

NTC

**RESEARCH FOR YOUR
ACHIEVEMENTS**

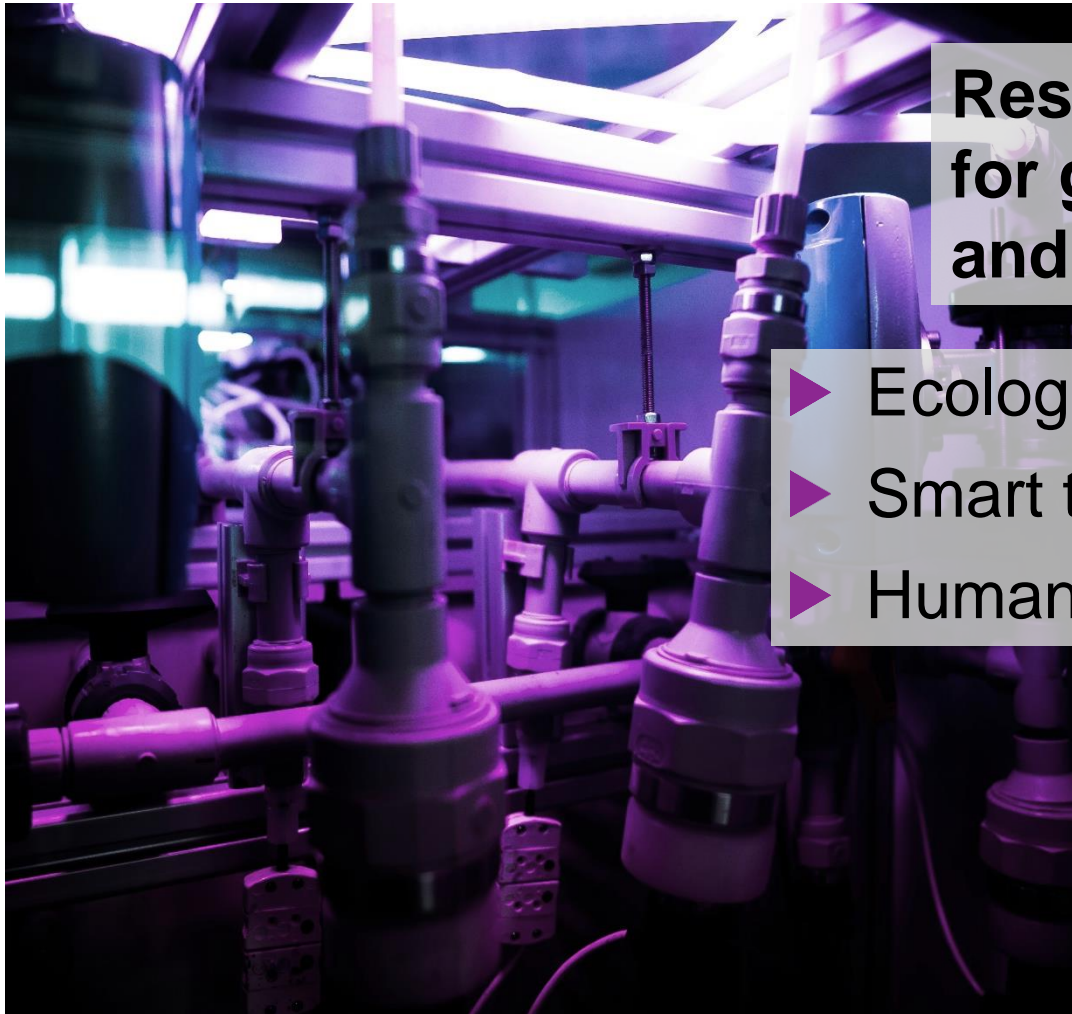


NEW TECHNOLOGIES
RESEARCH CENTRE
UNIVERSITY OF WEST BOHEMIA

- ▶ University institute since **2000**
- ▶ State of the art **computing and lab equipment**
- ▶ **Cutting edge research** and development - from the idea to the prototype
- ▶ Strong focus on **international and industrial cooperation**
- ▶ Multinational team of **130** researchers
- ▶ **HR AWARD** certification since 2018



OUR FOCUS



**Research and solutions
for green technologies
and advanced materials**

- ▶ Ecological energy sources
- ▶ Smart transportation means
- ▶ Human well being and health



OUR CORE VALUES



NEW TECHNOLOGIES
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► Uniqueness

We are looking for unique discoveries and solutions in the context of global knowledge.

