association, the Jagiellonian Institute and the Polish Society for Offshore Wind Energy also shows that Polish local content for offshore wind energy currently includes around 400 companies, both recognised entities on international markets and companies that could enter the sector using experience from related industries. It should be noted, however, that this potential is not yet fully exploited, and the analyses carried out also take into account the potential of companies that do not currently provide products and services for this sub-sector. This is important for assessing the possibility of developing the technology level in the coming years, together with the creation of new offshore wind farms.

Title: The Blue Economy: a starting point in Azores

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This paper aims to analyse the concept of Blue Economy and its application versus impact of the Autonomous Region Azores Development.

It comprises a brief introduction of blue concept terminology, European policies and programmes in the Azores, a state of art at knowledge of blue economy. Finally, it is done a critical analysis using a SWOT matrix.

Recommendations: the development the economic assessment of marine ecosystems in Azores.

Title: Insight on recent international departmental projects relevant to the respected fields

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The contribution will provide an insight on recent international departmental projects relevant to the respected fields. Due to my personal background in Human geography, a degree in spatial and regional planning and my almost 20-years international work experience in two different Business Schools explains the generally interdisciplinary approach of the presented projects. The main idea of presenting the projects is to spread ideas on possible joint future activities while also providing insights in the existing expertise in our department.

JOHANNA (https://southbaltic.eu/-/johanna)

Competence-building for small cruise ship management in the Baltic, providing a set of teaching modules for vocational training on guide-training, as well as teaching modules on scientific cruise and destination management.

E-CUL-TOURS - (https://europeanprojects.org/projects/e-cul-tours)

Development of several joint courses on Cultural heritage management in tourism:

 Online-self-learning course (Moodle)

 ISP (Intensive Programs on specific case studies for international student groups, e.g., improving the visitor experience in the world heritage mine of Dalarna/Sweden or Designing and managing dissonant narratives in the context of the Technical Historical Museum Pennemünde/Germany WATERSCAPES (International Summer school on Heritage, Governance & Tourism)

Bringing together a group of international students (MA and PhD-students) from various countries and academic backgrounds on a traditional sailing boat in the Croatian Adriatic Sea. The group use the ship as a travelling work space and visits several sites such as Goli Otok (dark heritage), natural park of Telascica (natural heritage), the city of Zadar (cultural heritage) and discusses with local experts' and academics possible strategies of further development.

Title: Interactions between fish-eating birds and fishers in vertical oligopolistic markets

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The interaction between fish-eating birds and human activities is considered as the cause of economic damages on fishery, aquaculture and angling. Nevertheless, reliable estimates of the economic impact of fish-eating birds' predation are often missing because of its biological complexity and limited data availability of fisheries harvesting. Moreover, no systematic attempt has been made to model the effects of the birds catches on willingness to supply, wholesales and retail prices and market equilibrium. We test the predictions of a stylized model of vertical oligopoly among fishing firms, fish wholesalers and fish-eating birds, combining 10 years monthly data of Great Cormorants (*Phalacrocorax carbo sinensis*) population in the Lagoon of Cabras, Italy, with the data on fishing firm harvest and fish market price.

We reject the hypothesis that cormorants reduce the quantity of fish fishermen are willing and able to harvest. We found evidence that the number of cormorants is negatively correlated to the wholesale fish price. Our results may be used to design appropriate mitigation policies for the management of the cormorant-fisheries conflict.

Title: Sustainable Flow of goods and decreased CO2 emissions of transportation

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Sustainable Flow is a project funded by EU-Central Baltic. Life and business in the Central Baltic countries are extremely dependent on the Baltic Sea in transportation of goods. At the same time, there are high demands related to the green deal that urges the maritime sector to be more environmentally-friendly, economically- and socially sustainable. How to respond to the demands on economical and societal growth that so far have been somewhat contradicting to global demands on tackling the climate crisis? Through seven pilot ports in the Central Baltic area, the Sustainable Flow is a project aimed to contribute to reduction of CO2 emissions. The project will not only increase the knowledge of what individuals and organisations can do, but also develop practical tools for stakeholders.

During the project time the aim is to decrease CO2 emissions in the 7 pilot ports by 10%. Results are gained by developing digital solutions and energy saving measures, and renewable energy. As a result, CO2 emissions are reduced in port operations in the Central Baltic region – and beyond. By the end of the project in 2026 the ports – as hubs of maritime sector in Central Baltic area – have the ability and the capacity to be smarter, greener, more cost-efficient, interoperable, sustainable, accessible, and safer and more secure.

Involved in the project are partners from Finland, The Åland Islands, Sweden, Estonia and Latvia, all with connections to the 7 pilot ports in the project.

Title: Data Analytics in the Blue Economy: Approaches and Applications

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This talk highlights the pivotal role of data analytics in advancing the blue digital economy, driven by key technological enablers such as the Internet of Things (IoT) and Artificial Intelligence (AI).

The blue circular economy focuses on the efficient use and reuse of marine and aquatic resources, promoting circularity in industries connected to oceans, seas and coastal areas. This includes sectors like fisheries, aquaculture, shipping, offshore energy, and marine biotechnology. Key goals are improving resource efficiency, adopting sustainable practices, reducing waste, and regenerating marine ecosystems.

IoT technology plays a crucial role in the blue circular economy by improving the efficiency, sustainability, and monitoring of marine resources and operations. Examples of IoT applications include: a) smart sensors and monitoring systems that measure water quality, temperature, salinity, oxygen levels, as well as fish populations and marine waste in real-time b) smart grid integration and predictive maintenance for renewable energy systems in coastal regions c) fleet monitoring and port management solutions d) sea health and environmental monitoring e) real-time tracking of seafood supply chains and fishing equipment.

In this framework, data analytics serves as a critical tool by transforming the vast amounts of data gathered from marine/coastal environments and deployed IoT devices into actionable insights. These insights improve decision-making, optimize resource usage, and support sustainability efforts. Key data analytics methods include data aggregation and visualization, statistical analysis, diagnostics and anomaly detection, time series analysis, machine learning algorithms, simulation models, big data analytics, and geospatial methods. The University of Patras (UPATRAS) team can contribute to the EUNICoast Alliance a wealth of expertise in data analytics, backed by a proven track record in both foundational and applied research, including advanced techniques that can be effectively implemented across a range of diverse domains.

Domain 3: 1.30 pm – 3.30 pm

Governance, planning and management

Title: Modelling the governance of European medium-sized port-cities

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The paper presents a model designed to analyse port governance. It considers that the stakeholders' ability to adopt cooperative behaviours constitutes the key element in port development. Its focus is on medium-sized European ports and fifteen cases were studied. Each territory was first subject to a qualitative survey and analysis of the contents of local stakeholders' discourse (over 80 interviews conducted). The material is rich, allowing for the comparison between two or even three ports, yet the delicate nature of the relations brought to light adds considerable complexity to the comparison within a larger ensemble. The paper, therefore, proposes a semi-automatic treatment which helps to mitigate this difficulty by means of a computer model based on graph theory. It involves a modelling system based on the relations between the entities of the system. In this context, the relations between stakeholders were analysed in order to create typologies and eventually envisage some standard models of governance. In order to territorialise the subject, six typical cases out of fifteen were used: Le Havre, Nantes-Saint-Nazaire, Dunkirk (France), Gdynia (Poland), Klaipėda (Lithuania), and Hamina-Kotka (Finland). The modelling of all these port environments according to a single format (i.e., a graph) led to the application of a certain number of metrics which enables them to be compared. Two main metrics were presented in the framework of this paper for illustrative purposes: "Density" and "S_metric". These metrics originating in graph theory, coupled with other indicators (distribution of degrees and number of hubs per port), made it possible to measure the relationships' intensity and the distribution of these intensities among the stakeholders, and to identify the main stakeholders or conversely the least influential.

Title: Tourism and the city - The impact on residents' quality of life

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The present work investigates the relationship between tourism presence and the urban quality of life (UQoL) of resident populations. This is currently a hot topic, because in many European cities, residents have started to voice concerns about mass tourism. An ad hoc questionnaire was designed and submitted to the resident populations of two Mediterranean destinations. Following an integrative approach à la Sen, UQoL is analysed using the presence of services/amenities (capa- bilities) as well as their accessibility (functionings). Findings indicate that both presence and—mainly—accessibility of services/amenities matter for UQoL and that a negative effect from tourism prevails.

Title: Comparative Analysis of Island Region: Autonomy & Demographic Pressure. Case study: Balearic Islands, Azores, French Antilles, Aland Islands, Feroe Islands and Sardinia

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The proposal involves two microcredential courses designed to analyze demographic pressure and regional autonomy in island territories such as the Balearic Islands, Azores, French Antilles, Åland Islands, Faroe Islands, and Sardinia. The comparative, multidisciplinary approach aims to provide valuable insights into insularity's impact on citizens' lives, enhancing public policy implementation through historical, socio-demographic, economic, and legal analyses. The study also focuses on how these regions tackle shared problems with diverse solutions. Each microcredential will consist of six modules based on key themes such as political systems, economic resources, and the effects of demographic pressure, concluding with a comparative analysis aimed at proposing strategies to improve island living conditions. This project benefits from the researcher's expertise in island studies and comparative analysis, fostering coordinated research activities across different regions.

