3rd MARINE BOARD FORUM
NEW TECHNOLOGIES FOR A BLUE FUTURE

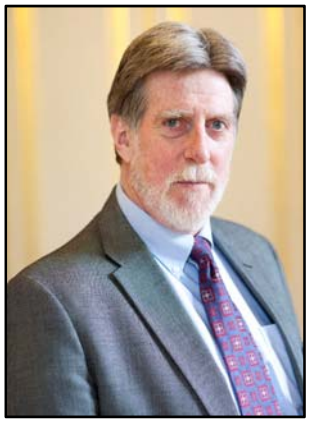
On 18 April 2012, experts from academia, industry and policy from 71 organizations gathered at the 3rd Marine Board Forum in Brussels to discuss future and emerging "Blue Technologies". The Forum highlighted innovation hotspots for the European marine sector, showcasing emerging technologies for driving growth, novel applications for human wellbeing and tools for next generation marine knowledge.

Towards a Knowledge Based Society

In an opening address, Dr. Kostas Nittis, Marine Board Chair, stated that ***"Blue Technologies drive science and innovation, supporting economic growth and wellbeing."*** He also highlighted the need for a Knowledge-driven Society, explaining that ***"Education and knowledge transfer hold the key to unlocking knowledge and ensuring that innovations are relevant and have a high impact."***

Dr. Kostas Nittis, Marine Board Chair.

The Forum highlighted the continuing need for blue skies ocean research to drive the future economy.



In a keynote speech on **'Understanding the planetary life support system: next generation science in the ocean basins',** Professor John Delaney, University of Washington, called for society to adopt a **systems approach** and to **design bold, innovative ways to further understand our 'inner space' - the global Ocean.**

> ***"We are entering a new era of engineering – Imagineering…….Rapid advancements in areas like fibre optic cables are offering the reality of unlimited power and constant telepresence in the oceans...these technologies and the knowledge they produce are going to vastly enhance the planet we live on and the future planets we will explore."*** Prof. John Delaney, University of Washington, USA.

The **call for fundamental research was supported by other Forum participants** including speaker Prof. Fiona Regan, MESTECH, National Centre for Sensor Research, Ireland. ***"Many relevant technology developments actually started out as blue skies research ideas and have taken years to progress to the innovations we see today,"*** she explained

Innovation hotspots driving future investments

The event showcased emerging technology that will empower society to manage, protect and sustainably benefit from the oceans vast resources. Speaking about developments in **acoustics**, Olav Rune Godø, Institute of Marine Research, Norway explained, ***"Enhancements to acoustic resolution and increasingly abundant data streams are providing new applications that will advance ecosystem-based management such as predictive modeling and species-specific monitoring."***

Technology was also highlighted as driving bio-inspired breakthroughs in areas such as advanced textiles. Bert Groenendaal, SIOEN Industries N.V., Belgium, described some of the latest bio-based polymers with multiple applications for marine and maritime sectors from oil booms to bio-platforms for open sea biomass cultivation. ***"We are entering a new era of sustainable materials."*** he said.

Marine applications for advanced textiles (SIOEN Industries).

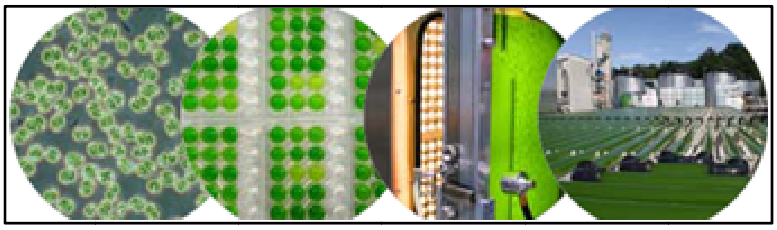
Unprecedented access to the deep-sea and innovative molecular techniques were also noted as driving new opportunities for bio-prospecting, leading to new discoveries and applications of marine biological resources.

> ***"Molecular studies of sponges – the most ancient metazoan taxa - are offering insights into human gene synthesis, control and expression leading to possibilities for human bone regeneration."***
> Professor Werner Müller, Johannes Gutenberg University, Mainz, Germany.

Technology innovations for a sustainable future

The event supported technology innovations that drive smarter, more efficient marine and maritime activities whilst maintaining responsibility towards nature.

Using the case study of AlgaeParc, Ellen Slegers, Wageningen University, the Netherlands, explained how **the reality of large-scale algae biofuel production is one step closer** thanks to pilot studies integrating natural and social sciences and creating an ideal test-bed for trialing technological innovations.



Biofuel production (Wageningen University, the Netherlands).

Hybrid data infrastructure was also noted as a **key technological advancement** for increasing the accessibility to data and impact of knowledge applications for marine safety, resource management and conservation.

> "***The cloud [computing] approach as a service offers the capability to run processes and observing capability up to 45 times faster for data processing, reducing costs of large distributed e-infrastructures."***
> Pasquale Pagano, ISTI, CNR, Italy and iMarine Technical Director.

Using Nature's Own Solutions

Taking inspiration from nature, **biomimetics** was presented as an **emerging area offering solutions to biofouling** – the undesirable attachment and accumulation of organisms on immersed surfaces – which may lead to significant savings for maritime industries.

"Technology is allowing us to replicate nature-inspired design, to create unique structure features to prevent fouling….this will ultimately reduce the cost of ownership and maintenance whilst ensuring better data quality." Prof. Fiona Regan of MESTECH, National Centre for Sensor Research, Dublin City University, Ireland.

A talk by Prof. Huib de Vriend of ECOSHAPE, the Netherlands, highlighted the need to maintain a balance with the natural world and minimize impact on the marine environment.

