Technical innovations are essential in many ways for improvements in the area of medical care. The combination of experts from various areas of speciality is often the basis for successful innovations. At the Technopol Wiener Neustadt, a high concentration of competence in this field of technology has been created. The figures speak for themselves:

- 5 research facilities
- 14 areas of expertise
- 95 employees
The research institutes at the Technopol Wiener Neustadt have successfully put their expertise to use in the medical technology field in many applications. Some examples are presented on the following pages.

- **Exploring** innovative measuring methods and development of measuring device prototypes for cardio-vascular system analysis

- **Exploring** physiological processes in living organisms by means of imaging techniques and customized biomarkers

- **Designing** overall solutions and developing safety and comfort technologies for a safe life in old age

- **Development and optimization** of biocompatible and biodegradable metals, specific production processes and resulting products

- **Analysis and development** of materials, products and methods in the sector of pharma, medical devices and hygienics

- **Manufacturing** of prototypes, parts and pilot series of highly challenging components using additive manufacturing processes (3D printing)

- **Solving** sophisticated tasks for electronic, mechanical and mechatronical systems

- **Development** of ready-to-use production processes for challenging plastic/ceramic and metal components by (powder) injection moulding
- Design of integrated system solutions for complex sensor-based applications

- Development of medical sensor systems for tissue property investigation and tissue classification

- Development of medical robot systems

- Design of micro-optical components for medical applications, e.g. multifocal lenses

- Development of novel surgical instruments and components for minimally invasive interventions

- Development of systems and processes for quantifiable optimization of surgical procedures
"We see ourselves as R&D service providers, who support the entire development process for medical technology systems".

DI Nikolaus Dellantoni
CEO of ACMIT
Multi-functional tools for minimally invasive surgery

In minimally invasive surgery, operations are performed through very small openings to keep injuries to skin and soft tissues as low as possible. ACMIT is developing new treatment methods and the multi-functional surgical tools needed for this. Examples:

- Instruments with integrated safety functions
- Anatomically shaped instrument handles for optimised and individual ergonomics
- Surgical shaving instruments with integrated cooling

Cochlear implants with an implantable middle ear microphone

Cochlear implants make an important contribution to the treatment of hearing loss. They replace the function of the inner ear by sending impulses to the auditory nerve by means of an implanted electrode. A novel implantable middle ear microphone, developed at ZISS, now allows the reception of acoustic signals in the functioning middle ear. In order to work with the conditions in the middle ear and those of the implant, the specially developed capacitive micro mechanical sensor must be produced in an extremely compact form, with specific evaluation electronics and work extremely energy efficiently, in order to be mounted directly to the auditory bones.
**Application example**

**Circadian Central Hemodynamics**

Studies have shown that damaged and sclerotic vessels often contribute to the development of heart attacks. As a means to identify them and thus for the early detection of high-risk patients, the pulse wave analysis for determination of the central hemodynamics is applied. This method was previously only available in clinical medicine as a singular one-point measurement. AIT has now been able to develop, for the first time worldwide, a solution that allows 24-hour monitoring of the central hemodynamics and that permits a standard extramural application. For this purpose, the shape of the pulse wave on the upper arm is recorded by means of a cuff. Special algorithms (ARCSolver) developed by AIT provide information about the cardiovascular condition (vascular condition, terminal organ damage, etc.) of patients.

**Application example**

**SIMTARA**

In targeted radionuclide therapy, an open radioactive material is administered, consisting of a carrier molecule and a radionuclide, to selectively destroy a tumour. For this purpose, in the "SIMTARA" project, AIT has developed computer models for individual treatment planning. A reference hybrid phantom of the human body is created, based on which individual data from positron emission tomography and computed tomography can be implemented through rapid and non-linear reshaping. This way, the patient-specific information for visual treatment planning can be used by medical physicists and oncologists.

*The AIT business unit Biomedical Systems creates biomedical-technical innovations for business and health care*.

DI Manfred Bammer, MAS
Head of the Biomedical Systems, AIT
Application example

Development of new hygiene concepts/technologies for health care facilities

In order to comply with hygiene regulations, medical equipment must be treated and disinfected accordingly. OFI produces hygiene concepts that prevent and reduce material damage during the treatment of medical devices and that target the proper use of disinfectants. In this regard, the focus is on substrate-specific applications of disinfection measure and effects of repeated use of disinfectants on organic material surfaces.

Application example

Injection moulded metal parts for medical technology

Magnetic components with one or more fields are produced at FOTEC by means of metal injection moulding (injection moulding of metallic powder) using magnetic materials (MnZn, FeCoV, AINiCo 8, hard ferrite). They are used in medical and industrial pumps.
Technopol Wiener Neustadt is characterised by the five fields of technology, shown below, in medical and material technologies. The focus here is on the integration of research, education and business:

- Material tribology (friction, wear, lubrication)
- Medical engineering sensor-actuator surfaces

The Technopol figures speak for themselves: e.g. 500 researchers, 3500 students, 17,500 m² of office and laboratory space, 4 COMET competence centres for tribology, electro chemistry, medical engineering and bio-resorbable implant materials, Fotec GmbH as a research company in the nearby University of Applied Sciences, the Centre for Integrated Sensor Systems of the Danube University at Krems, the business unit "Biomedical Systems" of the AIT - Austrian Institute of Technology, the Department of "Surface Engineering" of the OFI, as well as MedAustron, the cancer research and treatment centre, which is still under construction, AAC, Happy Plating, Attophotonics, FIANOSTICS and many others.NOSTICS und viele andere mehr.

- Concentrated competence
- Successful collaborations
- Excellent education

The Technopol manager, active on-site, supports the development of the site as part of the Technopol programme.

This brochure is also available as an e-paper. Simply scan the QR code or download it at: www.tfz-wienerneustadt.at

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In this brochure, all person-related statements apply equally to women and men. It is merely for the sake of simplicity that the masculine form was selected in the text.