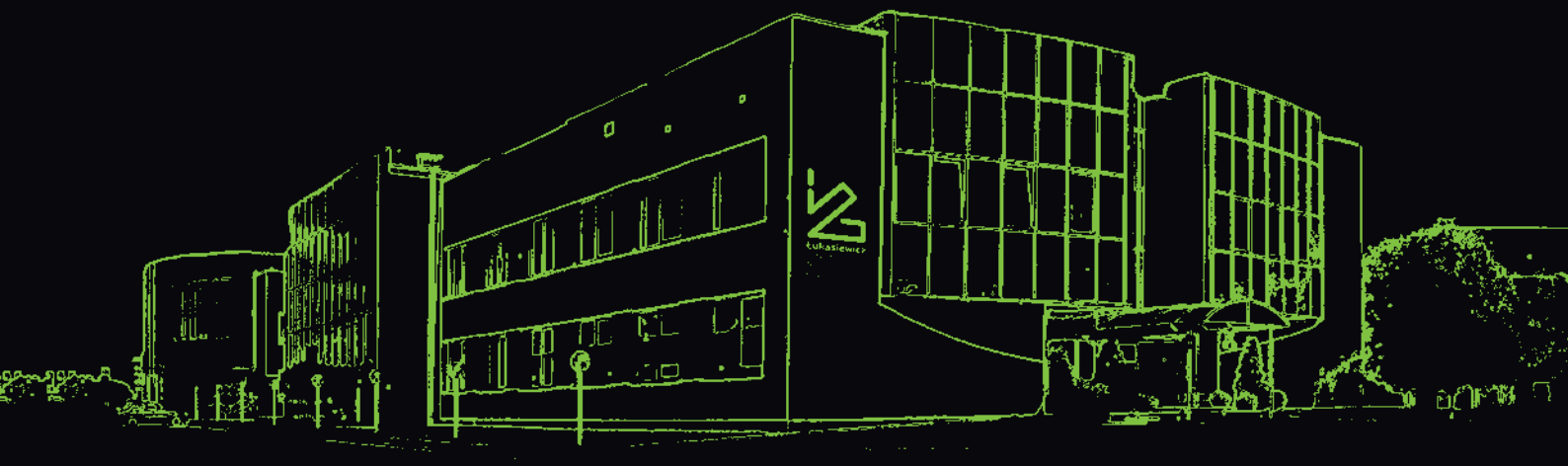
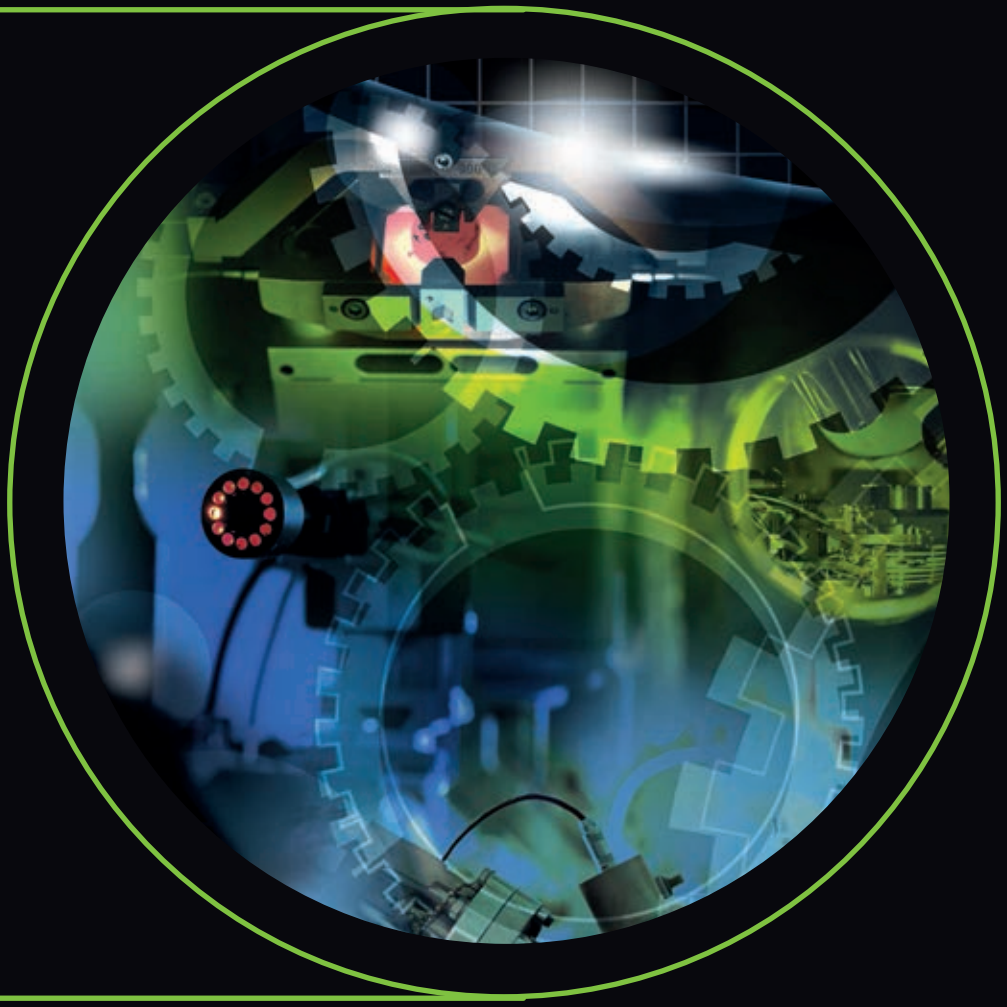
Łukasiewicz
Institute for Sustainable Technologies

