

Research team: Prof. Ioan MIHAI(team leader)
Dr. Claudiu-Marian PICUS
Assist. lect. dr. Marius Constantin BENIUGA

Research interest:

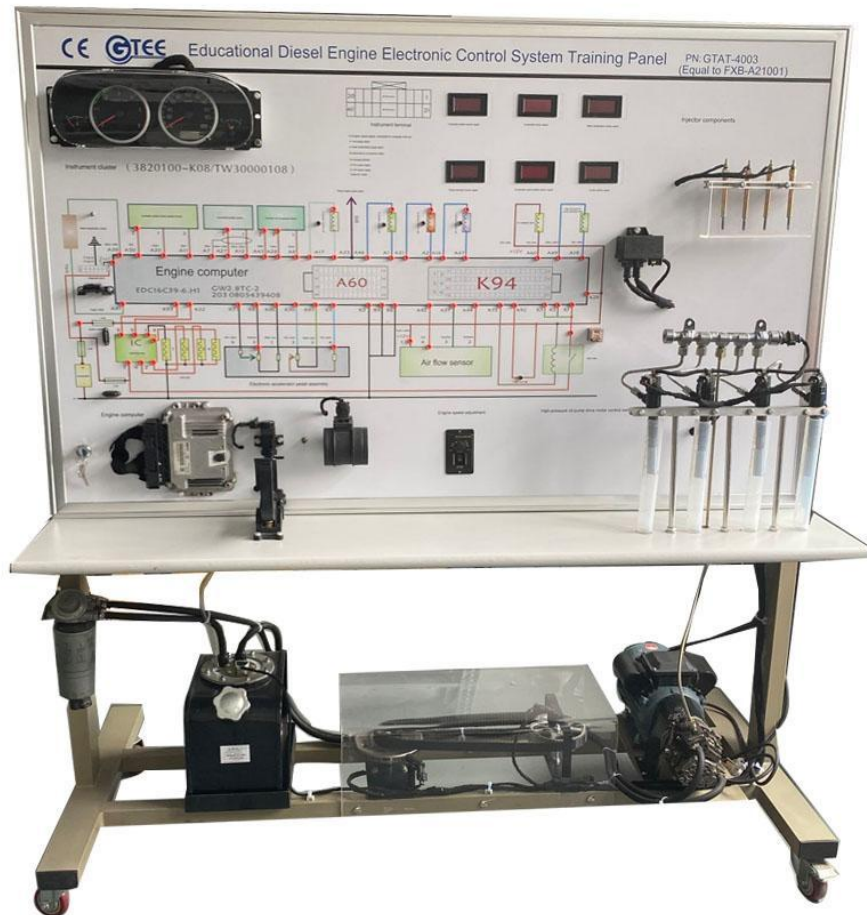
- **The laboratory was established following the attainment of doctoral supervision rights in the field of Mechanical Engineering, with research directions focused on thermal machine processes and equipment. The facility hosts research activities investigating the behavior of active and semi-active mechatronic suspension systems. These systems utilize magnetorheological dampers, with research centered on dynamic simulation and electronic control architectures. Furthermore, the laboratory addresses the reduction of pollutant emissions in reactive catalytic systems for diesel engines. Specifically, it investigates the technological implications of employing calefaction and magnetostrictive methods to enhance the atomization and vaporization of AdBlue droplets within NOx catalysts. Additionally, research is conducted on heat transfer enhancement within the micro- and nano-channels of CPU cooling systems.**

MET - Main Laboratory Equipment

Main Laboratory Equipment:

- **HAMEG 1507 Analog-Digital Storage Oscilloscope** – A dual-channel system equipped with signal memory and SP107 dedicated interface software.
- **Madur GA-12 Gas Analyzer** – A portable electrochemical system for the measurement and characterization of combustion flue gases.
- **Testo 300 Professional Flue Gas Analyzer** – An advanced instrument for institutional-grade combustion analysis and emission monitoring.
- **WEB-S - GTAT T006 Calorimeter** – A precision apparatus utilized for determining the calorific value of fuels and heat capacity of materials.
- **Cole-Parmer Hot-Wire Anemometer Kits (CFM/CMM Model)** – Featuring a high-sensitivity measurement range of 0.02 – 40 m/s and a computer interface for real-time airflow velocity data acquisition.
- **TRICIEV Computerized Industrial Cooling System Test Bench** – An integrated platform for the analysis of heat dissipation and cooling efficiency in industrial applications.
- **BDRClE V Refrigeration Cycle Analysis Rig** – A specialized test stand for the investigation of thermodynamic processes within vapor-compression refrigeration cycles.
- **ACT-3IEV Automotive Air Conditioning Automation Trainer** – A modular system for the study of control logic and performance in automotive HVAC systems.
- **ISUZU 75 kW Diesel Engine Performance Test Cell (GTAT-T003 & GTAT-T009)** – Equipped with a dynamometer brake and M400 software interface for the characterization of engine torque, power, fuel consumption, and load curves.

MET - Main Laboratory Equipment



Research Test Bench for Compression-Ignition Engine Electronic Systems, Model GTAT-4003

Research Test Bench for Spark-Ignition Engine Electronic Systems, Model GTAT-1001-004



Research Test Bench for Internal Combustion Engine Processes and Characteristics (Compression-Ignition), featuring Real-Time Data Acquisition, P.N.: GTAT-T003 & GTAT-T009



Research team: Assoc. prof. dr. Delia - Aurora CERLINĂ (team leader)
Assist. lect. dr. Dr. Ioan TAMAȘAG

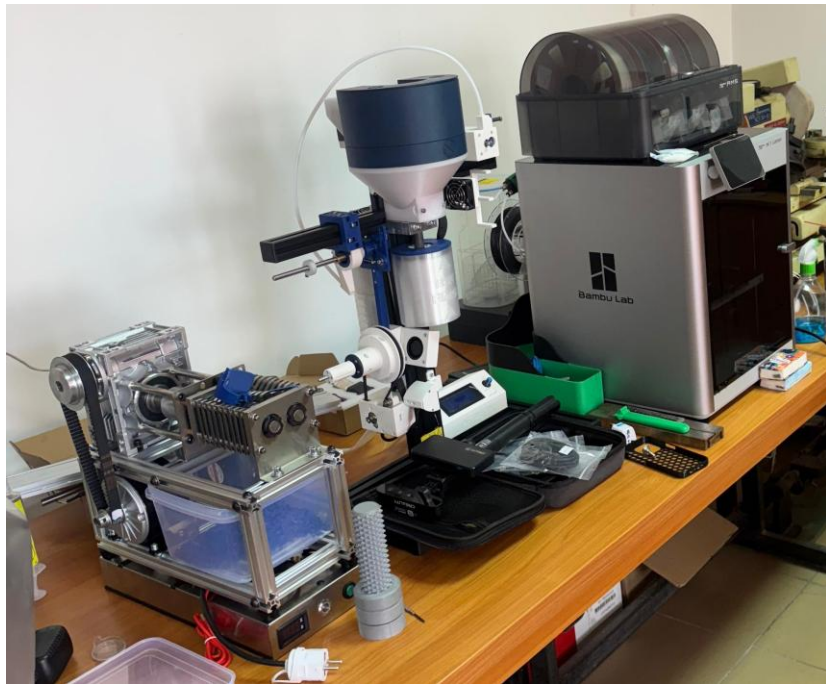
Research interest:

- The laboratory encompasses established research directions such as additive manufacturing and rapid prototyping of polymers and composites, alongside the study of advanced magnetorheological finishing processes for applications in the optical, electronics, and ceramics industries. Research activities involve the investigation of material properties during both the production and precision post-processing stages, providing a comprehensive environment for the development of functional components and the validation of technological performance.