Title: Small but Sturdy: Lessons on Robust Governance during COVID-19 in the Faroe Island

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Robust governance is vital for the development of social capacity, particularly in the face of unprecedented global challenges such as the COVID-19 pandemic. The Faroes are a subnational island jurisdiction that managed the pandemic relatively well. However, the causes for this governance success have not been adequately studied. In this case study I ask, 'how was Faroese COVID-19 governance robust?' and 'how did temporality play a part in robust decision-making?' The analysis shows a connection between robustness and speed. Although the Faroe Islands government and most of its organizations were unprepared for the pandemic, the ability to take rapid action compensated for the lack of preparedness. At several critical junctures, speed and expediency demonstrated their value over deliberation and planning which, under normal circumstances, hold considerable importance in public administration. The analysis indicates that in turbulent situations, timing is almost everything. Solving the 'speed versus deliberation' dilemma emerges as a crucial aspect of robust governance.

Title: Challenges in the governance of the seas and their communities. The case of the Azores.

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The Azores archipelago, located in the central part of the North Atlantic, has been an autonomous region at political and administrative level since 1976, within the Portuguese Republic, and benefits from the status of Outermost Region of the European Union, due to its specific characteristics and the problems it faces, which define its insularity, such as the dispersion and small size of its islands, the distance from the mainland and the transport and communications problems that arise from this, the lack of raw materials and mineral resources, and the fragility of its living and non-living systems. In this context, we intend to present some of the main challenges facing the governance of the sea in the Azores and their communities, under the influence of the global system and the European Union's governmental action, but also with the impetus and action of their self-government, from the local to the regional level, and to see how new objectives have been implemented, such as the energy transition, the sustainability of the economy, society and the environment, with a focus on new areas of economic activity, scientific research and the promotion of safety and quality of life in these island communities.

Title: Territorial Planning and Management

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Tourism-driven spatial transformations have (re)shaped urban areas into tourist resorts, touristifiying coastal zones, marinas, and harbours, particularly on islands.

Our analysis is grounded in the theoretical framework of the social production of relational space, which is closely connected to the Latin-origin concept of “territory”, understood as land with specific drawing function or purpose, from a critical geography of tourism.

Beyond the conventional business-oriented perspective, which views tourism as an economic boon or a path to development, our approach emphasizes the socio-environmental factors driving tourism, such as financialization and the real estate sector, as well as its constraints, including local community welfare, environmental conservation, and biophysical carrying capacity.

Our contribution is based on the study of diverse case studies from the Mediterranean basin, as well as the Caribbean, and Central and South America.

In light of this diagnosis, we examine governance, spatial planning, and management strategies focused on convivial tourism as tools for ensuring sustainability.

Domain 3: 4.00 pm – 6.00 pm

Planning, management and monitoring

Title : Violent maritime borders of Europe

Arnaud Banos
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According to the International Organization for Migration, more than 60 000 people died or disappeared during migration in the world, between 2014 and 2023. More than 50% of them were trying to reach Europe.
The toll at maritime borders is particularly high: nearly 60% of deaths documented during migration over the same period were linked to drowning.
According to specialists, these numbers are highly underestimated, as most of the hipwrecks and drownings remain invisible.
Dying at maritime borders is not a fate, though. By contrast, the widely spread of violence at European borders is a key element one has to envisage to understand the lethal cost of migration. Through examples taken from Central Mediterranean, Aegean Sea, Alboran Sea, the Atlantic Coast and the English Channel, this communication will highlight and illustrate the main trends at work since the 90's.

Arnaud Banos is a Research Director (Professor) at CNRS and University of Le Havre Normandy. He is also a sea rescuer and an officer of reserve for the French Navy, instructor in mass rescue in the Channel. Since 2019, he has been participating to 12 rescue missions in Aegean Sea and Central Med with several NGOs.

Title: Planning, development, design and data for facilitating knowledge exchange, engagement and deliberation on cultural and technical understanding of climate change, physical and social variables and processes for learning and adaptation.

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Focus on planning, development, design and data for facilitating knowledge exchange, engagement, and deliberation on cultural and technical understanding of climate change, physical and social variables and processes for learning and adaptation. Is it possible to integrate conventional climate/hazard mitigation and diverse data from sensors, social media, and wisdom from elders, cultural practitioners, and other stakeholders working to build and sustain safe, just, resilient communities? Is it possible to identify emphasis on nature-based solutions and deep connections to training, education, capacity-building and learning across sectors is central to the evolution and betterment of adaptation theory and practice?

Title: Existing and future legal tools to fight GHG emissions from the shipping sector

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Part I: Introduction

=> Definition: shipping sector, marine pollution vs GHG emissions
=> Shipping sector contribution to climate change: hard facts + future trends/increase in maritime traffic
=> Challenges: lack of technology, lifecycle of ships/long term effects of current investments, finding the right incentives to direct investments

Part II: Overview of legal tools designed to curb GHG emissions from the shipping sector

=> Rules regarding ship design and ship operation
=> Reporting obligations regarding GHG emissions
=> Rules regarding fuels

=> ETS

Part III : Focus on Fuel EU

=> Scope: Ships/routes targeted
=> Purpose: types of fuels/calculation of emission limits for operators
=> Timeline of application/possible revision
=> Critical Assessment

Title: Vademecum of Environmental Sustainability - a replicable model in coastal areas, implemented through the direct involvement of the local population

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The POFEAMP 2014-2020 project "Creation of a strategy for the monitoring of marine litter in the Marine Protected Area of the Island of Asinara with the involvement of fishermen" (scientific leader: Donatella Carboni) focused on issues and criticalities related to the management of marine litter and the relationship between man and the marine ecosystem. Thanks to an interdisciplinary team, the research group collaborated with fishermen and with all stakeholders operating in the area of the Asinara National Park, including local residents. In particular, the local community of Stintino was involved in beach monitoring and cleaning activities and participated in the EMD - In My Country events organised by the European Commission in 2023 and 2024. This collaboration led to several outputs, including an environmental education manual for primary and secondary school students in the municipality and participatory field research aimed at restoring the destination image by residents as opposed to mass tourism. The proposed future research seeks to extend the empowerment of the local community of Stintino through a project of co-creation of an environmental sustainability vademecum, defining a replicable model in coastal areas, implemented through the direct involvement of residents in all planning phases.

Title: Generating comprehensive information and knowledge about insularity in the Balearic Islands and other islands

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The University of the Balearic Islands and the Balearic Islands Government have launched initiatives to promote innovation, training and research focused on insularity. The Chair of Insularity addresses the need to generate and analyze data on the unique characteristics of insular regions across the European Union, informing public policies that enhance sustainable development and improve residents' quality of life. Building on these efforts, our recent study delves into the conceptualization of insularity, which has been widely studied and debated, encompassing both geographical and identity aspects. The academic discussion on the definition of insularity and isolation in the context of islands remains a current topic, along with the economic, social, legal and environmental challenges faced by insular regions. This study aims to deepen the conceptual framework of insularity and structure its issues from various scientific perspectives through quantitative bibliometric analysis. Key focus areas and research gaps have been identified, including the need for enhanced economic policies, better marine resource management, more comprehensive urban development research and improved data on social and political issues. The conclusions emphasize the importance of prioritizing intervention areas and specific policies to address the unique challenges faced by insular regions in terms of sustainable development.

Title: System of Systems for monitoring economy related parameters -reference to the Black Sea

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Data collection and analysis is a critical topic for marine-related activities planning and monitoring, as it helps us to understand and predict changes in coasts, sea, climate, weather, etc. There are various sources of information regarding many parameters of sea observation. The present paper describes the System of Systems (SoS): a GIS web-based application, which combines various data sources into a single platform. The platform brings together heterogeneous data from in-situ measurements and sensor arrays, satellite-based Earth observation, external repositories, and model outputs into single interactive visualisation platform for the Black Sea with harmonised data models. The SoS is designed to build a collective understanding to value the Black Sea, provide real information to tackle the main societal challenges of the Black Sea region.

The data could be visualized, filtered by various options, changes over time could be tracked. Data dashboards are being co-developed with stakeholders to retrieve data specific to users' needs, including data forecasts or the rapidly expanding DOORS in situ data sets. The data are well documented, and the software provides guidelines on how expert users can work with it directly in processing scripts.

Title: Improved Science-based maritime spatial planning to safeguard and restore biodiversity in a coherent European MPA network

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The main objective of MSP4BIO is to develop an integrated and modular Ecological-Socio-Economic (ESE) management framework for the protection and restoration of marine ecosystems. The ESE looks at the compatibility between maritime/coastal uses and protection measures: it includes the establishment of a practical typology of protection measures, ecological issues, and activities, allowing to categorize socio-economic impacts of these protection measures. The resulting solutions (strategic and spatial) will fill gaps on marine biodiversity and better the integration between MSP and MPA management. The framework will take into account the criteria and objectives of relevant policies (MSFD, WFD, MSPD, CFP, etc.) and contribute to the EU Biodiversity Strategy (EUBS) 2030 and the Convention on Biological Diversity post-2020 framework.

Six test sites in five European Sea Basins have been selected to conduct the analysis and to showcase and operationalise the ESE management framework. The test sites reflect the processes that are taking place at the national, sub-and-supranational levels, at different geographical scales, and focus on different socio-economic and environmental challenges.

