VSB TECHNICAL UNIVERSITY OF OSTRAVA

in cooperation with Fraunhofer

Introduction of the Fraunhofer Innovation Platform

FRAUNHOFER INNOVATION PLATFORM FOR APPLIED ARTIFICIAL INTELLIGENCE FOR MATERIALS & MANUFACTURING AT VSB – TECHNICAL UNIVERSITY OF OSTRAVA

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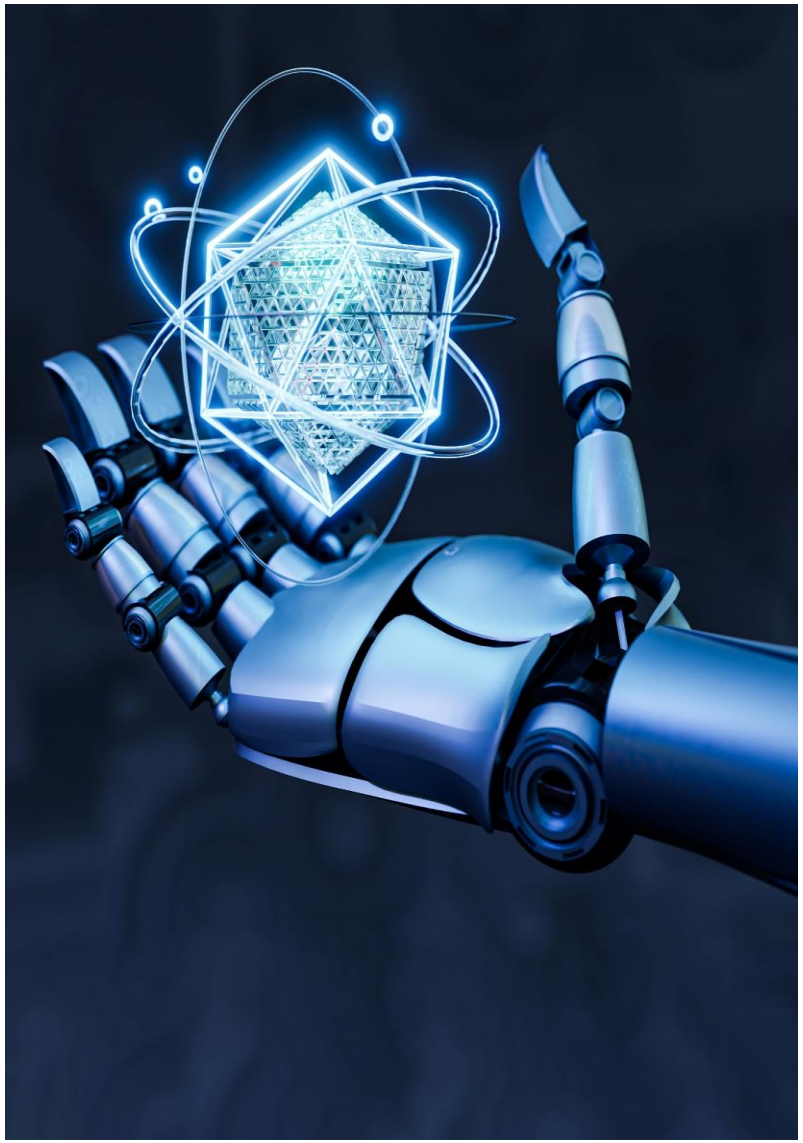
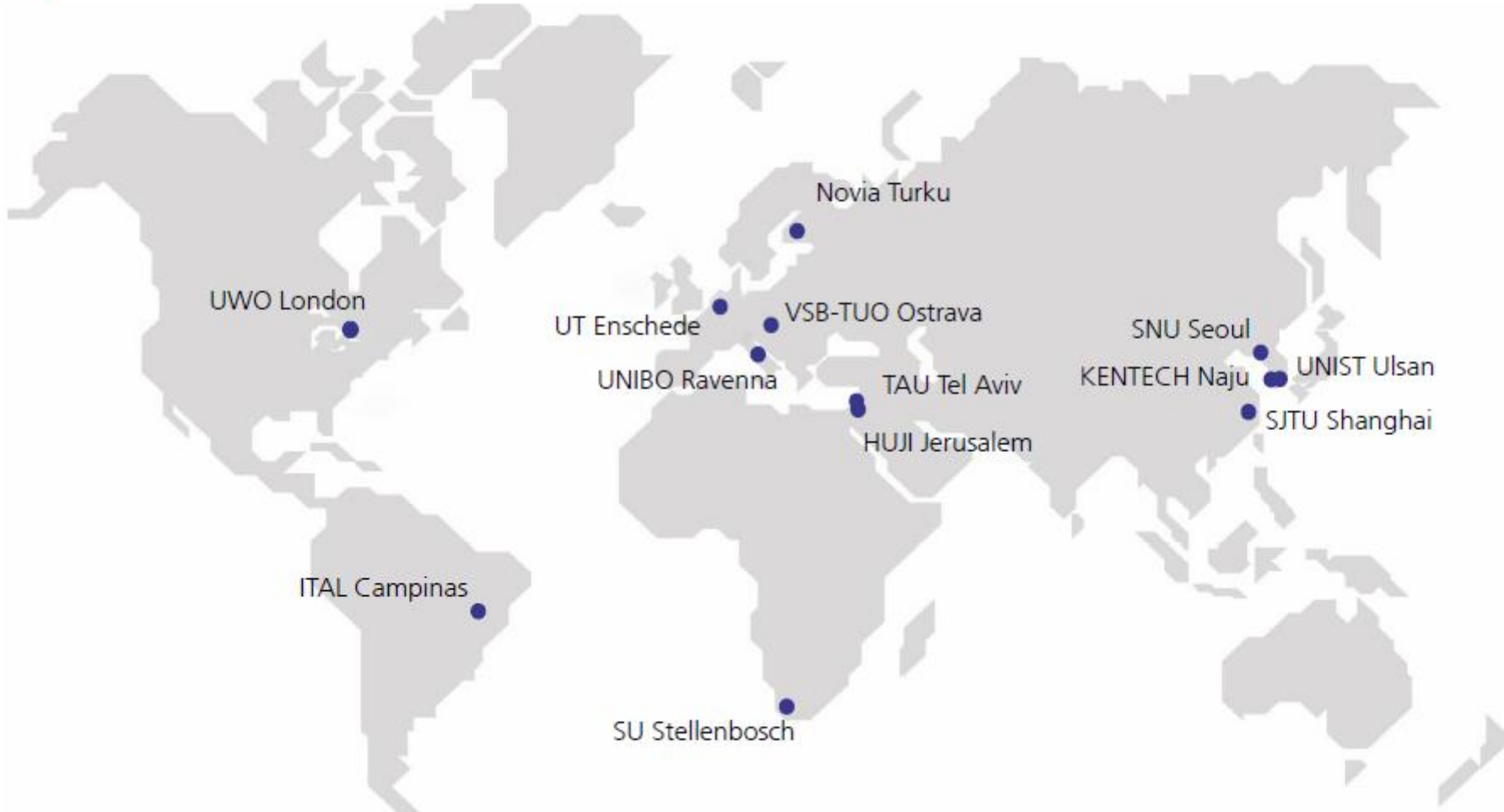
FRAUNHOFER INNOVATION PLATFORM