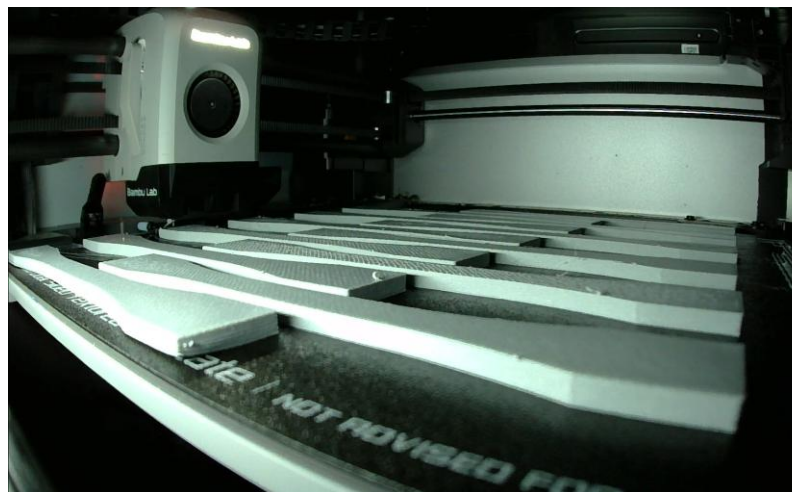
Main Laboratory Equipment:

- **Bambu Lab X1C FDM/MEX Printer** – A high-speed system utilized for investigating the influence of processing parameters on mechanical properties and surface topography.
- **Elegoo Saturn 16K SLA Printer** – Employed for the fabrication of ultra-high-resolution components and the characterization of photopolymer behavior.
- **Nanovea PS50 Optical-Mechanical Profilometer** – Utilized for 2D/3D metrology of surface roughness, profiling, and topography.
- **Tensile Testing Rig for Polymers and Composites** – A dedicated apparatus for evaluating the uniaxial mechanical strength of polymeric and composite materials.
- **Shore D Durometer** – Used for the hardness assessment of rigid polymeric materials and composite matrices.

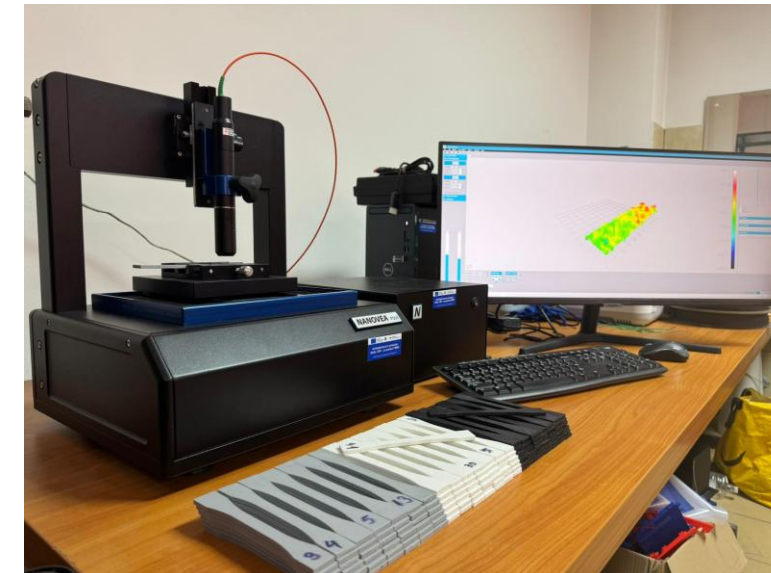
FINMAG - Main Laboratory Equipment



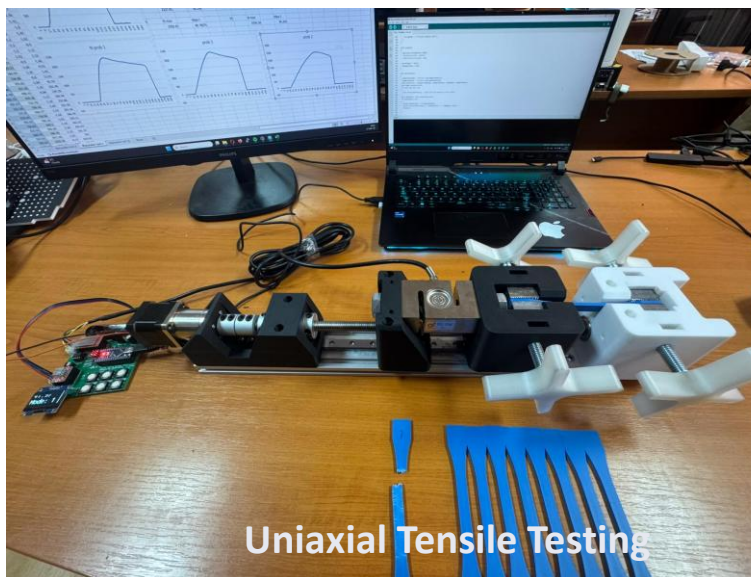
Additive Manufacturing Systems



FDM MEX FFF Manufacturing



Profilometer



Uniaxial Tensile Testing

Research team: Assist. prof. dr. Traian Lucian SEVERIN (team leader)
Assist. prof. dr. Ștefan – Constantin LUPESCU
Assist. lect. dr. Dr. Ioan TAMAȘAG