► Functionality

We want the results of our research to be used. We practically verify theoretical ideas.

► Cooperation and diversity

We are open, positive, and constructive cooperation across industries and continents with our partners and customers. We also cooperate within our team.

► Flexibility

We work efficiently. We perceive the importance of time. From the possible alternatives, we choose to achieve the result in the shortest possible time.

► Added value

The results of our work have a high added value for all involved in terms of financial benefits or benefits for society.

► Developing ourselves

We make sure that we are constantly evolving. We are looking for projects that push our expertise beyond standard knowledge.



INTERNATIONAL CO-OP WITH R&D INSTITUTIONS

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- University of Cergy-Pontoise, FR
- Ludwig-Maximilians-Universität München, GE
- University of Technology Hannover, Institut für Statik und Dynamik, GE
- Ariel University, ISR
- Holon Institute of Technology, ISR
- Department of Electro-technology of the University of Technology, Czestochowa, PL
- Institute of Applied Physics, Warsaw University of Technology, PL
- Institut Für Chemische Verfahrenstechnik, Universitat Stuttgart, GE
- Helmholtz Institute Freiberg for Resource Technology, Freiberg, GE
- German Research Centre for Aeronautics and Astronautics, Braunschweig, GE
- German Aerospace Centre (DLR), Institute of Technical Thermodynamics, Stuttgart, GE
- Tampere University of Technology, FIN
- Fraunhofer Institute in Dresden, GE
- Laboratoire National de Métrologie et d'Essais Paris, FR
- Department of Electronic and Electrical Engineering, University of Strathclyde, Glasgow, UK
- Institute of Electronics and Photonics, Slovak University of Technology, SK
- International Laser Centre, Bratislava, SK
- Oslo and Akershus University College of Applied Sciences, NOR
- Gjøvik University College, Faculty of Health, Care and Nursing, NOR
- Nagaoka University of Technology in Niigata, JPN
- Tianjin University of Science and Technology, CHN

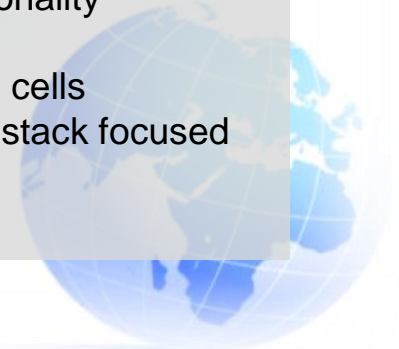
INTERNATIONAL CO-OP WITH COMMERCIAL ENT.



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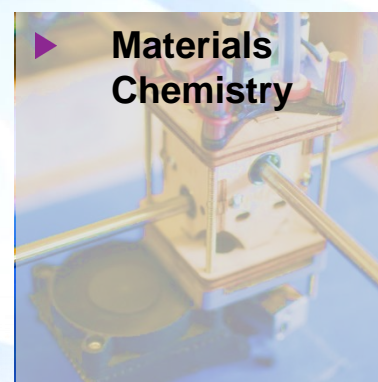
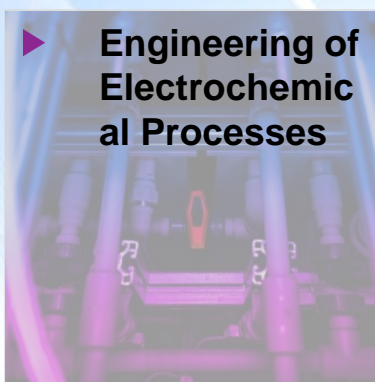
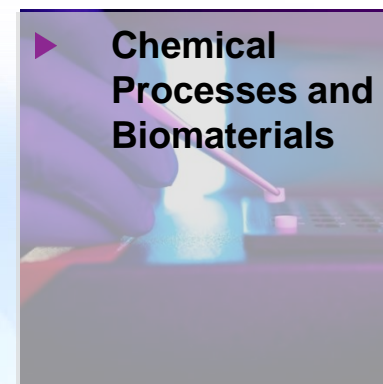
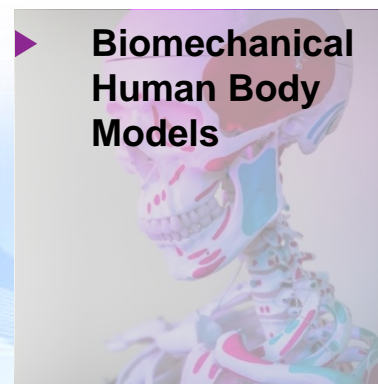
- **Frentech Aerospace, Thales Alenia Space, European Space Agency** – Development of a method for measuring material emissivity for new telecommunication satellites.
- **Continental, Powertrain Division, GE** – Research on technologies for laser processing of plastics.
- **Volkswagen Aktiengesellschaft, GE** – Computer simulation of the behaviour of battery systems for specified input parameters, preparation of an 1D cooling circuit model, CFD analysis of heat flow
- **ZF Engineering, CZ/GE** – computational fluid dynamics
- **Lyondelbasell industries, GE** – Modification of morphological surfaces; problems in manufacturing with degassing.
- **SABIC Petrochemicals B.V., NLD** – Scanning of polymer samples to micro-CT.
- **Automotive Lighting Reutlingen GmbH, GE** – Functionality verification of paint removal technology.
- **FuMA-Tech, GE** – Diagnostics of materials in PEM fuel cells
- **Ideevolutie, Netherlands** – Design of HTPEM fuel cell stack focused on space applications
- **Whitford corp., UK** – laser texturing