In innovative science and economy

Newsletter 2023

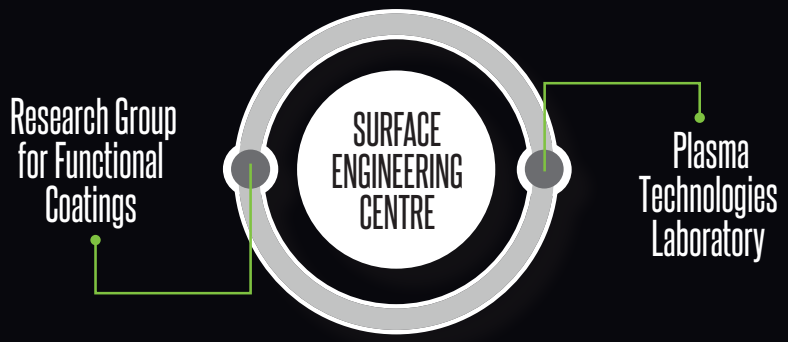




SURFACE ENGINEERING CENTRE

Our offer includes deposition of PVD coatings on tools and tool components made from different materials (e.g. stainless or high-speed steel, structural materials for thermal treatment, cold and hot-working steel, sintered carbides or titanium and zirconium alloys) and manufactured through a one-off (prototype), job, batch or flow production.

The Surface Engineering Centre is engaged in R&D and implementation projects centred around coating deposition by PVD methods. The coatings made at the Centre are intended for tools and tool components used in engineering, automotive, aerospace, tooling, metal casting, plastics and rubber processing, as well as paper and woodworking industries.



CONTACT:

prof. dr hab. inż. Jerzy Smolik

Head of the Surface Engineering Centre

jerzy.smolik@itee.lukasiewicz.gov.pl

T.: (+48) 48 364 42 41 ext. 251

developing technologies for production of coatings and layers intended for commercial purposes

designing new coating and layer materials solutions

designing and developing technological devices intended for surface treatment processes

analysing thin coatings and layers for anti-wear properties



OUR SERVICES

Deposition of PVD coatings

Fields of applications: cutting tools, forming tools, injection mould tools, parts of machines and various consumer goods made of high-speed steel, stainless steel or sintered carbides.

Coating name	Colour	Hardness HV	Thickness (µm)	Coefficient of friction (dry)	Maximum service temperature (°C)
TiN	gold	2,300–2,600	1–5	0.55	600
CrN	silver grey	1,800–2,300	1–6	0.30	700
ZrN	gold	2,100–2,600	1–5	0.40	550
TiCN	purple brown	3,500–3,800	1–3	0.20	400
TiAlN	purple grey	3,500–3,900	1–4	0.60	700
AlTiN	purple grey	3,500–3,900	1–4	0.70	900
AlCrN	purple grey and blue	3,500–3,900	1–4	0.40	900
AlTiCrN	purple grey and blue	3,600–4,100	1–4	0.55	850
nACo	purple blue	3,700–4,100	1–4	0.45	1,200
TiXCo	copper	4,000–4,300	1–4	0.55	1,200
DLC CROMVIc2	graphite	1,800–2,400	1–3	0.10	450
TiB2	grey	3,500–3,900	1–5	0.35	600
BorAC	blue grey	3,800–4,100	1–5	0.50	900

BENEFITS OF PVD COATING APPLICATION

- Reduced manufacturing costs due to lower need for tool replacement.
- Improved tool life and increased cutting parameters and efficiency of machining.
- Higher abrasion resistance of tools and their components.
- Improved quality and aesthetics of manufactured goods.
- Protection from external factors.