Research interest:

- **The CERCMAT Laboratory addresses a critical requirement at both institutional and regional levels within the domain of advanced testing and characterization of metallic and non-metallic materials. This entity is mandated with research initiatives, human capital development, technology transfer, and the provision of specialized services to the industrial sector. Furthermore, it provides complex technical expertise and evaluates the environmental impact associated with the industrial processing of materials.**

CERCMAT - Main Laboratory Equipment

Main Laboratory Equipment:

- OLS 4100 Laser Confocal Microscope (Olympus Corporation - Japan);
- DIL 402 Expedis-SUPREME Dilatometer (NETZSCH-Gerätebau GmbH - Germany);
- DuraScan 70 Microhardness Tester (EMCO-TEST Prüfmaschinen GmbH - Austria);
- FOUNDRY-MASTER Xpert Spark Spectrometer (Oxford Instruments Analytical GmbH - Germany);
- PMI-MASTER Pro Mobile Optical Emission Spectrometer (Oxford Instruments Analytical GmbH - Germany);
- QUASAR 600 Universal Testing Machine (CESARE GALDABINI S.P.A. - Italy).



Research team: Assist. prof. dr. Traian Lucian SEVERIN (team leader)
Assist. prof. dr. Ionuț – Cristina ROMÂNĂ
Assist. prof. dr. Cornel - Camil SUCIU

Research interest:

- **The laboratory aims to expand existing research and development initiatives by addressing emerging sub-domains in robotic processing and control technologies, aligned with European thematic priorities. These include robotic machining as a CNC system, remote measurement and control, industrial virtuality, pattern recognition, and investigations into the feasibility of transferring processing technologies from conventional CNC machines to industrial robotic platforms.**

ROBFLEX - Main Laboratory Equipment

Main Laboratory Equipment:

- **Nikon MCx20 Articulated Measuring Arm** – Featuring a 7-axis manual coordinate measuring system integrated with a **Nikon MMCx80** digital laser scanner.
- **InspecVision Opti-Scan 350.10 System** – A high-precision 3D white light scanning metrology solution for surface and edge inspection.
- **KUKA KR 6 R900 Robotic Cell** – An industrial articulated robot from the **AGILUS** series, characterized by a 901 mm reach and a 6 kg payload capacity.
- **Schunk Pneumatic Gripper** – An industrial-grade end effector utilized for automated material handling and high-precision grasping tasks.
- **Linatec Automated Transfer Line** – An integrated conveyor system designed for sequential assembly and material flow management in flexible manufacturing environments.
- **KukaSim Pro Robotics Software** – Specialized simulation software for offline programming and virtual validation of KUKA robotic cells.
- **Stäubli Robotics Suite** – A high-performance software environment for the development, simulation, and management of Stäubli industrial robots.
- **SMC MAS-200 Modular Automated Assembly System** – A flexible training platform representing a complete industrial production line with modular stations.
- **Bosch Rexroth ctrlX CORE Training Panel** – An advanced mechatronics training system integrating electric drives, pneumatic actuators, and **PLC** control architectures.
- **autoSIM-200 Automation Simulator Package** – A comprehensive software suite for the simulation and 3D visualization of automated pneumatic, hydraulic, and electrical systems.