- Fraunhofer branded research units at university abroad; mirror group at Fraunhofer Institute in Germany
- joint management (co-directors), Supervisory Group and Advisory Council
- funding according to Fraunhofer model + investment
- joint strategy for applied research and exploitation of results
- set of milestones and evaluation after 3 and 5 years



FIP program

Fraunhofer Innovation Platforms FIPs worldwide



VSB TECHNICAL UNIVERSITY OF OSTRAVA

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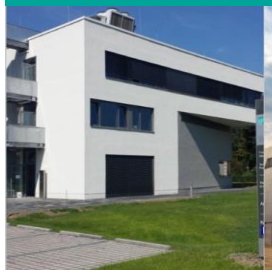
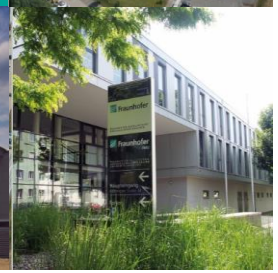
VSB - TUO

- VSB – Technical University of Ostrava
- Nearly 12,000 students
- 7 faculties
- IT4Innovations National Supercomputing Center (IT4I)
- Center for Energy and Environmental Technologies (CEET)

FRAUNHOFER IWU

- Institute for Machine Tools and Forming Technology
- 4 locations (Chemnitz, Dresden, Zittau, Wolfsburg)
- Fraunhofer Group for Production





FRAUNHOFER ICT

- Institute for Chemical Technology
- 2 locations (Pfinztal, Karlsruhe)
- Department for Energetic Systems