Communities of Practice (CoP) will be established in each of the test sites for the effective interaction with planners, regulators, and researchers relevant for MSP and MPAs. Interactions will take place in the form of workshops and focus group meetings. This is expected to facilitate exchange, to build ownership, thus ensuring uptake of developed tools in test areas and beyond.

Domain 3: 1.30 pm – 3.30 pm

Monitoring, sustainability and climate change

Title: DNA Metabarcoding for Comprehensive Detection and Monitoring of Non-Indigenous Marine Invertebrates in Recreational Marinas

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7. UNESCO Chair – Land Within Sea: Biodiversity & Sustainability in Atlantic Islands,
8. MARE – Marine and Environmental Sciences Centre / ARNET – Aquatic Research Network, Agência Regional para o Desenvolvimento da Investigação Tecnologia e Inovação (ARDITI), Universidade da Madeira (UMa)
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The NIS-DNA project aimed to develop, improve, and apply DNA metabarcoding techniques to efficiently detect and monitor non-indigenous marine invertebrates (NIS) in recreational marinas. The study assessed the effect of different sample types (hard substrate scrapings, surface water, and planktonic tows) and geographical locations on NIS detection across ten recreational marinas in mainland Portugal (North, Aveiro, and Lisbon), Madeira, and the Azores. Samples were analyzed using Illumina MiSeq, focusing on COI and 18S (V4 region) genes, and processed with mBrave and SILVAngs platforms. The taxonomic composition analysis revealed differences in species richness and community structure among hard substrates, surface water, and zooplankton, with no common NIS found across all sample types. Spatial assessment identified 656 marine invertebrate species, 39 of which were NIS. The Azores exhibited the highest species richness, while Lisbon had the highest NIS count. Regional variations in taxonomic composition were noted, with unique NIS predominantly found in the Azores and only 10% of NIS detected across all regions. The results highlight the need to consider multiple sample types for comprehensive DNA metabarcoding-based NIS monitoring in recreational marinas. This approach supports the integration of DNA metabarcoding into NIS surveys in line with the Marine Strategy Framework Directive.

Title: Monitoring Marine NIS in the Azores: lessons learned

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The islands are particularly vulnerable to biological invasions, and new records of previously unobserved species have been occurring at an alarming pace. The first record of a marine non-indigenous species (mNIS) in the Azores was given by Southward (1998), who reported *Amphibalanus amphitrite* and *Balanus trigonus*, first observed in 1887 by Gruvel (1920). In the twentieth century, references to mNIS in the region were sparse. However, the invasion in Faial Island by *Caulerpa webbiana* caught the attention of local researchers, the public, and the government. An action plan was implemented to address this invasion, and in 2006, the first list of mNIS for the archipelago was published by Cardigos et al. (2006). Growing scientific interest in the subject led to the development of national and regional research projects. The results, highlighting the high number of mNIS present in the islands and the inclusion of the NIS descriptor in the MSFD, established the basis for monitoring programs in the Azores in 2015. Here, we present a critical review and analysis of local mNIS research and monitoring programs, invasions, and lessons learned, discussing challenges and future perspectives regarding research, monitoring, and management.

Title: Monitoring contaminants in commercial seafood species from the Azores archipelago science, education and government support

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A contaminant monitoring program for commercial seafood species from the Azores archipelago is vital for ensuring public health, environmental sustainability, and economic security. By systematically tracking contaminants such as heavy metals, plastics, and chemicals, the program generates essential scientific data that helps verify seafood safety and compliance with international food standards. These findings are crucial for assessing the health of marine ecosystems and understanding the impact of human activities on seafood quality.

In parallel, an educational literacy initiative raises awareness about marine pollution, food safety, and fisheries sustainability, promoting knowledge that supports conservation efforts.

Government support is critical to the program's success, providing the necessary funding and regulatory frameworks. This collaboration enables policymakers to make informed decisions that safeguard both consumers and marine environments, fostering stronger regulations to manage contaminants and ensuring sustainable fishing practices in the region.

Title: Justice and ecological economics: a network model for environmental conflicts

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Despite widespread agreement on the urgency of fostering sustainability transitions, conflicts over conservation enforcement rise due to their significant justice implications. This paper reviews environmental conflicts in protected areas, highlighting the often-overlooked link between conflict and justice. It proposes a novel theoretical framework integrating environmental justice and ecological economics to better understand conflict dimensions: substance, process, and relation. Conflicts are seen as part of complex social–ecological systems, emphasizing social relations and entitlements over ecosystem services. A new methodology is introduced for measuring these theoretical domains, along with a social–ecological network model to apply the framework empirically.

An application of the framework and methodology is presented through a case study conducted in Costa Rica on a conservation area. Semi-structured interviews with key collective actors were conducted to extract their roles, characteristics and relationships within the area under study. Descriptive and correlation network analyses are developed to explore environmental justice and conflicts. Furthermore, an inferential network analysis using Exponential Random Graph Models (ERGM) is conducted to identify the drivers of conflicts based on group characteristics, their relationships, and their trade-offs in terms of entitlements to ecosystem services, as well as the market and non-market tools they benefit from or are subject to.

This work aims to provide practitioners and policymakers with a comprehensive toolkit to address natural resource conflicts, particularly within protected areas.

Title: Transformation of coastal fronts subjected to strong socio-economic dynamics in the face of climate emergencies

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Since the second half of the 20th century, we have been able to observe how the coastal territory has become:
1. the urban system with the highest population growth.
2. the area of greatest development of tourist activity
3. the territory that has undergone the greatest landscape transformation.

In recent decades, the effects of climate change on the coast have highlighted the urgent need to adapt it to climate change from an integral vision.

However, despite the fact that the concept of 'Integrated Coastal Zone Management' was born in 1992 during the Earth Summit in Rio de Janeiro, it is still one of the main challenges facing the European coastline today.

In this communication, through the case of Mallorca, different projects and instruments of urban territorial planning for the adaptation of the coastline to climate change will be presented.

Title: Innovative Maritime Education: Integrating Simulators and Laboratories for Comprehensive Training

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Åland University of Applied Sciences maritime education programs are designed to equip future maritime professionals with the skills and knowledge required in an ever-evolving shipping sector. During our presentation, we will showcase how we integrate advanced simulation technology and hands-on experience to create a comprehensive learning environment. With the largest training ship in the Nordic region, a state-of-the-art engine room hall, and specialized laboratories, we offer students exceptional practical training opportunities.

We will demonstrate our navigation and engine room simulators, featuring fully equipped bridge and control room setups that provide realistic scenarios for maritime operations. Additionally, we will highlight the significance of cross-program on-ship training, where students from both navigation and engineering disciplines collaborate in practical exercises aboard our training ship. This integrated training fosters essential teamwork and real-time problem-solving skills, preparing students for the complex demands of maritime operations. Our program also includes workshops for metalwork, maintenance, and ship-related tasks, as well as laboratories focused on automation, electrotechnics, and electrical systems.

The presentation will explore how our blend of theory and practice, coupled with small group instruction and individual guidance, ensures students are well-prepared for certification and future challenges in the maritime sector.

Domain 4: 1.30 – 3.30 pm

Health, risks and prevention

Title: Environmental Endocrine Disruption in vertebrates – Impacts of estrogenic endocrine disruptors on the immune and the neuroendocrine system of the european sea bass *Dicentrarchus labrax*.

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Research Laboratory : Stress Environnementaux et BIOsurveillance des milieux aquatiques (UMR-I 02 SEBIO)
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Our oceans harbour a vast and understudied biodiversity that is threatened by climate change, pollution, and other global issues. More than 80% of domestic and industrial effluents enter the oceans raw, leading to the accumulation of harmful pollutants, including endocrine-disrupting chemicals (EDCs), in marine ecosystems. The research group in Le Havre has a long experience with working with EDC and vertebrates looking at different end points like neuroendocrinology and immunity and also acting at the regulation level. After a brief introduction of the topic of EDC developed in the laboratory SEBIO, T. Monsinjon will present her work on the immune system impacted by EEDC.

O**e**strogen-active **e**ndocrine **d**isrupting **c**ompounds (EEDCs), comprising natural and pharmaceutical oestrogens, excretions from livestock, oestrogen-active industrial chemicals and pesticides are permanently released into the aquatic environment and have been identified as a major threat to the aquatic fauna. EEDCs can be almost ubiquitously detected in aquatic environments and the continuous high-level input of estrogenic compounds renders them 'pseudo-persistent', despite the rapid biodegradation of natural oestrogens. In fish, like in other vertebrates, oestrogens primarily control development, sex characteristics and reproduction.

However, oestrogens also interact with the immune system in general and the developing immune system in particular. The immune system is essential to the health and survival of fish in view of the high pathogen pressure in the aquatic environment. An increasing body of evidence suggests that endocrine disruptors increase the susceptibility to disease in fish via the cross talk between the endocrine and the immune system. Thus, it is important to know whether immunodisrupting effects of environmental oestrogens are impairing immunocompetence of fish and, therefore, are a relevant factor to be considered in the ecotoxicological risk assessment.