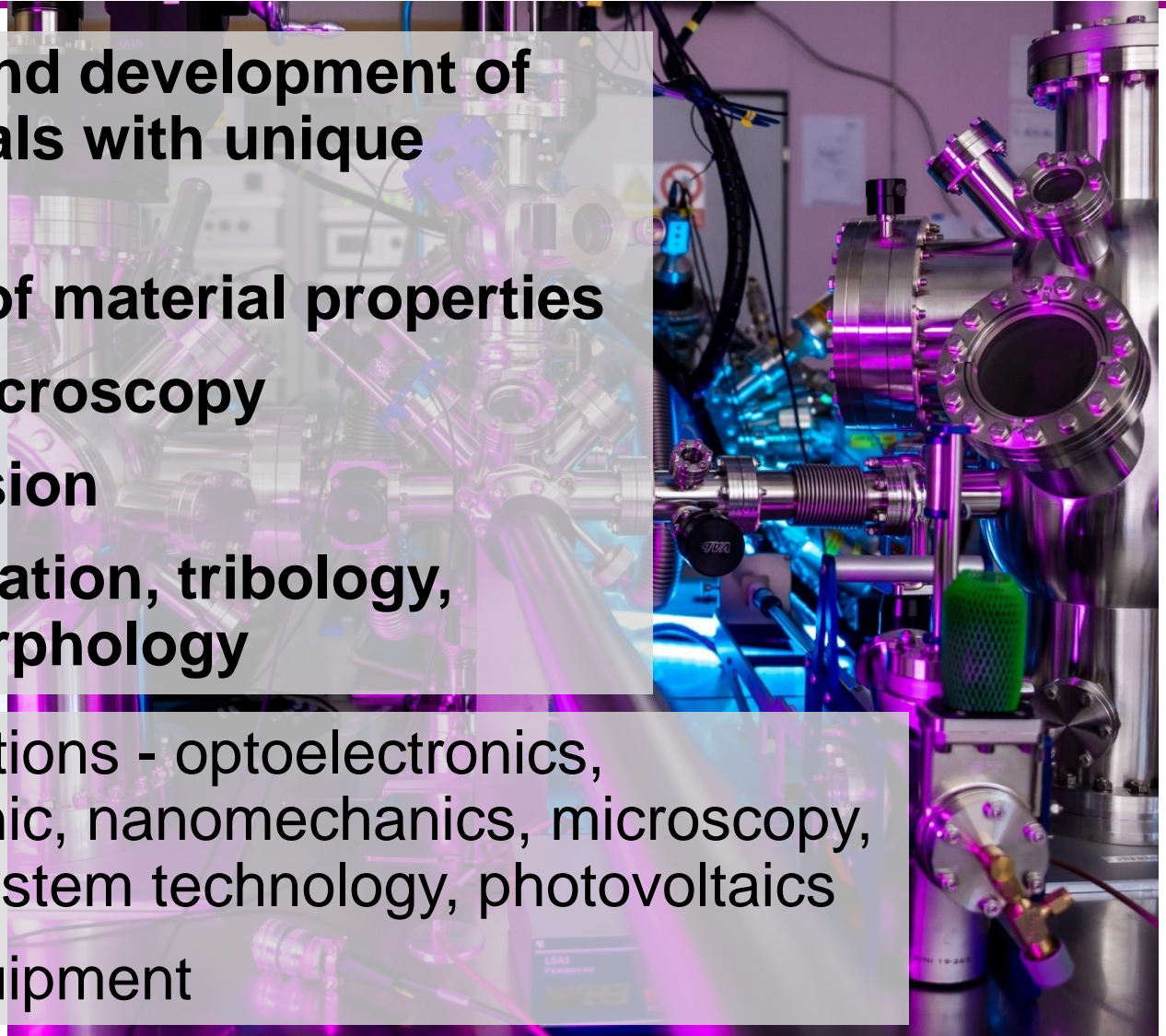
RESEARCH TOPICS



**NEW TECHNOLOGIES
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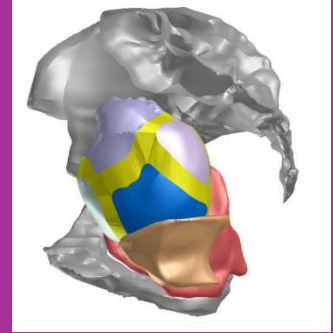
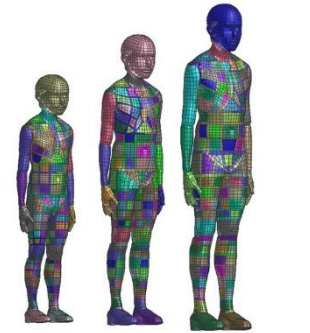
- ▶ **Research and development of new materials with unique properties**
 - ▶ **Prediction of material properties**
 - ▶ **Electron microscopy**
 - ▶ **Photoemission**
 - ▶ **Nanoindentation, tribology, surface morphology**
-
- ▶ Applications - optoelectronics, spintronic, nanomechanics, microscopy, microsystem technology, photovoltaics
 - ▶ Top equipment



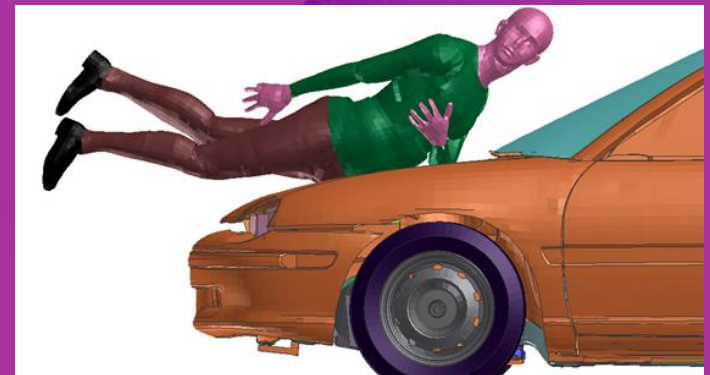


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- ▶ **Development of measuring methods and instruments**
 - ▶ **Non-contact diagnostics of thermal processes**
 - ▶ **Optimization, monitoring, and control of heating technologies**
 - ▶ **Non-destructive testing, marking**
-
- ▶ **Commercialization - LabIR®**
 - ▶ **Industry: aerospace, automotive, machinery, metallurgy and construction**
 - ▶ **Energy, healthcare**
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- ▶ Prediction and analysis of tissue load and injury
- ▶ Prediction of birth injuries
- ▶ Analysis of postural balance
- ▶ Injury prevention and sport performance analysis
- ▶ Muscle activity calculation



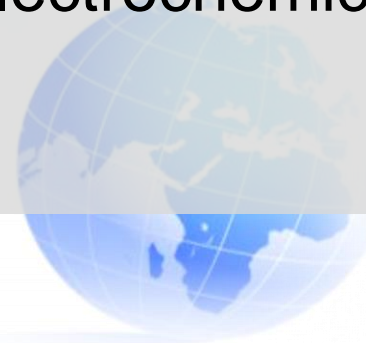
Injury prevention in transport, healthcare, sports and optimization of therapy in medicine





