
The 2024 COMPAMED Innovation Forum: Implant Technologies Revolutionise Medicine



Major economic significance of high-growth field

Medical technology implants have revolutionised the healthcare sector. Thanks to miniaturisation and their growing intelligence, small, powerful devices are performing more and more tasks in the human body. "From pacemakers to artificial joints and innovative neurological implants, they offer a wide range of solutions for medical needs", explains Dr Thomas R. Dietrich, CEO of the International Microtechnology Business Network IVAM. Given this background, the general topic of this year's COMPAMED Innovation Forum was smart implant technology. The digital event, held as a webinar on 3 June, was once more presented jointly by IVAM and Messe Düsseldorf and offered insight into a key topic of COMPAMED, which is again scheduled to take place in the Messe Düsseldorf trade fair Halls 8a and 8b from 11 to 14 November 2024.

The leading international trade fair for suppliers of the medical technology industry, which is always held in parallel to the world's leading medical trade fair MEDICA, offers the full spectrum of materials, systems, products and services for medical technology. "In the year before, MEDICA and COMPAMED recorded a total of 83,000 visitors. Based on current booking trends, we again expect more than 750 exhibiting companies at COMPAMED and more than 5,000 at MEDICA", estimates Christian Bigge, Senior Project Manager at Messe Düsseldorf.

The market for medical implants shows significant growth potential. According to Skyquest Technologies Group, the global market in 2022 was estimated at 90.3 billion US dollars and is expected to grow to 152.85 billion dollars by 2030. Medical implants are designed to restore bodily functions, alleviate pain and improve quality of life. The increasing prevalence of chronic illnesses and age-related conditions such as arthritis and cardiovascular diseases are driving market growth. Advances in implant technology and minimally invasive procedures also offer considerable potential for development.

Magnetic Force for Smart Implants

Magnets have an important role to play in the further development of implants. Two factors are of particular significance here. Magnet technology improves patient outcomes by reducing invasive procedures and increasing quality of life on the one hand and by covering an extensive range of applications from cochlear implants to implantable medication on the other. This is also due to the fact that both magnetically soft and magnetically hard materials are available. If these two material types are magnetised, this results in different possible behaviours and applications: magnetically soft materials are relatively easy to change in a magnetic state, while magnetically hard materials are difficult to change and are thus considered permanent when magnetised.

"Thanks to this variety of outcomes, using our magnets offers a range of technological and clinical advantages. These include precision control of implant functions for better therapeutic results, non-invasive adjustments and energy transmission, increased patient comfort due to smaller, more efficient implants and improved safety thanks to strict compliance with legal standards", reported Mike Shilling, Medical Market Manager at Dexter Magnetic Technologies, as part of the COMPAMED Innovation Forum.

The company is one of the leading developers of magnetic solutions for implantable medical devices, for instance a device to support cardiac function which operates with minimally invasive heart pumps that require miniaturised motors. High magnetic moment ensures the required torque while the high coercive force offers resistance against demagnetisation. "This means that we can further reduce the size and width-to-height ratio", says Schilling. The lymphatic drainage project is currently still in development. It uses magnetic coupling technology to facilitate moving and draining



Photo: The IVAM Microtechnology Network is a cooperation partner of Messe Düsseldorf for the COMPAMED Innovation Forum (© Constanze Tillmann).

lymphatic fluid and aims to overcome the limitations of the methods used to date.

3D Printing's Increasing Importance for Implant Technology

3D printing is gaining importance for implant technology. Formlabs is a leading manufacturer and developer for the entire spectrum of 3D printed hardware, software and materials for prototyping and production. For example, the company develops biocompatible materials for medical applications. During the COMPAMED Innovation Forum, Shiden Yohannes, Manager Medical Market Development at Formlabs, demonstrated how 3D printing makes manufacturing low-cost, patient-specific models for pre-operative planning and training possible. According to Yohannes, a study carried out by Ghent University has shown that 3D printed models can be used for training carotid stenting.