Title: Feasibility of a combined land- and water-based outdoor program for managing motor and non-motor symptoms in mildly disabled persons with Parkinson's disease: a single-group pilot study

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Background: Outdoor land- and water-based activities are considered non-conventional, promising activities for individuals with motor disorders deriving from neurological conditions. The aim of this study was to investigate the anthropometric, body composition, functional and psychological effects of a 10-week, combined outdoor program (i.e., hiking, surf, kayak, and sailing) in mildly disabled individuals with Parkinson's disease.

Methods: The research design was set as a single-group pre-test/post-test interventional pilot study. Fifteen subjects (12M:3W; median Hoehn-Yahr: 2; range: 1-3) were recruited from those referring to the neurology unit and volunteered to participate in a 10-week combined outdoor program with a frequency of twice per week. The program consisted of alternating hiking (trekking with poles) and water activities sessions (divided into 2 weeks of basic aquatic skills, 3 weeks of kayaking, 3 weeks of surfing, and 2 weeks of sailing). Outcomes (anthropometrics, body composition, balance, muscular strength, flexibility, cardiorespiratory fitness, gait ability, quality of life, etc.) were assessed at baseline (PRE), at the end of the 10-week program (POST), and after three months from the completion of the multisport intervention (follow-up, F_UP).

Results: RM-ANOVA and Bonferroni-adjusted pairwise revealed a significant increase in body weight between POST and F_UP assessments (+3.1%; p=0.02). Wilcoxon signed ranks test detected a significant reduction in UPDRS part I (mentation, behaviour, and mood) at POST assessment (-3.07 pts; Z=2.64; p<0.01). On functional outcomes, Sit-and-Reach test (SRT), Berg Balance scale (BBS) and gait speed revealed significant positive changes at POST evaluations (SRT: +68.44%, p=0.04; BBS: +3.22%, Z=2.35, p=0.02; gait speed: +9.03%, p=0.03). On psychological outcomes, a significant reduction in Beck Depression Inventory-II at POST assessment was observed (-3.42 pts; Z=2.20; p=0.03). Moreover, Bonferroni-adjusted pairwise comparisons revealed a significant increase in Parkinson Fatigue scale at POST evaluation, where a relevant clinical decrease in this score was detected in 9 out of 15 participants (60%).

Conclusion: Data showed that a 10-week program combining land- and water-based outdoor activities proved safe and feasible in mildly disabled individuals with Parkinson's disease, also showing potential for improving mood as well as selected anthropometrics and motor-functional outcomes. However, the significant drops in performance detected at the 3-month follow-up should be taken into proper account as they may suggest the need for involving people with PD in longer-term interventions to induce a stable behavioural change in their lifestyle.

Title: Cyanobacteria toxins and neurodegenerative diseases

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The prevalence of neurodegenerative diseases (NDs) is increasing, partly due to increased life expectancy, with a greater proportion of the population living to an older age, but the aetiology and pathogenesis of NDs are not fully understood and effective treatments are still lacking. Neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease and Amyotrophic Lateral Sclerosis are generally thought to progress as a result of genetic susceptibility and environmental influences. Recently, attention has been drawn to the complex interplay between cyanotoxins produced by cyanobacteria and neurodegenerative diseases. Cyanobacteria, also known as blue-green algae, are a group of photosynthetic bacteria widely distributed in various aquatic habitats (oceans, seas, rivers, lakes, etc.) and terrestrial habitats (e.g. wet soils) that can produce a variety of secondary products, collectively called cyanotoxins, which are known to play a role in NDs. Given the unique ecological environment of the island of Sardinia, we are investigating the molecular interplay between cyanotoxin exposure and NDs using as in vitro models various cell lines and as in vivo model Drosophila melanogaster.

Title: Sleeping volcanoes, awaking health issues: the hazardous health effects of hydrothermal emissions on volcanic islands

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Volcanic activity, either eruptive or non-eruptive, is known to be one of the major natural sources of pollutants, particularly of the air. Present-day volcanic activity in the Azores archipelago is marked by several hydrothermal manifestations consisting of active fumarolic fields, thermal and cold CO_2 springs and soil diffuse degassing areas. This type of "silent" volcanic activity is responsible for the emission into the environment of several noxious compounds, such as gases (some radioactive) and heavy metals, which can cause adverse health effects in organisms that live in these areas, including humans. In this presentation we will unveil some of the silent risks of living in these environments, by presenting and discussing our most recent studies concerning the main health effects of vulcanogenic pollutants.

Title: The health risks of mould Fungi in European housing and how to prevent

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The fungi with potential pathogenic properties to animals and humans often occur in the indoor environment. In the last decades the increase of the number of diseases caused by the fungi, i.e., mycoses, toxicoses and allergies has been observed. This situation enforces the producers of paints, building materials, cosmetics and cleaning products to use biocides. It seems, however, that the much simpler, relatively cost-effective and pro-ecological solution of this problem is to use of the photocatalysis process.

Title: Microbes and pollution: from causing problems to providing solutions

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Our research group has extensive experience in microbiology, particularly in various aspects of environmental microbiology, microbial diversity, and taxonomy. We also have teaching responsibilities across several degree programs (Biology, Biochemistry, Medicine, and Pharmacy), as well as in postgraduate studies. For more than 10 years, we have coordinated a Master's course (Advanced Microbiology) and a PhD program (Environmental and Biomedical Microbiology). The Master's course includes topics such as Marine Microbiology and Environmental Biotechnology, and a substantial number of PhD theses in our program focus on research in marine environments.

Our research in coastal and marine environments primarily addresses various aspects of pollution, with two main objectives: (1) understanding microbial diversity in polluted environments and how microbial communities withstand or adapt to the presence of pollutants, and (2) identifying microorganisms involved in pollutant degradation and determining how they degrade these pollutants. We have conducted research on hydrocarbon pollution for over twenty years. More recently, we have initiated projects on plastic degradation and the effects of eutrophication in coastal environments. With multidisciplinary expertise spanning genomic techniques, biochemistry, physiology, and the principles of microbial ecology, our group is well-positioned to integrate this knowledge for a better understanding of coastal and marine environments impacted by human activities.

Domain 4: 4.00 pm – 6.00 pm

Biodiversity, coastal and marine resources

Title: Biodiversity monitoring: tools for environmental assessment

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High levels of biodiversity sustain ecosystem functioning, ensuring a constant delivery of goods and services to society. Scientifically sound and quantitative monitoring of marine biodiversity is crucial for understanding, managing and conserving biodiversity at genetic, species and ecosystem level ensuring ecological processes and ecosystem services. Monitoring biodiversity involves tracking changes in species and ecosystems' abundance, distribution, and composition over time. The EU and other countries and regions have policies for marine biodiversity protection, but implementing these policies needs high-quality data and standardization of methods. With this Microcredential EUNICoast proposal, a coordinated and potentially global comparative approach can help deepen the understanding of the main objectives, concerns, and protocols developed in different geographic regions regarding marine monitoring programs. This approach will aid in monitoring and studying the marine biodiversity of the adjacent seas of all alliance members, facilitating a better understanding of biodiversity-related problems and enabling discussions on potential solutions to global changes. The Balearic Biodiversity Centre (CBB; University of the Balearic Island) is an initiative aiming at generating, gathering and sharing knowledge about exceptional biological diversity in the region, developing methods for biodiversity assessments, strengthen the potential and capacity of the scientific community and establishing collaborations and synergies and provide scientific-technical support to government managers and the private sector. The CBB is aiming at coordinating this Microcredential EUNICoast proposal, and making the infrastructure and experience gathered at the CBB-UIB headquarters available for this initiative.

Title: Joint Oceanographic Course on EUNICoast waters

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The short talk will be just be an introductory explanation of the proposal of a collaborative oceanographic course focusing on various marine ecosystems within the waters surrounding the consortium partners. The aim is to provide students with a comparative understanding of the attributes and ecology of diverse marine systems, along with the challenges they face.

We would provide our expertise through the subjects included in our Masters in Marine Ecology (MECM) at the UIB which eventually can serve to discuss a Joint International Master's Degrees within the alliance. The MECM boasts an array of elective courses to be taught by esteemed experts in the field. As English is one of the official languages of the MECM, certain courses may be available in English.

The elective courses of MECM are the following:

- Climate and Global Change in Coastal and Oceanic Ecosystems
- Coastal Ocean Observing and Forecasting System
- Ecology of Seagrasses and Mangroves
- Ecology and Conservation of Marine Top-Predators
- Effective Scientific Communication
- Fundamentals of Hydrodynamics and Coastal Geology for Coastal Ecology and Management
- Integration of Oceanography and Ecology in the Advisory and Management of Marine Systems
- Marine Biodiversity
- Marine Chemical Ecology and Biotechnology
- Marine Molecular Ecology
- Marine Pollution
- New Techniques in Fisheries Ecology
- Data analysis with R
- Dynamics of Ecosystems and Exploitable Living Resources
- Marine Bioindicators
- Marine Paleoecology
- Microbial Marine Ecology
- Phytoplankton Ecology

Title: Research for valorization of marine resources from Azores

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The Biotechnology Center of the University of the Azores (CBA) has focused part of its research on the valorization of the genetic resources from Azores, through the identification of active molecules with various applications. In this regard, the Center is part of PT-OPENSCREEN, a nationwide network of chemistry and biology research institutes that bridge screening platforms (high-throughput screening) for the identification of new molecules with biological/therapeutic potential. The CBA participates in several projects with companies focusing on cosmetics and health, studying marine algae and microalgae produced or collected in the Azores, bacteria from various biotopes (sediments, thermal springs, and shallow vents), and marine invertebrates such as mollusks and cnidarians. As example, Vertical Algas research project focuses on the extraction of compounds from algae with anti-aging, anti-inflammatory, and UV protection properties. We created a portfolio of more than 50 extracts, of which 3 present high anti-inflammatory activity, 2 significant anti-aging activity, and 1 is in the process of being patented due to its antioxidant and UV protection properties. In another project, the focus is on the extraction of collagen from the Portuguese Man o' War (Physalia physalis) for application in cell regeneration and the study of this organism's venom for health applications. This project, carried out in a business context, optimized the extraction process on an industrial scale in collaboration with the Norwegian institute Nofima, and identified for the first time over 250 molecules in the venom of P. physalis. This project led to the creation of a start-up to valorize some of the identified molecules.