FRAUNHOFER INNOVATION PLATFORM FOR APPLIED ARTIFICIAL INTELLIGENCE FOR MATERIALS & MANUFACTURING AT VSB – TECHNICAL UNIVERSITY OF OSTRAVA

7 FACULTIES

1849 — VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF MINING AND GEOLOGY

1849 — VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF MATERIALS SCIENCE AND TECHNOLOGY

1950 — VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF MECHANICAL ENGINEERING

1977 — VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF ECONOMICS

1991 — VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

1997 — VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF CIVIL ENGINEERING

2007 — VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF SAFETY ENGINEERING

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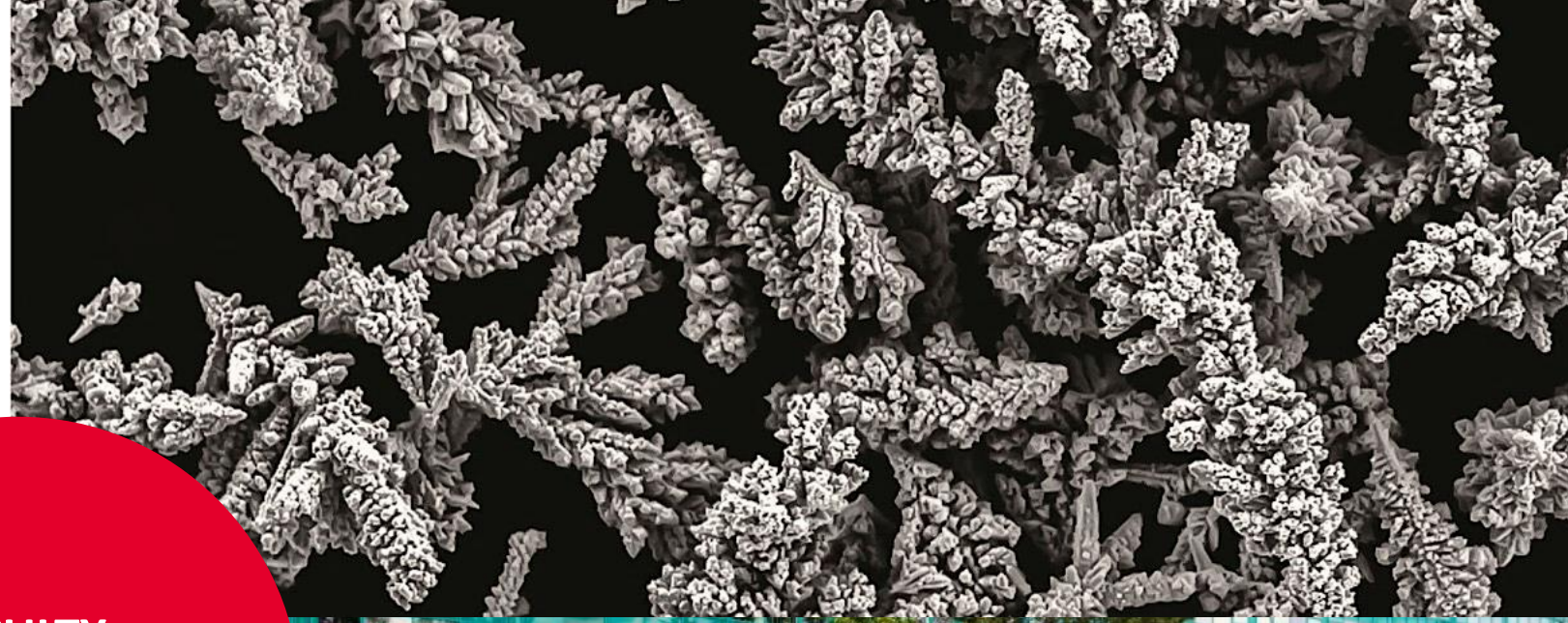
VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF MINING AND GEOLOGY

FACULTY OF MINING AND GEOLOGY

Modern faculty which interconnects natural sciences with technical and economic fields of study in a completely unique manner.

www.hgf.vsb.cz/en

VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF MATERIALS SCIENCE AND TECHNOLOGY



FACULTY OF MATERIALS SCIENCE & TECHNOLOGY

Modern faculty, integrating attractive teaching and research excellence in material, metallurgical, chemical, economic and environmental disciplines.

www.fmmi.vsb.cz/en

VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF MECHANICAL ENGINEERING

FACULTY OF MECHANICAL ENGINEERING

65 years of experience and one of the best faculties in the Czech Republic recommended by employers.