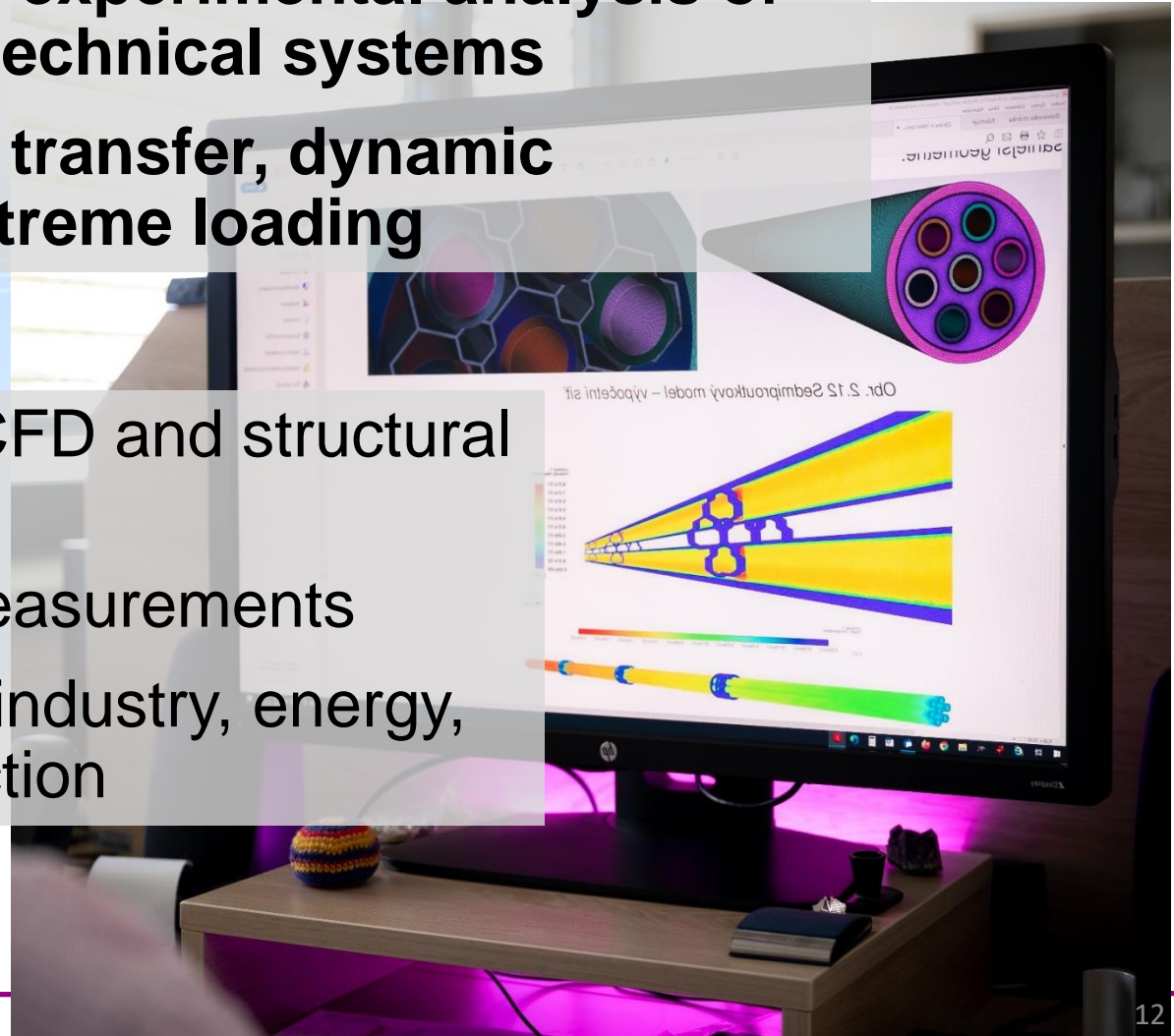
- ▶ **Development and characterization of biomaterials**
- ▶ Thermal, thermomechanical and chemical properties
- ▶ Visco-elastic, surface and sorption properties