Title: Nature-based solutions of aquaculture waste streams management and potential ways forward

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Aquaculture is one of the fastest growing sectors in the food production chain, currently producing 94.4 million tonnes of seafood annually. More than half of the production comes from freshwater aquaculture, which alone shows the potential for further intensification and can significantly contribute to improving global food security. Traditional common carp (*Cyprinus carpio*) farming, mainly realised in earthen ponds, functions highly embedded in the landscape and is regarded as a semi-natural ecosystem. Semi-intensive pond aquaculture faces numerous challenges (e.g., soaring production costs, subsidies-dependent production) that significantly affect profitability of the farms. To overcome this difficult situation farmers must diversify produced species or seek for solutions to use waste streams already available at a farm. A good example of a waste stream are suspended solids, widely available in discharged water when ponds are annually emptied to harvest market-size fish for the market or to transfer fish between the ponds for grading or wintering. Emptying the ponds is a traditional on-farm procedure. However, it releases a significant pulse of organic and inorganic matter to the creeks downstream the farm. In this talk circular economy approaches to reduce the environmental impact and improve the viability of the freshwater aquaculture will be introduced.

Title: Evaluation of the genetic variability among Mediterranean and Atlantic Callinectes sapidus populations

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The Atlantic blue crab, scientifically known as *Callinectes sapidus*, has emerged as an invasive species in the Mediterranean region, posing significant challenges to biodiversity, ecosystems, and human activities. Originally native to the western Atlantic, this crab has progressively expanded its range into European coastal waters since the early 1900s. Despite its ecological and economic significance, comprehensive genetic studies on this species have been limited. In this context, our research aimed to assess the levels of genetic diversity and the evolutionary history of Mediterranean and Atlantic *C. sapidus* populations. We conducted genetic analyses using a total of 667 mitochondrial Cytochrome c Oxidase Subunit I (COI) gene sequences, which included 36 newly obtained sequences from previously understudied Mediterranean locations and 631 from worldwide regions available in the GenBank database. Our findings revealed two distinct, though closely related, genetic groups within the species' distribution, suggesting the potential presence of a species complex. The first putative sister species was mainly distributed in South and Central America, while the second primarily occurred in North America, the Mediterranean, and Black Sea. Moreover, the results of the phylogenetic analysis suggested that the differentiation between these two groups occurred around 500,000 years ago, originating from a common ancestor that inhabited the Atlantic coasts approximately 700,000 years ago. In the Mediterranean basin, genetic variability was generally low, except for a significant haplotypic differentiation in samples from Turkey. This research offers a global perspective on the genetic diversity and evolutionary patterns of *Callinectes sapidus* across its native and introduced ranges.

Title: Evolutionary History and Genetic Diversity of Pinna nobilis: Implications for Mediterranean Conservation

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The endemic bivalve mollusc *Pinna nobilis*, a flagship species of the Mediterranean Sea, is now on the brink of extinction due to a multifactorial disease that has caused repeated mass mortality events (MMEs) since 2016. This crisis has prompted Mediterranean organizations and the European Union to develop ex situ conservation programs like LIFE PINNARCA and LIFE PINNA. Understanding the evolutionary history and genetic variability of *Pinna nobilis* is crucial for successful repopulation efforts. To address this, a comprehensive dataset of *Pinna nobilis* samples from various Mediterranean populations was analysed, including previously underexplored regions that still harbour some of the last remaining populations of the species, such as the Adriatic Sea. Our findings suggest that *Pinna nobilis* originated approximately 2.5 million years ago, following the migration of its ancestor from the Atlantic into the Mediterranean after the Zanclean flood, which occurred 5.33 million years ago. Initial colonization took place in the central part of the western Mediterranean basin. After a large period of genetic differentiation (lasting around 1 million years), early population expanded throughout the entire basin, leading to the first adaptive radiation of the species. Additionally, our results revealed shared haplotypes between populations in the Adriatic Sea and the western Mediterranean, suggesting that translocating individuals from the Adriatic could help restore the species' historical genetic diversity in the western Mediterranean. These findings offer valuable insights for developing conservation strategies aimed at promoting the recovery of *Pinna nobilis* populations across the Mediterranean region.

Domain 4: 1.30 – 3.30 pm

Biodiversity protection and nature-based solutions

Title: Black waters and valorisation of dredging sediments

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Fundamental processes of sediments transport (rheology, consolidation, flocculation, waters interaction depending of the salinity, biological effects, pollution (macro to colloidal)) have been important to contribute to develop sustainable sediment. The relationship between rheological characteristics and other physico-chemical properties of the mud is known but the change of scale to the sediments management is always complex, without in-situ measurements and understand the littoral hydrodynamic effects. Indeed currents, tides, floods, submersions with erosion or accretion in the coastal zone have an influence for accessibility of the nautical traffic and the port infrastructures (docks, quays, protection dykes..). Understand the continental erosion is also to consider because high runoff and terrigenous inputs containing industrial elements as phosphates, nitrates, and heavy metals increase the sediments flux is also to consider. The valorization of the sediments, as construction materials (bricks) or soils reconstitution with organic matters, is an important point for sustainable strategies sediments in ports, bays, costal marshes and estuaries are one of the best important examples of the continuum land-sea.

Title: Cost-effective, environmentally friendly methods for producing bacterial cellulose and application of the biomaterial in medicine, healthcare, and plant tissue cultures

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Bacterial cellulose (BC) production on an industrial scale requires reducing costs associated with the medium for biosynthesis. The optimal solution, also from an environmental perspective, would be to use industrial waste, which is dispensable for the manufacturer. Our studies include verification of the possibility of valorizing a significant waste product of the potato starch industry, potato tuber juice, as a cost-effective medium for BC biosynthesis. Moreover, in these studies, we demonstrated the usefulness of the obtained biomaterial as a gelling agent (alternative to agar) in plant tissue cultures *in vitro*. We also showed that our BC, after functionalization with low-pressure argon plasma, can be used as fully biobased, biodegradable filters characterized by excellent antimicrobial and antiviral properties against pathogenic bacteria, and viruses, including SARS-CoV-2, with no cytotoxicity versus murine fibroblasts *in vitro*. Moreover, our BC (after appropriate "green" modification) can be impregnated with antimicrobials (including antiseptics, bacteriophages, or enzymes) and used as a dressing biomaterial for biofilm-infected, highly-exuding wounds.

Title: Forest and Nature based solutions

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Coastal environments are increasingly deteriorating due to both anthropogenic activities and natural stressors such as land-use change, coastal erosion, wildfires, sea level rise, pollution, climate change effects, and, last but not least, tourism impacts. These degraded environments are vulnerable and can drive disaster risk. Forest- and Nature-based Solutions (FbS, NbS) are gaining global recognition for their applicability and co-benefits, particularly in island coastal ecosystems where vulnerabilities to these disturbances are emerging issues. NbS offer long-term benefits over traditional hard adaptation measures commonly used for sea level rise and coastal erosion. Coastal sand dunes and Mediterranean pine forests represent referential coastal landscapes while being NbS, acting as natural barriers and providing multiple ecosystem services, including agricultural protection, biodiversity support, recreational spaces, and timber production. However, since the mid-20th century, these landscapes have been altered by management practices, land use changes, and global change effects, leading to a decline of both forest stands and coastal dunes vegetation. The opportunity given by introducing NbS and FbS -based approaches is framed in the domain of ecological restoration and Nature-based Thinking, and it is discussed on the basis of adaptive governance options, and the potential vegetation dynamics, interpreted as NbS, through adaptive management and evolutionary design issues towards improving biodiversity and resilience of coastal landscapes.

Title: The Condor seamount protected area in the Azores (North-East Atlantic)

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The Condor seamount is located close to Faial Island, in the Azores, in the North East Atlantic Ocean, at depths between 185m and 2000m. Condor seamount hosts vulnerable marine ecosystems, such as coral gardens and sponge aggregations, and commercial fishes.

For decades it has been an important area for economic activities such as commercial fisheries and marine tourism; since 2008 it has been earmarked for research, to increase knowledge on seamount ecosystems and recovery from impacts of human activities. Condor was closed to bottom fishing in 2010, following the agreement of stakeholders, and was classified as Marine Protected Area-MPA of Azores Marine Park in 2016, for management of fishing resources.