The European MAT(T)ISSE project has the goal of developing an innovative breast bioprosthesis for breast cancer patients. The bioprosthesis (a class 3 medical device) combines a synthetic network with a 3D printed absorbable structure that marks the volume to be reconstructed. This technology allows breast tissue to be regenerated through autologous adipocyte transplantation. The researchers are also studying other applications for reconstructive implants.

Open Communication and Impermeable Sealing at the Human-Machine Interface

Professor Niels Benson of the University of Duisburg-Essen presented new communication options for implants at the COMPAMED Innovation Forum. His start-up airCode develops wireless communication technologies for medical implants that can interact with smartphones via Bluetooth, for example to give status updates. These technologies use proprietary antenna modules in combination with data management software for application integration. "We make communication possible even in the most challenging environments, for example in the vicinity of water or metal", says Benson. To date, conventional smartphone communication methods are not compatible with medical implants, which is why medical experts and special equipment are required to run updates and manage device interaction.



Photo: Leading international platform for suppliers to the medical technology industry - COMPAMED in Düsseldorf (© Constanze Tillmann).

Glass-to-metal seals are crucial to ensure the reliability and durability of implants.

Schott, a glass manufacturing specialist, has been developing hermetic glass-to-metal seals for more than 80 years. This technology is particularly suited for the next generation of active medical implants and batteries, as outlined by Julia Hütsch, Product Manager Medical Electronics at Schott, in her talk at the Forum. Glass-to-metal seals and hermetic housings have compelling advantages, for example in terms of biocompatibility, extreme impermeability and "cardio-friendliness". This means that they can also be used for pacemakers and neurostimulators, which is a big plus on the growing market for implants.

Dr Martin Schüttler, co-founder of CorTec, reported on the further development of the company's Brain Interchange System at the Forum. "The system is able to exchange information between biology and technology, between the brain and a computer. Our system provides the technological tools needed to develop new therapies and brain-computer interface applications", says Schüttler. The Brain Interchange System has potential applications for a wide range of brain disorders as neuromodulation implants are now a proven technology. Currently, a clinical study is investigating a novel procedure for stroke rehabilitation that uses cortex stimulation to improve brain plasticity.

Medical Polymers for Intelligent Neuronal Implants

Medical polymers for intelligent neuronal implants are a further advancement. Professor Vasiliki Giagka from the Fraunhofer Institute for Reliability and Microintegration (IZM) held a talk on this subject as part of the Innovation Forum. IZM's expertise ranges from material selection and miniaturisation technology to reliability testing and risk assessment on a technical and biological level. The Institute cooperates with leading companies and research institutions worldwide. Thanks to innovative biocompatible technologies for active neural interfaces, stimulating electronics, for example, can be embedded in soft and biocompatible polyurethane substrates in order to stimulate the peripheral nerves using gold electrodes. Overall, neuronal implants require a large number of different components in order to function permanently as a closed system. They are challenging to manufacture due to the flexible substrates and the high reliability and safety standards for implantations. This is why special development expertise such as IZM's is in high demand in several areas.

Implants have been indispensable "spare parts" for human bodies for quite some time now. Their development is progressing by leaps and bounds and expanding to more and more areas as the COMPAMED Innovation Forum has clearly demonstrated.

Implants and More at COMPAMED 2024

If you want to see for yourself what medical technology industry suppliers are capable of beyond the field of implants, the best option is COMPAMED 2024 (from 11–14 November) in Düsseldorf, in the trade fair Halls 8a and 8b. In five different worlds of experience, the exhibiting companies will present their wide range of high-tech and service solutions. The five worlds of experience are: Manufacturing & Devices (e.g.,

© For personal and private use only. Reproduction must be permitted by the copyright holder. Email to copyright@mindbyte.eu.

components, parts, manufacturing processes), Services & Advice (e.g., research, development, services), Materials (e.g., plastics, glass, ceramics, metals, composite materials, adhesives, packaging), Micro Tech (such as micro components, microfluidics) as well as IT in Tech (software development and maintenance for medical technology).

Source & Image Credit: [COMPAMED 2024](#)

Published on : Wed, 26 Jun 2024