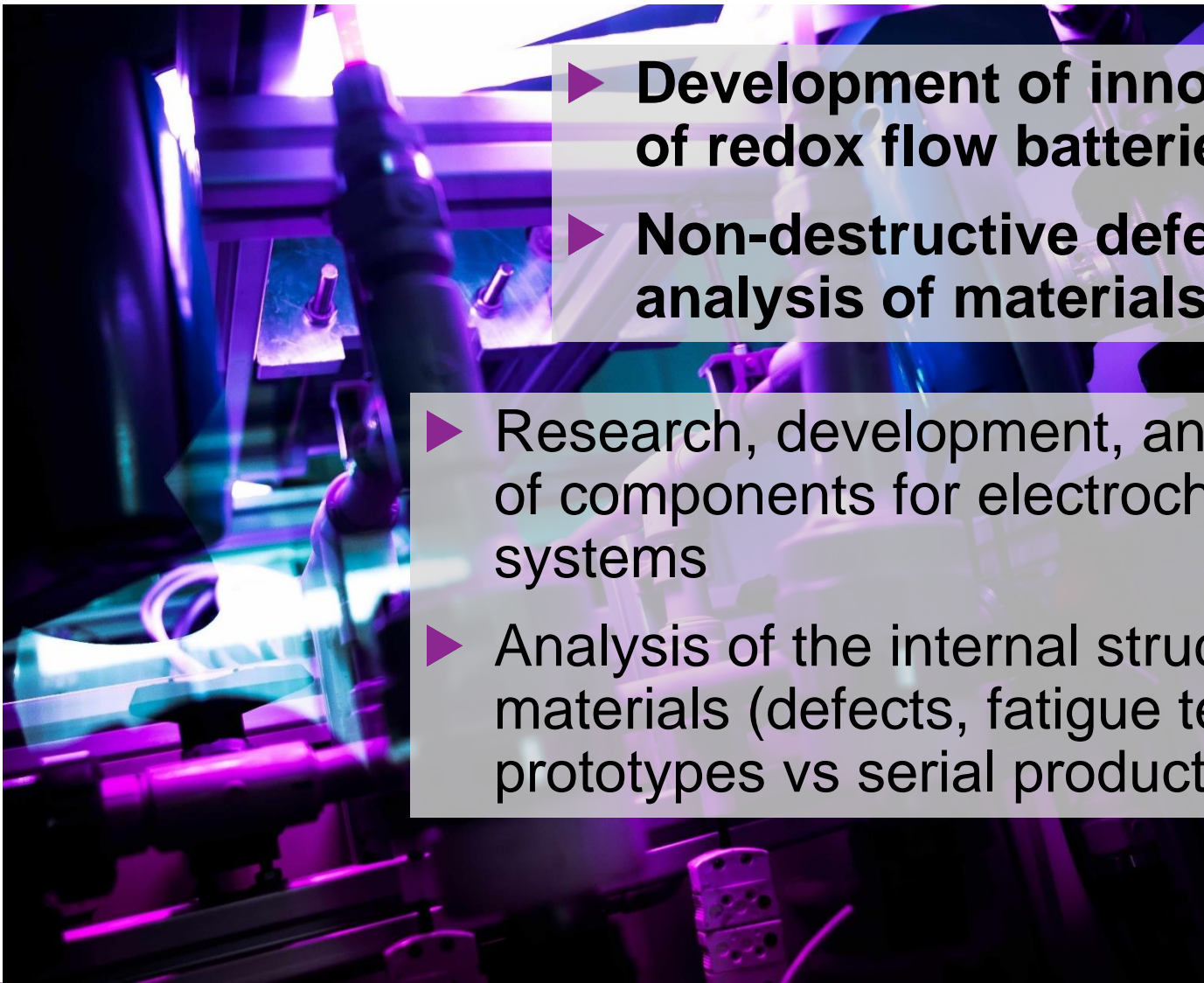
- ▶ **Fuel cells testing and development**
- ▶ Study of electrochemical processes





- ▶ **Theoretical and experimental analysis of phenomena in technical systems**
- ▶ **Fluid flow, heat transfer, dynamic phenomena, extreme loading**
- ▶ Computational CFD and structural analysis
- ▶ Experimental measurements
- ▶ The automotive industry, energy, industrial production





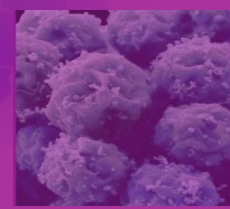
- ▶ **Development of innovative types of redox flow batteries**