www.fs.vsb.cz/en

VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

FACULTY OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Focused on the latest technology in the areas of informatics, communication technologies, electronics and electrical engineering.

www.fei.vsb.cz/en

VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF ECONOMICS

FACULTY OF ECONOMICS

Offers daily basis from the fields of economics, management, economic policy and administration, informatics and systems Engineering.

www.ekf.vsb.cz/en

VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF CIVIL ENGINEERING

FACULTY OF CIVIL ENGINEERING

The structure of individual courses reflects the latest findings in the field of civil engineering, and effectively combines lectures and practice.

www.fast.vsb.cz/en

VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF SAFETY ENGINEERING

FACULTY OF SAFETY ENGINEERING

Response to the growing demand of practice for highly educated professionals in the area of safety engineering and for related scientific research activities.

www.fbi.vsb.cz/en

2 RESEARCH INSTITUTES

VSB TECHNICAL UNIVERSITY OF OSTRAVA | CENTRE FOR ENERGY AND ENVIRONMENTAL TECHNOLOGIES

VSB TECHNICAL UNIVERSITY OF OSTRAVA | IT4INNOVATIONS NATIONAL SUPERCOMPUTING CENTER

VSB TECHNICAL UNIVERSITY OF OSTRAVA

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THE CENTRE FOR ENERGY AND ENVIRONMENTAL TECHNOLOGIES

CEET brings under one roof 4 research centres:

- ENET Centre
- Nanotechnology Centre
- Institute of Environmental Technology
- Energy Research Centre

The research agenda is focused on:

- materials for energy and environmental technologies
- energy utilisation of secondary raw materials and alternative energy sources
- energy storage, transformation and management
- environmental aspects and technologies

https://ceet.vsb.cz/en

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THE IT4INNOVATIONS NATIONAL SUPERCOMPUTING CENTER

- IT4Innovations is a leading research, development, and innovation centre active in the fields of High-Performance Computing (HPC), Data Analysis (HPDA), Quantum Computing (QC), and Artificial Intelligence (AI) and their application to other scientific fields, industry, and society.
- IT4Innovations operates the most powerful supercomputing systems in the Czech Republic.

The key research areas include:

- big data processing and analysis,
- machine learning,
- development of parallel scalable algorithms,
- solution of computationally demanding engineering problems,
- advanced visualisation and virtual reality,
- modelling for nanotechnologies,
- material design.

https://www.it4i.cz/en

FRAUNHOFER INNOVATION PLATFORM FOR APPLIED ARTIFICIAL INTELLIGENCE FOR MATERIALS & MANUFACTURING AT VSB – TECHNICAL UNIVERSITY OF OSTRAVA

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KEY RESEARCH AREAS

HIGH-PERFORMANCE COMPUTING AND AI

- IT for crisis management
- Numerical modelling to solve engineering problems
- Libraries for parallel computing
- Modelling for nanotechnologies
- IT for knowledge processing
- Safe and reliable architectures and networks

ENERGY

- technologies for conversion of fuel, particularly waste and other alternative fuels for thermal and electric energy and its efficient use in machinery and compact power units

ENVIRONMENTAL ENGINEERING

- waste processing
- air pollution
- water treatment technologies

MATERIALS SCIENCE

- materials for automotive
- Nanomaterials
- materials for energy storage

Fraunhofer ICT

Research for a better tomorrow

Fraunhofer Institute for Chemical Technology ICT

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EXPLOSIVES TECHNOLOGY, SAFETY AND SECURITY

- Development of propellants and explosives
- Synthesis, processing and manufacturing methods
- Performance measurement and characterization
- Modeling and simulation
- Stability and aging behavior
- Explosives detection

POLYMER ENGINEERING

- Polymer synthesis
- Material and formulation development
- Processing technologies
- Component development and service life analyses
- Lightweight construction and composites
- Recycling and sustainability concepts

CHEMICAL PROCESSES

- Non-fossil chemistry
- Electrochemistry
- Chemistry with hazard potential
- Continuous and microprocess engineering
- On-line process analytics
- Process and operational safety of chemical plants

ENERGY AND DRIVE SYSTEMS

- Drive systems for mobility
- Batteries
- Fuel cells and electrolysis systems
- Thermal storage devices
- Battery and hydrogen safety

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FOR MATERIALS & MANUFACTURING AT VSB – TECHNICAL UNIVERSITY OF OSTRAVA