ROBFLEX - Main Laboratory Equipment



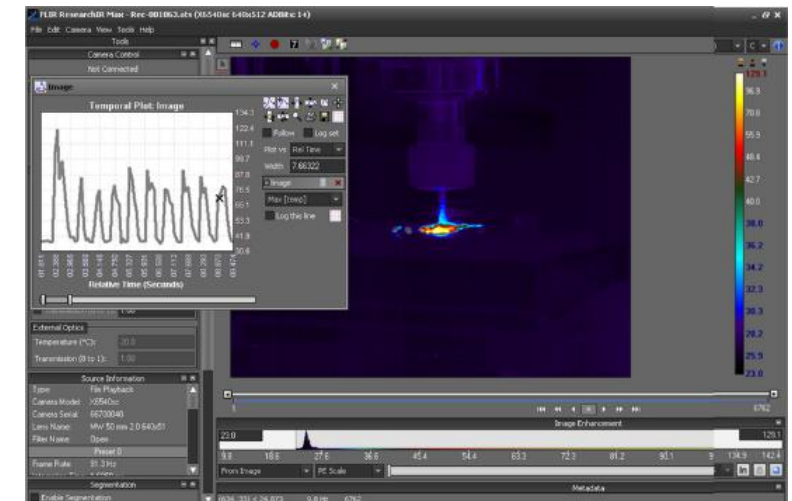
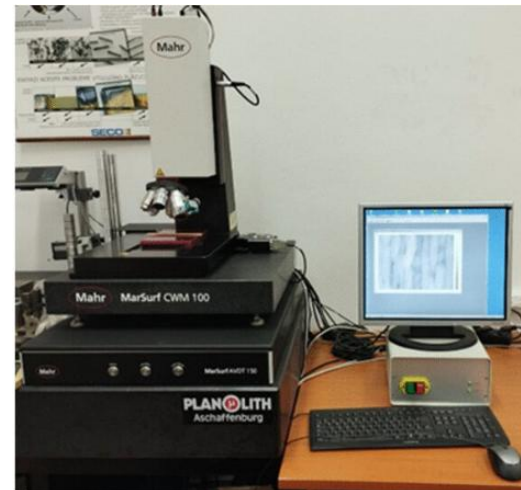
KUKA Robotic Cell



Research team: Assist. lect. dr. Irina BEȘLIU – BĂNCESCU (team leader)
Assist. lect. dr. Dr. Ioan TAMAȘAG

Research interest:

- The laboratory integrates state-of-the-art CNC technologies, advanced Computer-Aided Design, Manufacturing, and Numerical Control (CAD/CAM/CNC) solutions, and additive manufacturing processes for both prototyping and functional production. Furthermore, the facility features coordinate metrology equipment and 3D scanning systems for the high-precision analysis of surfaces and structural geometries.



CIM - Main Laboratory Equipment

Main Laboratory Equipment:

- **CNC machining centers for high-precision operations integrated into seamless CAD/CAM workflows;**
- **a high-resolution optical profilometer featuring interferometric capabilities for surface topography characterization;**
- **and both a stereomicroscope and a confocal microscope for detailed morphological and structural analysis;**
- **a comprehensive suite of metrology-grade 3D scanners for high-fidelity digitization, alongside Coordinate Measuring Machines (CMM) integrated with tactile and optical sensors for advanced dimensional inspection;**
- **for prototyping and functional production, the laboratory utilizes FDM and LSPC-based 3D printing technologies;**
- **specialized dynamometers are employed for force measurement during machining processes, complemented by a high-speed thermographic camera for monitoring thermal phenomena in subtractive, additive, and hybrid manufacturing processes.**

Research team: Prof. Ilie MUSCĂ (team leader)

Prof. Stelian ALACI

Assoc. prof. dr. Sergiu SPINU

Assist. prof. dr. Ionuț – Cristina ROMÂNUL

Assist. prof. dr. Cornel - Camil SUCIU

Assist. prof. dr. Cosmin MANOLACHE-RUSU

Research interest:

The Tribology and Contact Mechanics Laboratory focuses on applied research aimed at optimizing and certifying mechanical components for regional industry. By bridging the gap between academia and the private sector, the lab promotes technology transfer and attracts funding through diverse research projects. As a vital hub for student training, the facility strengthens the university's educational standards and its strategic contribution to the regional economic landscape. Main research interests include:

- **Study of friction and wear in contacts between metallic and non-metallic materials.**
- **Study of friction and wear in kinematic pairs.**
- **Study of contact between non-linearly elastic bodies.**

LTMC - Main Laboratory Equipment

Main Laboratory Equipment:

- Nanonics Imaging MultiView Academia Atomic Force Microscope (AFM)
- NanoFocus scan Laser Profilometer
- UBM 14 Laser Profilometer