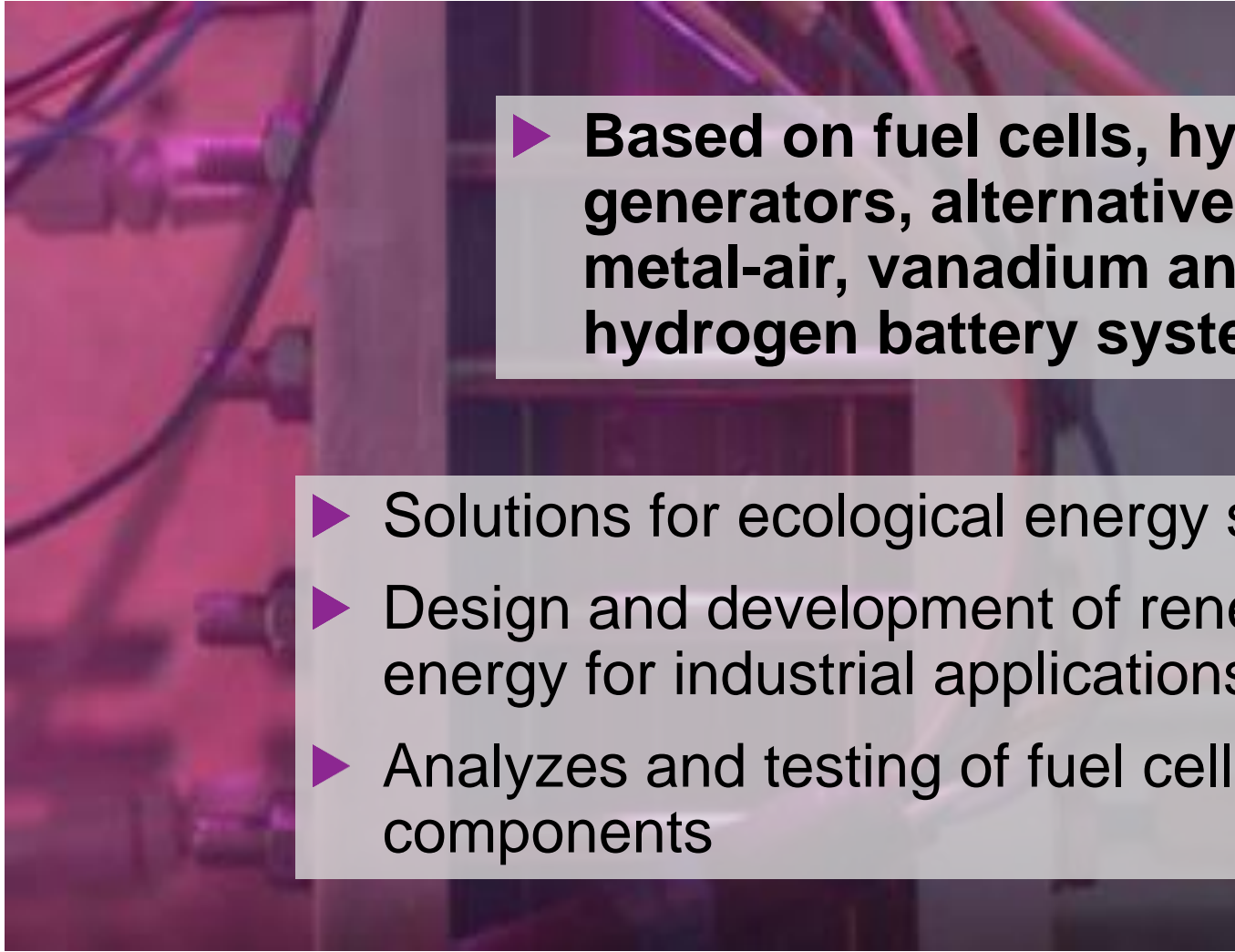
- ▶ **Non-destructive defectoscopic analysis of materials - micro CT**

- ▶ Research, development, and production of components for electrochemical systems

