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Food security through sustainable marine aquaculture

German Society for Marine Aquaculture strengthens Fraunhofer IMTE

Aquaculture is a growing market around the world. From animal feed production and food manufacturing to pharmaceuticals and medicine, a wide range of industries are profiting from the insights provided by fundamental and applied research into aquaculture — considered a key research and development field for providing food security to a growing global population. As of January 1, 2022, the research team at the German Society for Marine Aquaculture (Gesellschaft für Marine Aquakultur mbH, GMA) has joined the Fraunhofer Research Institution for Individualized and Cell-Based Medical Engineering IMTE in Lübeck to further consolidate the institution's expertise in this area. This provides the research institution with a second site. It also bundles expertise in the research sector, which will strengthen the maritime economy in northern Germany and promote the development of innovative technologies to improve the ecological and economic balance sheet of aquaculture.

The demands placed on aquatic organisms are rising continuously — especially for their use as a food, animal feed or nutritional supplement. Stagnating yields from the fishing industry and the increasing needs of a growing global population have led to a supply shortfall that is already being covered in half by aquaculture. However, the further expansion of aquaculture is coming up against various limitations at both the regional and supra-regional level, which has given rise to a need for new biological and technological solutions. To enable the sector to develop over the long term, these innovations must be sustainable from both a social and environmental perspective.

The Fraunhofer-Gesellschaft has long conducted research into innovative, sustainable solutions in the field of aquaculture for an internationally focused market with increasing growth rates and to help provide food security in a way that protects the environment. To further advance this area of research, the research team at the German Society for Marine Aquaculture (GMA) is now further consolidating the expertise of Fraunhofer IMTE, with the support of the state of Schleswig-Holstein and Christian-Albrechts-Universität zu Kiel (CAU). The complementary skill sets at the two institutions will enable existing scientific and infrastructural capacities to be used effectively in the development process for aquaculture and the associated applied research, and the fields of research to be expanded significantly.

Contact

Dr.-Ing Svenja Ipsen | Fraunhofer IMTE, Lübeck, Germany | Science Communication | Phone +49 451 384448-197 | svenja.ipsen@imte.fraunhofer.de

Sustainable, ecological and humane aquaculture

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As Karin Prien, Science Minister for Schleswig-Holstein, emphasizes: “The integration of the GMA in Büsum into the Fraunhofer Institute IMTE in Lübeck is an enormously important initiative for science policy and offers a number of advantages. It strengthens research into aquaculture in Schleswig-Holstein and promotes the further development of the Fraunhofer Institute in Lübeck. This initiative also consolidates the strategic collaboration between CAU and the Fraunhofer-Gesellschaft, and further increases the prominence of the Fraunhofer-Gesellschaft within Schleswig-Holstein.”

“Fish populations and the natural balance of our seas are facing significant threats from overfishing and pollution. At the same time, the global demand for aquatic organisms continues to grow,” says Prof. Reimund Neugebauer, President of the Fraunhofer-Gesellschaft. “The research team from the German Society for Marine Aquaculture (GMA) provides a complementary expansion to the expertise and infrastructures at Fraunhofer IMTE in the areas of feed development, plant optimization and animal welfare. This will enable us to provide even better support to companies along the entire aquaculture value chain, exploit existing potential and be successful in the face of international competition.”

“Adding a second location in Büsum to the Fraunhofer IMTE in Lübeck will promote targeted innovation in the areas of fish nutrition and, above all, fish health through the interplay of the Lübeck cross-innovation areas of intelligent instrumentation with the work areas of imaging, additive manufacturing and artificial intelligence,” says Prof. Thorsten Buzug, Managing Director of the Fraunhofer research institution. “Fraunhofer IMTE operates as a research unit for intelligent systems and processes, especially with regard to instrumentation and digitalization for the healthcare sector and bioeconomy. Aquatic technologies for healthy nutrition and a healthy environment are important elements at the very start of the health chain and reduce the risk of subsequent illness.”

Prof. Carsten Schulz, Scientific Director at the GMA stated that “The GMA has always served as an interface between applied research into aquaculture and the private sector and has established a broad national and international network that spans the entire aquaculture sector. The close link between the GMA and the CAU has also made an important contribution to the vocational training of the scientists of tomorrow. The integration of the GMA research team into Fraunhofer IMTE brings together different, innovative research areas to create a unique institution for research and scientific vocational training in the field of aquaculture. This will enable us to identify new potential for the blue bioeconomy and provide the sector with a decisive impetus for further developments.”

CAU President Prof. Simone Fulda underlines the benefits for all parties involved: “The research projects initiated by the GMA are an important building block for the strategic development of the northern German innovation area. The increased interlinking with Fraunhofer IMTE is a great opportunity to exploit the synergies in our state even better. Together

we develop science-based answers to current and future requirements for marine aquacultures.”

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“Hansenetz” networking project

To further strengthen the regional and Germany-wide economy in the field of aquaculture, the “Hansenetz” project funded by the state of Schleswig-Holstein is creating a technology network for bringing together know-how. This focuses on linking together the maritime economy in northern Germany and developing innovative technologies for improving the ecological and economic balance sheet of aquaculture.

Action areas include the reduction of anthropogenic environmental impacts caused by the discharge of nutrients into waterways and energy savings to improve cost and resource efficiency. The expertise of the GMA will be integrated into the Hansenetz. The following institutes of the Fraunhofer-Gesellschaft will be involved in the initial stage: Fraunhofer Research Institution for Individualized and Cell-Based Medical Engineering IMTE, Fraunhofer Institute for Microstructure of Materials and Systems IMWS, Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Fraunhofer Institute for Computer Graphics Research IGD, Fraunhofer Institute for Molecular Biology and Applied Ecology IME and Fraunhofer Institute for Integrated Circuits IIS, Division Engineering of Adaptive Systems EAS.

The Hansenetz will be perpetuated through the establishment of a cross-institute “Fraunhofer Center for Aquaculture Research,” where the participating Fraunhofer Institutes can combine and further develop their expertise over the long term.

German Society for Marine Aquaculture

The German Society for Marine Aquaculture (Gesellschaft für Marine Aquakultur mbH, GMA) was founded at the end of 2004. It operates a research facility for the expansion of aquaculture at its site in Büsum (SH) to support and implement projects for applied research and development relating to the breeding and farming of organisms in fresh water and sea water, as well as in the area of biomass production. It also serves as a transfer point for both knowledge and technology. In addition to its specific expertise in the breeding and farming of fish and other aquatic organisms, the GMA operates a modern research infrastructure for aquaculture.

Please direct your questions to

Fraunhofer IMTE, Dr.-Ing. Svenja Ipsen, Science Communication
Phone: +49 451 384448-197; E-Mail: Svenja.Ipsen@imte.fraunhofer.de