Over the years, Condor MPA was targeted by an intensive research effort, becoming a reference area for fundamental and applied research, monitoring and management. Among other things, regular monitoring of deep-sea demersal fishes provides information on temporal changes after the cessation of fishing. Here we show the results of more than a decade of fish monitoring surveys, and the effects of a seamount protected area on several descriptors of deep-sea demersal fishes.

Title: Guns'&Roses: microbial volatilome and the biological control of postharvest fungi

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The contamination of agricultural commodities by mycotoxin-producing fungi is an important threat to human and animal health. Ongoing climate changes will have a significant impact on the spread of toxigenic fungi and it is estimated that an increase in temperature of 2°C in 2050 will increase the risk of mycotoxin contamination in the Mediterranean area by more than 50%. It appears urgent to develop new strategies to mitigate the risk of contamination by mycotoxins based on the containment of toxigenic fungi during the conservation phases. Different biological control strategies were developed to control mycotoxin contamination: exploiting the antimicrobial activity of yeast-derived volatile organic compounds (VOCs) with antimicrobial activity is receiving increasing attention. VOCs produced by of two non-fermenting (*Cyberlindnera jadinii* 273 and *Candida friedrichii* 778) and two low-fermenting (*Candida intermedia* 235 and *Lachancea thermotolerans* 751) yeast strains are able to control *Aspergillus* spp. on different stored commodities *in vitro* and *in vivo*. The main component of yeast volatile blend is 2-phenylethanol. Proteomics analysis demonstrated that exposure to 2-phenylethanol only partially mimicks the metabolic effects observed by the whole yeast volatilome, with protein biosynthesis and proliferative activity being reduced when compared with the control samples, but still far from the VOCs-exposed condition. Selected antagonists are being characterised to determine their VOCs blend composition, aiming to develop innovative storage systems allowing the controlled release of VOCs with antimicrobial action.

This study was carried out within the Agritech National Research Center and received funding from the European Union Next-GenerationEU (PIANO NAZIONALE DI RIPRESA E RESILIENZA (PNRR) – MISSIONE 4 COMPONENTE 2, INVESTIMENTO 1.4 – D.D. 1032 17/06/2022, CN00000022). This manuscript reflects only the authors' views and opinions, neither the European Union nor the European Commission can be considered responsible for them.

Title: Looking for enzymes to break down biomass effectively

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CBA has collections of microorganisms sampled in different environments on the Islands and in the ocean, some of which are considered extreme environments. Moreover, we have genomic and metagenomic parts of these materials. The collections and the banks are exploiting these collections to search for pathways and bioactive molecules, including enzymes with application in the circular economy. Cellulose is the most abundant polymer in nature despite its application is quite dependent on its depolymerization. CAZymes is a protein family implicated in this deconstruction. In marine environments, sheep worms are known to deconstruct cellulose very efficiently. To profit on this potential we performed metagenomics of the associated microbiome and we searched for CAZymes. This analysis allowed the identification of hundreds of CAZymes, some with high divergence from known enzymes. So far, we cloned in Escherichia ecoli six of the identified genes, and we are producing recombinant protein and analyzing for optimal substrates, temperatures, pH, and activity on different solvents.

Title: Climate adaptation in coastal Piran considering implementation of nature-based solutions and revalorization of cultural heritage protected urban infrastructure

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The Mediterranean town of Piran in Slovenia faces several climate challenges through the intensification of weather events. Among them are sea level rise, coastal flooding and erosion, storm surges and torrential rains, as well as landslides, droughts, and heatwaves. The threats are seasonally spread throughout the year, but the duration and intensity of the events is compromising the out-dated drainage, predominantly giving rise to diminished fresh-water availability. Analysis of the historic town centre and its infrastructure suggests to implement the combination of nature-based solutions like urban greening, parks and rooftops with preservation of historic water cisterns, terraced slopes and water-permeable pavements using traditional stone-works. These measures are believed to restore the urban water-cycles, address water-scarcity induced by droughts and heatwaves as well as to assist in diminishing floods.

Domain 4: 4.00 pm – 6.00 pm

Biodiversity and management of marine resources

Title: Response of marine species to environmental stress

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Marine ecosystems are exposed to multiple stresses linked to global change, such as severe temperature fluctuations, ocean acidification and chemical pollution. Added to these disturbances is the exposure of these species to specific or non-specific pathogens, whose occurrence in the environment is modified by climate change. The combination of abiotic and biotic stresses forms complex and evolving exposure sequences that have deleterious effects on aquatic organisms. In marine species, various physiological disturbances affecting metabolism, immunity and the endocrine system have been correlated with several types of contaminants, such as pharmaceuticals, heavy metals and organic chemicals. Other studies have shown the ability of environmental stresses to unbalance the microbiota of organisms that promote the emergence of disease.

Title: Assessing the impacts of sunscreens to coastal marine microbial communities

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Associated with the growth of human presence in coastal areas and awareness of the risks associated with exposure to ultraviolet radiation (UVR) is the use of sunscreens, which inevitably end up released into the environment through water-based recreational activities or effluents of wastewater treatment plants. These skincare products commonly contain a combination of inorganic nanoparticles that reflect UVR; and organic chemicals designed to absorb UVR and re-emit it in a lower-energy, less-harmful wavelength. Once in seawater, sunscreens get adsorbed to cell walls, causing physical effects such as shading or direct mechanical damage; or absorbed, undergoing translocation into the intracellular environment, impacting DNA, attaching to organelles and blocking normal functions, or increasing the autolysis by inducing the production of reactive oxygen species (ROS). This talk seeks to show some of the impacts of organic and inorganic UV-filters on specific marine bacteria associated to the endemic Mediterranean seagrass Posidonia oceanica, as well as the impacts of these pollutants to natural microbial communities in a supposedly pristine coastal area such as Antarctica.

Title: The Experimental Aquaculture Laboratory (AquaLab) of IICM-Okeanos: development of breeding techniques for marine organisms of low trophic level

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Sustainable seafood production is increasingly reliant on marine aquaculture, with a growing interest on low-carbon alternatives, particularly species at lower trophic levels. The cultivation of these species offers sustainability advantages due to their reduced feed energy requirements. This includes decreased energy inputs for formulated feed of herbivorous species, and no input for primary producers and extractive or unfed species. Since 2008, the IICM-Okeanos aquaculture research facility at the University of the Azores has been developing techniques for economically valuable species to promote sustainable aquaculture in the region. This presentation will showcase the advancement and optimization of hatchery methods for several low trophic species: *Megabalanus azoricus* (Azorean giant barnacle), *Haliotis tuberculata coccinea* (European abalone), *Patella aspera* and *P. candei* (limpets). Additionally, it will cover the micro and macro algae used as feed in these processes.

Title: Challenges in coastal management: addressing the bioinvasion of Rugulopteryx okamurae in Azorean waters

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In European waters, the non-indigenous brown macroalga *Rugulopteryx okamurae* is the most recent example of an unprecedented case of bioinvasion by a marine organism, causing considerable ecological impacts on coastal communities. In 2020, the species was first recorded in the north-eastern Atlantic archipelago of the Azores close to one of the islands largest harbors (Ponta Delgada, São Miguel Island), but presumably present since 2019. The alga quickly proliferated and over a very short period of time it became the dominant species covering most of the rocky bottom around the island and producing substantial accumulations of algal wrack on coastal areas. Native species were displaced, and invaded communities were structural different and supported a much more impoverished and homogenous assemblage. The species has also expanded to other islands where is now well-established. Here, we document the timeline of *R. okamurae* distribution across the archipelago, examining possible introduction and dispersion pathways. We also assess temporal changes in its life history characteristics and highlight its impacts on the structure of shallow water marine benthic communities. Finally, we discuss ongoing research and the challenges and perspectives associated with management strategies to monitor and mitigate the effects of *R. okamurae* on coastal ecosystems in the Azores.

Title: New insight into the reproductive biology of the crayfish Procambarus clarkii (Girard, 1852) (Crustacea, Cambaridae): a morphometric approach.

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The Mediterranean region is considered a hotspot for bioinvasions, and is threatened by a number of non-indigenous species currently expanding their ranges and increasing their abundances. Indeed, among the various elements threatening biodiversity, invasive alien species (IAS) are ranked as the second greatest cause of species endangerment and extinction after habitat destruction. *Procambarus clarkii* (Girard, 1852), in particular, is an extremely invasive crayfish species, exhibiting r-selected features and rapid growth rates. A very important field in the management of alien species is the morphometric approach to better investigate reproductive aspects. Thanks to this, we were able to find evidence of the presence of two biological alternative morphotypes in *P. clarkii* samples. This alternation in a reproductive and a non-reproductive (or quiescent) form, can be appreciate through the measurements and observation of anatomical features, in particular, the chelae length. The intra-sexual dimorphism whithin the morphotypes was evaluated through the allometric growth analysis. The relative growth of the body part of interest (Chela length) respect to a reference dimension (Carapace length) was examinated using the allometric growth equation. With the same method applied to the secondary sexual character (Gonopod length) we could provide for the first time the Size at Onset of Maturity, calculated from a morphometric point of view.

RESULTS: The presence of the two alternative morphotypes in *P. clarkii*, linked to its reproductive period, was statistically proven for the first time in the Mediterranean Island of Sardinia. The Size at Onset Maturity (SOM) could be estimated between 35- and 37.1-mm Carapace length.