Fraunhofer
IWU

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AUTOMATION

SHEET METAL FORMING

ADDITIVE MANUFACTURING PROCESSES

INDUSTRIE 4.0

DETERMINING CHARACTERISTIC VALUES AND MATERIAL CHARACTERIZATION

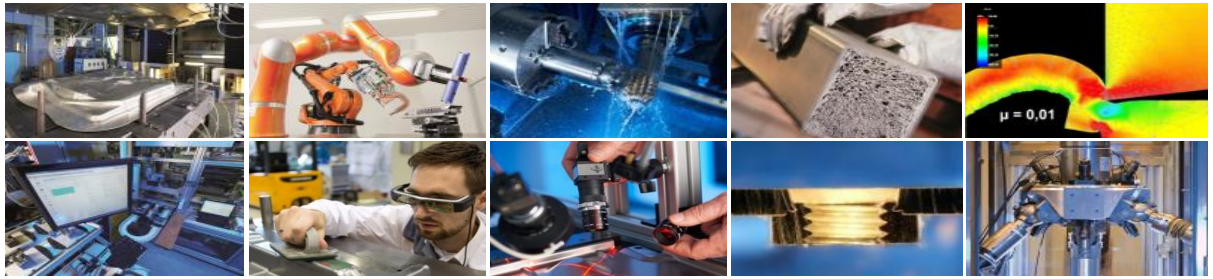
LIGHTWEIGHT CONSTRUCTION

BULK METAL FORMING

MECHATRONICS AND ADAPTRONICS

MEDICAL ENGINEERING

MICRO AND PRECISON MANUFACTURING



ASSEMBLY TECHNOLOGY AND ROBOTICS

PRODUCTION MANAGEMENT

HYDROGEN AND FUEL CELL PRODUCTION

SIMULATION

CUTTING AND REMOVAL

ACOUSTICAL ENGINEERING

THERMAL AND MECHANICAL JOINING

VIRTUAL AND AUGMENTED REALITY

MACHINE TOOL

TOOL AND MOLD MAKING

FUNCTIONAL INTEGRATION AND SYSTEM INTEGRATION

PRODUCTION SYSTEMS AND FACTORY AUTOMATION

PROCESS TECHNOLOGY

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FRAUNHOFER ICT

- Energetic systems and materials development
- Thermal storage and conversion

FRAUNHOFER IWU

- Production and processing technologies

VSB-TUO

- Application of AI and Machine Learning
- AI supported system integration in energy technologies

MATERIAL AND ENERGETIC SYSTEM DEVELOPMENT → PRODUCTION AND PROCESSING TECHNOLOGIES → AI SUPPORTED SYSTEM INTEGRATION

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BENEFITS FOR THE CUSTOMER

- The FIP is offering core competences from three research organisations covering a broad spectrum of the value chain:
  - development of materials and energy systems
  - production and processing technologies
  - artificial Intelligence (AI) supported system integration
- **One** contact partner for cooperation with **three** research organisations.
- **One** contract with the FIP for the customer.
- Access to various technologies and skills from three research organisations via one contact partner.
- Contact in the Czech language via VSB-TUO and in German via Fraunhofer.

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FIP-AI@VSB-TUO CONTACTS

Jana KUKUTSCHOVÁ
Vice-Rector for Science and Research at VSB-TUO
Director of FIP-AI@VSB-TUO
jana.kukutschova@vsb.cz
fip@vsb.cz
+420 596 993 022

Vladislav KOLARIK
Energetic Systems, Fraunhofer ICT
Deputy Director of FIP-AI@VSB-TUO
https://www.iwu.fraunhofer.de
vladislav.kolarik@ict.fraunhofer.de
fip@vsb.cz
+49 (0)721 464 0147

Dieter WEISE
Division Sheet Metal Forming, Fraunhofer IWU
Deputy Director of FIP-AI@VSB-TUO
https://www.iwu.fraunhofer.de
dieter.weise@iwu.fraunhofer.de
fip@vsb.cz
+49 (0)371 5397-1218

Kateřina ANGUS
VSB - Technical University of Ostrava
Organisational Support for FIP-AI@VSB-TUO
katerina.angus@vsb.cz
fip@vsb.cz
+420 596 993 036

Marcel ŠIHOR
VSB - Technical University of Ostrava
FIP-AI@VSB-TUO Coordinator
marcel.sihor@vsb.cz
fip@vsb.cz
+420 596 995 474

WEBSITE
https://www.vsb.cz/fip-ai/en

LINKEDIN
https://www.linkedin.com/company/fip-ai-vsb-tuo/

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THANK YOU FOR YOUR ATTENTION

Jana Kukutschová