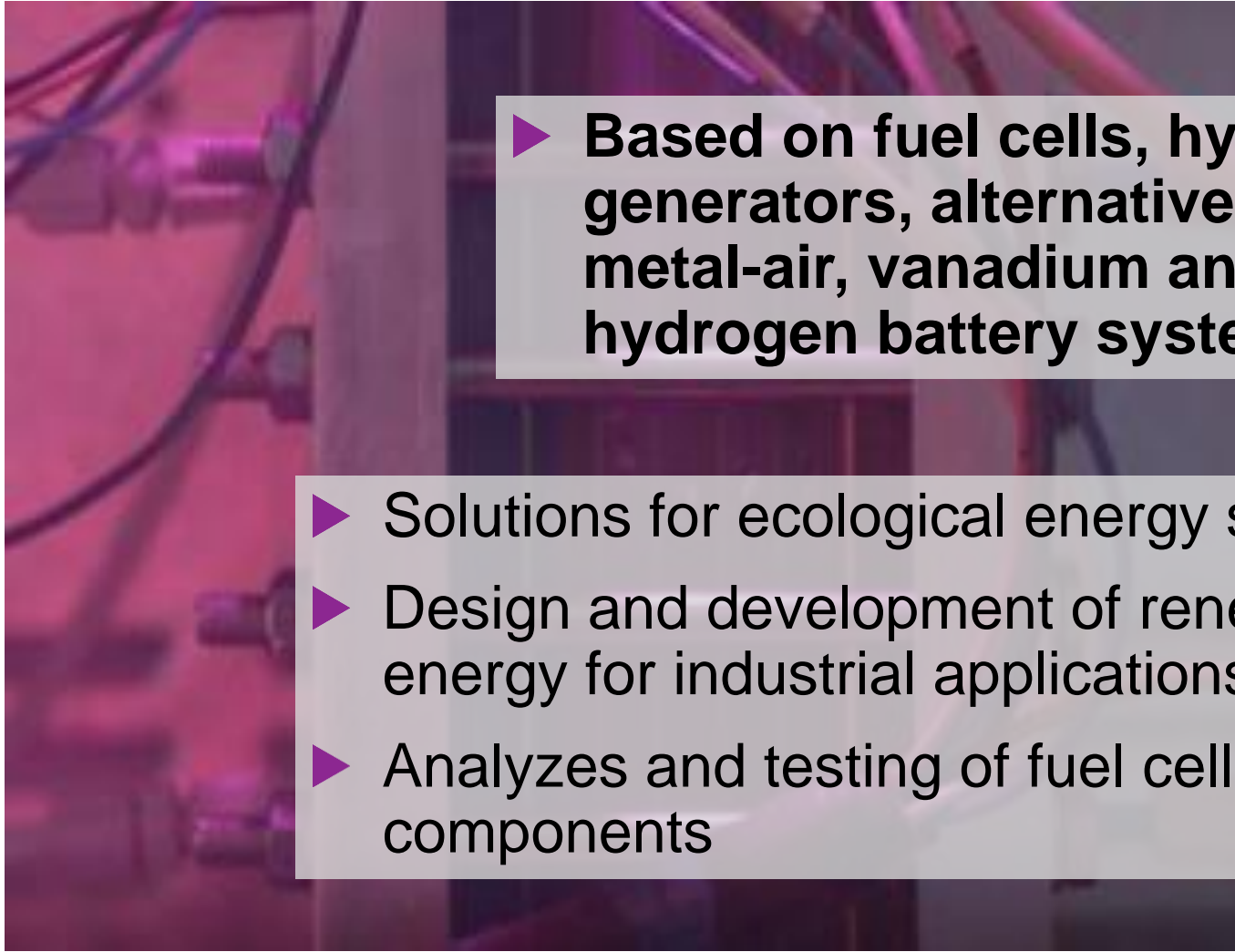
- ▶ Analysis of the internal structure of materials (defects, fatigue tests, prototypes vs serial production...)

- ▶ Expanding horizons of materials science
- ▶ Fundamental properties of active and smart materials
- ▶ **Flexible Wearable Electronics** – electrochem. wearable sensors and self-powered devices
- ▶ **3D Printing** - for the construction of catalytic systems for energy storage and energy generation devices as well as for bioanalytical chemistry devices
- ▶ **Electrochemistry of Nanomaterials** - the basics of electrocatalysis of materials
- ▶ **Nanomedicine** - active nanomaterials as carriers for drug delivery targeted disease therapy





► **Based on fuel cells, hydrogen generators, alternative fuels, metal-air, vanadium and redox-hydrogen battery systems**

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- Solutions for ecological energy sources
 - Design and development of renewable energy for industrial applications
 - Analyzes and testing of fuel cell components

CONTACT



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