Workshop

BIODEGRADABLE

Platform for modern implantology

Reserach of individualizedh biodegradabile materials

Reg. No.:
CZ.02.01.01/00/23_020/0008512

Project duration:
1. 1. 2025 – 31. 12. 2028

Research into advanced iron-based alloys with targeted, adjustable degradation rates and mechanical properties.

Advanced diagnostic and design methods (AI) The use of artificial intelligence for material and shape optimization of implantable medical devices.

Complete qualification for the certification process Ensuring the development-qualification process and technological validation for the rapid market entry of new products.

Socio-economic evaluation and ethical impact Integration of social sciences, humanities, and arts (SSHA) to assess the broader impacts of technological innovations.

Breakthrough solutions for medical practice Minimizing complications associated with traditional implants and strengthening competitiveness in the field of modern medicine.

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Charles University

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UNIVERSITY OF CHEMISTRY AND TECHNOLOGY PRAGUE

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CZECH TECHNICAL UNIVERSITY IN PRAGUE

Co-funded by the European Union

MINISTRY OF EDUCATION YOUTH AND SPORTS

Workshop on

B Ceps

Bioinspired Cellular Actuators

Additive manufacturing of multi-materials that work like muscles

Development of Bioinspired Cellular Actuators
Engineering a revolutionary class of muscle-inspired microscale devices based on active cellular metamaterials that expand and contract like natural muscles.

Advanced Multi-Material Additive Manufacturing (3D Printing)
Utilizing cutting-edge 3D printing tech to combine high-strength structural elements with active, stimuli-responsive components into unified artificial sarcomeres.

Multi-Scale Computer Modeling and Simulation
Applying advanced numerical modeling from the single-unit cell scale to complex 2D and 3D arrays to optimize force and collective deformation.

Machinery Design, Testing, and Validation
Developing custom production machinery and running rigorous experimental validations to guarantee highly precise, robust, and enduring motion.

Revolutionary and Sustainable Industrial Impact
Overcoming the limitations of traditional electric motors to provide lightweight, highly efficient, and fully recyclable movement systems for robotics, automation, and advanced medical tools.

BRNO UNIVERSITY OF TECHNOLOGY

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Manufacture the future.

EIC Pathfinder Open
European Innovation Council
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Project Duration
1.3.2025 – 28.2.2029

Development of Specialized Wire Feedstocks for Welding and 3D Printing

Project Duration:
03.2024 -12.2028

Technical Frontiers & Materials

- **LW-DED Optimization:** Advanced robotic path planning and in-situ thermal management to eliminate microstructural anisotropy in large-scale prints.
- **Feedstock Metallurgy:** Overcoming chemical and surface variability in wire semi-products to guarantee repeatable macro-mechanical properties.
- **Extreme Environments:** High-temperature validation of nickel superalloys (up to 1200°C), Gen IV/SMR nuclear steels, and cobalt-free High-Entropy Alloys (HEAs).

Workshop & Consortium Targets

- **Industrial Upscaling:** Transitioning fundamental laboratory materials science into robust, foundry-scale robotic manufacturing deployment.
- **Empirical Validation:** Performance benchmarking of real-world functional prototypes under severe thermal and mechanical loading.
- **Funding Roadmaps:** Active consortium building for upcoming collaborative project calls under TAČR, MPO Trend, and Horizon Europe.

Reg. No.: CZ.02.01.01/00/23_021/0008433

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ŠKOLA WELDING OD ROKU 1925

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