This analysis may contribute to enhance the biological comprehension of *P. clarkii*, enlivening the dedicated guidelines for the taxonomic recognition of cambaridae species and implementing timely eradication and management plans.

Title: Arthropod traits as proxies for abundance trends in the Azorean Islands

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Human activities drive ecological transformation, impacting island ecosystems from species diversity to ecological traits, mainly through habitat degradation and invasive species. Using two unique long-term datasets we aim to evaluate whether species traits (body size, trophic level, dispersal capacity and habitat occupancy) can predict temporal variations in the abundance of endemic, indigenous (endemic and native non-endemic) and exotic arthropods in the Azores Islands. We found that body size is crucial to predict arthropods abundance trends. Small-bodied herbivorous arthropods showed a decrease in abundance, while large-bodied indigenous arthropods increased in abundance, mainly in well-preserved areas. Also, large-bodied exotic arthropods increased in abundance across the entire archipelago. Moreover, endemic canopy dwellers increased in abundance, while endemic ground-dwellers decreased in abundance. Simultaneously, exotic arthropods showed the opposite result, increasing abundance in the ground while decreasing abundance in the canopy. Finally, habitat influenced both endemic and exotic spider abundance trends. Endemic spiders that occupy solely natural habitats experienced a decline in abundance, while exotic spiders in the same habitats increased in abundance. Our study underscores the significance of arthropod species traits in predicting abundance changes in island ecosystems over time, as well as the importance of monitoring species communities. Conservation efforts must extend beyond endangered species to protect non-threatened ones, given the increased extinction risk faced by even common species on islands. Monitoring and restoration programs are essential for preserving island ecosystems and safeguarding endemic arthropod populations.

Title: Production of biosecure native oysters for aquaculture and restoration

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The University of Dubrovnik's mariculture laboratory is located in Mali Ston Bay, which is a hotspot for aquacutlure produciton of the native European flat osyter. This small bay, of only 28 km in length accounts for more than 85% of aquaculture prodcution of this species in the Mediterranean. With the Nature restoration law recently adopted by the European Commission, huge swathes of marine habitats are planning to be restored in European waters in the upcoming years. One of the priorities will be to restore natural oyster beds and reefs which were an important habitat in European waters of the past but are now practically non-existant. For such practices, as well as for kickstarting aquaculture in new sites, it will be mandatory to ensure a stable supply of biosecure oysters. This means that high emphasis will be placed on moving and translocating just oysters, without any hitchiking biofouling or intervalval organisms or pathogens, the introduction of which can have catastophic to the receiving site and ecosystem. For this purpose, the Bistrina Maricultutre Laboratory has recently established a native oyster hatchery which aims to produce completely biosecure juvenile oysters. It will also provide the service of screening and treating older juvenile and adult oysters from Mali Ston farms before translocation to other areas.

Domain 5: 1.30 pm – 3.30 pm

Data-driven solutions and renewable energy

Title: AIS Data for Maritime Transport Network modeling with temporal Graph

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A few years ago, we began to take an interest in AIS data and how it can be used to address a range of maritime and port issues. This data provides interesting information on the movement of ships around the world. We are particularly interested in container transport. There are several possible angles of study based on this data: the study of the impact of the takeover of certain ports by China, the prediction of ship arrival dates, the evolution of maritime networks over time or the study of port performance. Recently, we have focused on reconstructing maritime networks from AIS data and modelling these networks using temporal graphs. Our objectives are to be able to analyse the evolution of these networks on the basis of our historical data and, why not, to predict their evolution in the future.

Title: The potential of the Faculty of Electrical Engineering WPUT in the area of renewable energy

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The Faculty of Electrical Engineering of ZUT has considerable intellectual potential in the field of modern energy conversion technologies. Research has been and continues to be conducted on electromechanical energy converters using permanent magnets, which have high efficiency. Additionally, the Department's employees deal with unconventional electrical machines that have the so-called hybrid excitation. This allows for expanding the operating range of such machines, making them suitable for use in applications related to the generation of electricity from wind energy, which is highly stochastic in nature. Additionally, the Faculty cooperates with companies that deal with, among others: issues related to the conversion of electrical energy using power electronic converters. This combination of scientific and industrial experience will allow the development of comprehensive solutions for generating electricity from wind turbines.

In addition, the faculty has specialists working in laboratories designed to conduct non-destructive testing. These scientists could cooperate in the field of research on structural elements, e.g. parts of wind turbines.

Title: Marine Robotics and Artificial Intelligence

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At a time of growing concern for the marine environment, the fusion of marine robotics and intelligent data management is emerging as a critical frontier, not only for industrial and transport applications, but also for environmental monitoring and conservation.

Using cutting-edge technologies such as Autonomous Underwater Vehicles (AUVs) and Autonomous Surface Vehicles (ASVs), researchers can access and explore the depths of our oceans with unprecedented precision and efficiency. These marine robotic platforms enable the collection of vast amounts of data on marine ecosystems, biodiversity, weather patterns and more, providing the scientific community with a new way to better understand and assess the state of the environment.

The transformative power ultimately lies in the intelligent management and analysis of the data collected. Using advanced algorithms and machine learning techniques, complex data sets can be interpreted and transformed into actionable insights, highlighting key trends, for example, identifying ecological threats and informing strategic conservation efforts.

Members of the UIB Marine Robotics Lab are ready to collaborate on research projects with EUNICoast members, bringing their expertise in autonomous and intelligent systems applied to marine scenarios. We would also like to share our knowledge and experience for teaching initiatives focused on the marine context from a multidisciplinary perspective.

Title: Citizen Science for Marine- Renewable Energy and marine drone's utilisation

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Nowadays there is an increased usage and demand on unmanned vehicles, including submarine drones. The unmanned submarine vehicles extend the horizon not only on sea exploration, but also on underwater analysis and mapping. The capabilities of the drones to operate on variety of sea depts, overcoming the negative effect of caisson sickness effect on the diver. This allows a wide range of explorations and sea water analysis, including analysis of the possible renewable energy sources of the sea or ocean water such as harvesting waves energy or exploiting the hydrogen sulfite as a fuel.

Title: Projects in the maritime sector of the Institute for renewable energy systems

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The maritime sector, a cornerstone of global trade, is currently at a pivotal juncture, since the world becomes increasingly aware of the environmental impact of various industries, there is a pressing need to address the sustainability of maritime transport. This includes the production of carbon neutral fuels and the possibilities of using renewable energies for the maritime sector. With the experience of more than 30 years in the applications of renewable energies the institute of renewable energy systems (IRES) at the university of applied sciences in Stralsund is aiming to distribute and deepen the knowledge in this field. Prior projects focused on the production of methanol and ammonia from green hydrogen for the maritime sector. In addition, the infrastructure for electric boats has been investigated. These research results have been included in the curriculum of the courses at the university with the goal of reducing the environmental footprint of maritime activities. Embracing sustainable practices is not just an environmental imperative but also an economic opportunity, positioning the maritime industry for a resilient and responsible future.

Title: Virtual Lab and Center for Doctoral Training (CDT) in Renewable Energy

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In University European Alliance, such as in the EUNICOAST alliance, combined programs need to be organised in order to give birth to a common project, which become touchable in all the dispersed universities in Europe. Therefore, and following previous discussions between the University Le Havre Normandy members and Andreu Moia-Pol during his week of visit from 27th of Nov. 2023 to 1st of Dec. 2023, we decided to propose two actions, the creation of two common activities: “Virtual Lab on Renewable Energy” and “Center for Doctoral Training (CDT) in Renewable Energy”

The Virtual Lab on Renewable Energy could include several research topics such as: Offshore wind, Tidal energy, Wave energy, Smart grid for remote places and islands, Net zero cruise (electrification of ports for cruise boats during overnight stop), Storage (Hydrogen, Bidirectional Hydro-power), Water desalination. These topics are already treated in several involved universities of the alliance. This should, we hope, be a structuring project for the alliance.

The second idea is the creation of a “Center for Doctoral Training (CDT) in Renewable Energy”. The CDT should be able to fund, via one to two 3-years PhD funding from each university to give an overall of 10-15 PhD grants on the project duration (depending of involved universities). Those PhD grant would be spread among the partners as co-supervised PhD (a co-supervised PhD means supervised by PhD directors from two different EUNICOAST universities). Off course, the topics of the PhD will be aligned with the research topics of the Virtual Lab. Also dedicated summer school program, which could be open to other PhD students.

Title : Blockchains for Smart Ports

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The growth of massified international trade via containerized maritime transport is driving the evolution of ports. In order to manage the growth of these flows in a context of constrained territorial infrastructure development, it is necessary to optimize services and make operations as fluid as possible. The digitization of transport documentation and the securing of associated intangible transactions are therefore essential to make port passage more fluid, but also to make the entire transport chain along the logistics corridors more fluid. Blockchain is a technology designed to secure transactions and to accompany the massification of information flows associated with the massification of goods.