"Building with Nature is vital to ensure that natural processes are taken into account….This is achievable through the Golden Triangle of Innovation – government, private sector, knowledge sector – which together can promote evidence-based approaches to marine management."
Prof. Huib de Vriend, ECOSHAPE, the Netherlands.

Delfland Sand Engine, Rijkswaterstaat / Joop van Houdt.

Advanced technologies driving Marine Knowledge

The 3rd Forum highlighted Europe's position as a world leader in several marine and maritime sectors, from sensor development to off-shore renewable energy, with a clear need to promote multi-stakeholder collaboration to fast-track commercialization and drive new growth.

Speaking about **advances in environmental micro sensor development**, Dr. Matt. Mowlem, National Oceanography Centre (NOC), Southampton, UK, showcased new tools for monitoring complex biological and chemical oceanic processes. He noted that the latest **'lab-on-a-chip' solutions** are reaching new levels of maturity with **far-reaching applications from marine genomics to monitoring contaminants**. But, he stressed, academia alone cannot bridge the current funding gap between prototypes and the mass market.

"***Engaging with industry is essential to fast-track product commercialization and maximize the impact of emerging technologies.***"
Dr. Matt Mowlem, NOC, Southampton, UK.

Multi-sector partnerships

Stakeholder collaboration was also presented as vital for driving multi-use of ocean space towards a smarter, more efficient and environmentally sustainable use of European seas and oceans.

IBM Distinguished Engineer, Dr. Harry Kolar, presented **SmartBay**, a multi-sectoral initiative to provide real-time environmental monitoring of water quality, sea conditions, and weather for Galway Bay, Ireland.

> ***"Next generation integrated coastal and marine monitoring and management is essential so we can move from state-funded approach towards beneficial partnerships."*** Dr. Harry Kolar, IBM Distinguished Engineer.

The benefit of collaborative initiatives was also clear for other marine and maritime sectors. Prof. Bela Buck, Alfred Wegener Institute for Polar and Marine Research (AWI), Germany explained that such an approach was essential for driving growth in industries such as off-shore aquaculture – currently valued at US $200 Million per year worldwide. "***Building consortia through integrated multi-trophic aquaculture will help resolve user conflicts and drive a more efficient green economy***," she explained. Industry representatives also stressed the importance of a bottom-up approach for technology developments. ***"Innovations should answer customer needs,"*** stated Philippe Jean, SBM Offshore N.V., Netherlands, when explaining the research and development route to using **electro active polymers as novel converters for creating wave energy**.

Investing in Knowledge

The Forum also stressed the importance of investing in marine knowledge in order to achieve economic growth in the context of responsible environmental management.

In a key-note address at the 3rd Marine Board Forum, Dr. Manuela Soares, Director of the Environment Directorate, DG Research & Innovation, European Commission, described European research and innovation initiatives on Marine Technologies, calling for:

> "***New and innovative technological solutions [are required] …to ensure the protection and use of the sea and waterways and supply of energy, food and materials are economically sound and conducted in an environmentally sustainable way."*** Dr. Manuela Soares, DG Research and Innovation, European Commission.

When discussing **the need for measurable knowledge transfer**, David Murphy, AquaTT, explained that effective Knowledge transfer is set apart from dissemination because it is tailor-made and targeted to specific end-users. ***"Scientists do not always realize the cross-cutting applications of knowledge,"*** he stated. "*Clearly defining the type of knowledge, who owns it, the market readiness and where it's available will really maximize the impact and will transform the value we gain from marine knowledge.*" In a presentation on **'Commercializing marine science: Process to production',** Professor Stephen de Mora, Plymouth Marine Laboratory (PML), UK, noted that whilst there are still significant hurdles moving from research funded technology developments to industry based production, recognizing the motivation and fostering innovation was key to achieving success. ***"There is a real potential for gaining financial benefits from scientific excellence through horizon scanning such as tracking market trends and identifying emerging markets,"*** he explained.

Summarizing the event, Marine Board delegate Geoffrey O'Sullivan, Marine Institute Ireland concluded "***It is inspiring to note that many innovations that will progress marine science will come from areas outside marine science including robotics, advanced IT solutions and other emerging technologies converging on the oceans."*** Regarding the need for an integrated approach, Geoffrey O'Sullivan stated that all sectors could contribute on a multidisciplinary level and that there was evidence that collaborative public and private networks accelerate and catalyze the development and utilization of these technologies in the marine environment.

Participants at the 3rd Marine Board Forum including a Panel Discussion with speakers (left to right) Prof. John Delaney (University of Washington, USA), Dr. Manuela Soares (Director, Environment Directorate, Directorate-General for Research and Innovation, European Commission), David Murphy (Aqua TT, Ireland), Prof. Stephen de Mora (Plymouth Marine Laboratory, UK) and Dr. Harry Kolar (IBM Research).

Contact

Marine Board Secretariat: +32 (0) 59 34 01 63
Email: info@marineboard.eu

A full programme and speaker presentations can be downloaded from the Marine Board website: http://www.marineboard.eu/fora/3rd-marine-board-forum

Founded in 1995, The Marine Board provides a pan-European platform for its member organizations to develop common priorities, to advance marine research and to bridge the gap between science and policy, in order to meet future marine science challenges and opportunities.
www.marineboard.eu

The Marine Board works in association with the European Science Foundation (ESF), an independent, non-governmental organization that promotes collaboration in scientific research, funding of research and science policy across Europe. www.esf.org

The Marine Board Forum series brings together a wide range of marine science stakeholders (scientists, European and national policymakers, pan-European and regional networks, etc) to discuss and develop a common position on a marine science topic of common concern. The forum bridges the gap between the scientific community, policymakers and other stakeholders to advance the issue at hand.