Blockchain technologies are generating a craze for smart ports development in the context of the deployment of the digitalization of logistics transactions. Indeed, they ensure a very high level of security for these transactions, which is essential to restore confidence in the new digitalization procedures. The automation of this security is a key factor in making port passage dramatically more fluid. But these Blockchain technologies also raise questions, because of the complexity of understanding them, the energy costs and the uncontrolled speculation in the digital currencies needed to validate transactions, particularly on public Blockchains. This contribution/presentation aims to demystify these technologies in order to better understand their real added value and to take stock of the obstacles that still need to be overcome to ensure their sustainable deployment on a large scale.

Domain 5 and 4: 4.00 pm – 6.00 pm

Biodiversity, computer and Engineering sciences

Title: The challenges of modeling maritime invasive species

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Invasive species refer to plants, animals, or microbes from outside a particular ecosystem that, once introduced, harm native species and their environment. Although often associated with terrestrial environments, invasive species pose a significant threat in marine ecosystems as well. They enter marine habitats through various pathways such as ship ballast water, aquaculture activities, and unintentional releases.
For example, algae, fish, jellyfish, and crabs, among others, have invaded the Mediterranean. Marine invasive species have a significant economic impact. They can damage infrastructure, disrupt commercial fishing, and decrease property values. Strategies to combat this phenomenon aim to prevent and manage the spread of marine invasive species and encompass regulations on ballast water management, quarantine and inspection initiatives, as well as public education and outreach campaigns. While field studies and observations have contributed significantly to our understanding of biological invasion, recent advancements would be difficult to achieve without the extensive utilization of mathematics, especially through mathematical modeling. The reason for this lies in the very nature of the problem. Conducting regular studies is often infeasible due to technical and experimental impediments, and laboratory experiments are often ineffective due to inconsistencies in spatial scales. In this presentation, after a brief overview of the challenges of modeling maritime
invasive species, some examples will be provided to illustrate how mathematical modeling can help understand and measure the impacts of this phenomenon, the effectiveness of strategies implemented, and the long-term evolution.

Title: Computer modelling of biological systems

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We focus on the development and application of computer models for the simulation of biological systems. Various simulation methods are in our toolbox. Discrete-event simulation or the use of simulation methods for solving differential equations were used for whole-body models of organisms. Metropolis Monte Carlo and Replica Exchange methods enabled the use of massively parallel systems such as the North German Network for High Performance Computing. Current technologies such as WebGL were used for visualization, including on mixed reality. Advanced software engineering methods were applied to develop simulation and analysis software utilized in our research. We employ open science frameworks for management of data.

The general approach of the group is to build mechanistic computer models of biological processes. Experimentally observable parameters are calculated and compared with experimental data. The discrepancies are used to identify gaps in current knowledge and to infer biological relationships. This modeling approach is possible even with comparatively small amounts of data. As an example, we successfully concluded that natural killer cells (NK cells), a part of the immune system, induce a dormant state in metastases. In another example, we were able to show how certain proteins change the spatial structure of chromatin at a fundamental level. Currently, we are in contact with several institutions such as the Research Institute for Farm Animal Biology (FBN Dummerstorf), the Federal Agency for Nature Conservation (BFN Insel Vilm) and the local chapter of the he Nature and Biodiversity Conservation Union (NABU Stralsund) to explore the possibility of collaborating on research in the field of biodiversity protection.

Title: Using acoustic monitoring to evaluate marine biodiversity and human impact

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Advanced and effective methods for tracking biodiversity and human activities are pivotal to ensuring both are managed sustainably. Among the emerging technologies and methods, acoustic monitoring stands out as a powerful tool capable of providing valuable information to assess biodiversity, rooted in the recognition that natural environments are teeming with sound. In recent years, advancements in autonomous recording technology, which can continuously capture audio recordings over extended periods, coupled with sophisticated data analysis techniques, have popularized the use of acoustic monitoring in biodiversity research and ecosystem assessment. These recordings may serve as acoustic snapshots of communities, offering valuable data on the composition, abundance, and behaviour of species. One of the most compelling advantages of acoustic monitoring lies in its capacity to transcend traditional limitations associated with visual surveys, providing uninterrupted surveillance of communities. To explore innovative applications of acoustic monitoring, I present findings from distinct case studies to: 1) explore acoustic monitoring for assessing the effectiveness of seagrass restoration efforts; 2) evaluate the impact of local temperature patterns and heating events on the acoustic fish community inhabiting coralligenous reefs; 3) verify the use of acoustic bioindicators to assess the impact of leisure boating disturbances on common bottlenose dolphins; and 4) assess whether acoustic data can be used to build species distribution models. The results encourage the use of acoustic monitoring as a complementary tool to traditional techniques for studying biodiversity variability. Additionally, the need to gather data from various geographical areas and wide gradients of human influence to help define the limitations of acoustic monitoring is highlighted.

Title: Octopus's Garden – teaching to and learning from coastal workers and their families

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In the last decades, there has been an increase in science education outside of the school grounds, as well as growing interactions between researchers and the general public in outreach actions. In this regard, it is essential to turn science into something meaningful to the non-academic public and involve them in data collection. Coastal workers are valuable stakeholders who spend a lot of time observing the ocean and have centuries of cultural knowledge to share. On the one hand, researchers need to use adequate language to effectively reach this specific public. On the other hand, academics should learn how to truly listen and value their input. One approach is to conduct informal interviews in their working environment instead of the traditional inquiries that may exude superiority. Another approach is to create appealing activities, letting them make and answer questions as they observe the subjects. Additionally, outreach activities should be developed with the partners and children of coastal workers. That would allow the scientific message to be passed to the whole community and provide the researcher with different experiences and points of view. Ultimately, when coastal workers' knowledge is valued, they may easily and eagerly contribute to the effort of biodiversity protection.

Title: Geomatics and underwater photogrammetry for mapping and monitoring coastal and marine environments

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Geomatics is an interdisciplinary, systemic approach that deals with collecting, organising, analysing and sharing geospatial data for various applications and in different contexts. It encompasses and integrates different disciplines, such as surveying, navigation and positioning, remote sensing, cartography and geographic information system, informatics, and artificial intelligence. In the context of biodiversity protection, nature-based solutions, sustainable exploration of coastal and marine resources, geomatics provide tools and methods for mapping and monitoring, assessing the impact of stressors and effect of protection actions. This presentation will illustrate how geomatics, in particular underwater photogrammetry, supports non-invasive and high-resolution monitoring of benthic species. Examples of various interdisciplinary projects carried out in different coastal and underwater environments will be showcased, with emphasis on the critical issues and methods developed and currently under development to facilitate increasingly efficient and flexible monitoring procedures supporting preservation and communication actions.

Title: How high-resolution marine geophysical exploration along rocky coasts may help to better define potential natural hazards. The example of Normandy coast, France

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The Normandy region is characterized by various geological contexts and cliffed rocky coasts, such as the Cotentin Peninsula within the North Armorican Massif made of intensely fractured and folded rocks with granitoid intrusions and the Seine-Maritime in the Paris basin, with chalk sedimentary deposits. Even if the Normandy region is considered as a Stable Continental Region (SCR), coastal chalk cliffs of Seine-Maritime are regularly collapsing, conducting to general coastal retreat and the North Cotentin "old" faults are suspected to be potentially reactivated under the actual tectonic state of stress recorded in NW Europe. Deep faults reactivation generates earthquakes. The large pannel of marine earthquakes recorded in the Cotentin and the Channel argue the occurrence of large-scale faults.

Recent geophysical cruises (high-resolution bathymetry and seismic reflection exploration) along Cotentin and Seine-Maritime coasts have evidenced previously unknown submarine geological structures, such large-scale faults able to be reactivated on the Cotentin margin and continuous submarine steps parallel to the Seine-Maritime coastline, from which the precise location is crucial to determine long-term (millenial years) coastal retreat rates to evidence a modern coastal erosion acceleration.

The use of the French oceanographic fleet, operated by ifremer, with 5 coastal ships may be deployed in the Channel, Atlantic and the Mediterranean for scientific purposes, from coastal to offshore waters. The aim of the fleet (french national instrument) is to support research program from the seafloor exploration and fundamental knowledge to more applied underwater mapping projects. Ships are doted of up-to-date acoustic equipement for acquiring, monitoring, processing and interpreting data from the seafloor (multi-beam echosonders, sub-bottom profilers, gravity corer, rock dregdes…). Such type of acoustic mapping always presents better resolution than aerial and satellital acquisition, because it reaches a precision of about 1m, equivalent to the inland field-work.

Title: AI and automatic speech recognition language technology for the low-resource language of Faroese

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This research aims to develop robust automatic speech recognition (ASR) technology for Faroese, a low-resource language, to address challenges posed by limited data availability in real-world settings. Despite significant advancements in ASR technologies, languages like Faroese remain underrepresented due to the scarcity of large, transcribed datasets. The project will utilize state-of-the-art multilingual AI models such as Whisper and wav2vec 2.0, employing cross-lingual transfer learning techniques to enhance performance and accuracy. Existing Faroese ASR datasets, including the 100-hour Ravnursson corpus, will be leveraged. Strategies involving knowledge distillation will be explored to create efficient and scalable ASR models suitable for deployment in computationally constrained environments. By investigating these methods, the research aims to produce an ASR system that serves the Faroese community and provides methodologies applicable to other low-resource languages. Anticipated outcomes include improved accessibility for Faroese speakers and contributions to the preservation and digitization of linguistic diversity.

List of attendees: reference registration list via weezevent

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