We deposit PVD coatings, which help increase tool life and machine service life, employing plasma and chemical methods, with which we are able to modify the surface layer of the material to give it the desired functional and performance characteristics

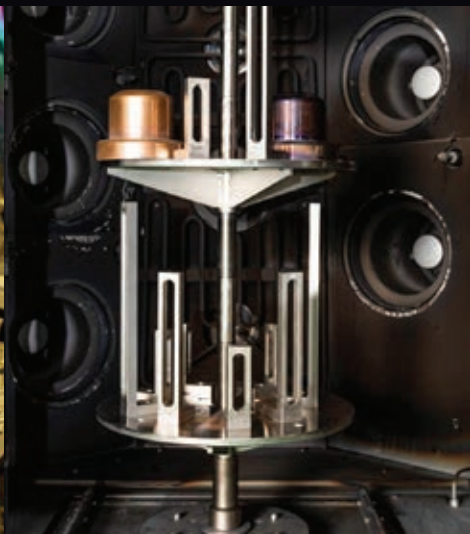
OUR EQUIPMENT

Specialised PVD devices enabling us to carry out research and provide services on an industrial scale:

- PLATIT Pi-411Plus – maximum format size that can be processed φ 450 x 520 mm
- Metaplas Ionon (Oerlikon Blazers) MZ383 – maximum format size that can be processed φ550 x 600 mm
- Ł-ITEE Radom Standard – maximum format size that can be processed φ 460 x 550 mm
- Ł-ITEE Radom Standard XXL – maximum format size that can be processed φ 500 x 1,200 mm

Specialised research instruments:

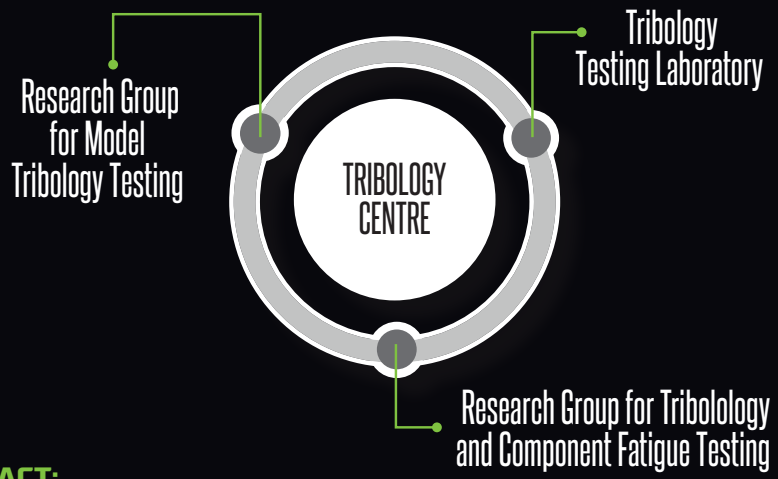
- ZEISS Neophot 32 Metallographic Microscope by Zeiss – magnification from 50 to 1,000x
- VHX 1000E digital microscope by KEYENCE – magnification from 0.1 to 5,000x
- hawk optical measuring microscope with a Vision camera – magnification up to 1,000x
- REVETEST by CSM – assessment of thin film adhesion and scratch resistance
- EMCO-TEST M4R075 hardness testing device – the Rocwell hardness test
- FV-7 hardness testing device by Future Tech – the Vickers hardness test
- Nano-Hardness Tester by CSM – hardness and Young's modulus tests at microscale
- Pin-on-disc tribometer by DUCOM – friction and wear studies at up to 900°C
- SEM TM3000 scanning microscope with a chemical composition detector by Hitachi – magnification up to 30,000x



TRIBOLOGY CENTRE

Our activities are primarily centred around friction, wear and fatigue tests employing various methods compliant with internationally recognised standards, as well as comprehensive pre- and post-friction surface analyses. We can cooperate with you on scientific and R&D projects, carry out research assignments or offer internship programmes.

We also sell tribotesters we have been developing and manufacturing at the Institute for over 30 years. Their originality and novelty have been confirmed by nearly 30 patents as well as over 30 gold and silver medals and awards won at international innovation, invention and new technology exhibitions and fairs. They have also won acclaim from the industry and science sectors, and over 200 of them have been implemented at various manufacturing entities as well as scientific and R&D institutions. Our tribotesters are also exported to many countries all over the world.



CONTACT:

dr hab. inż. Remigiusz Michalczewski

Head of the Tribology Centre

tribologia@itee.lukasiewicz.gov.pl

T.: (+48) 48 364 42 41 ext. 247


tribology testing
fatigue testing
surface analyses and measurements
tribotesters
internships

TESTS WE CONDUCT

We have 30 unique tribotesters with which we can:

- study lubricating properties of greases and other lubricating agents;
- study tribological properties (wear resistance and hardness, friction coefficient) of structural materials, tools, parts, and biomaterials;
- study anti-wear coatings;
- run tests in the presence of lubricants, dry friction or abrasives;
- run tests under extreme conditions (low or high temperature, vacuum);
- study model friction couples (ball-on-disc, pin-on-disc, roller-block, etc.);
- conduct fatigue tests on components – toothed wheels and roller bearings;
- study resistance to motion at the time of cutting (threading);
- test hip implants; and
- study resistance of toothed wheels to tooth bending fatigue.

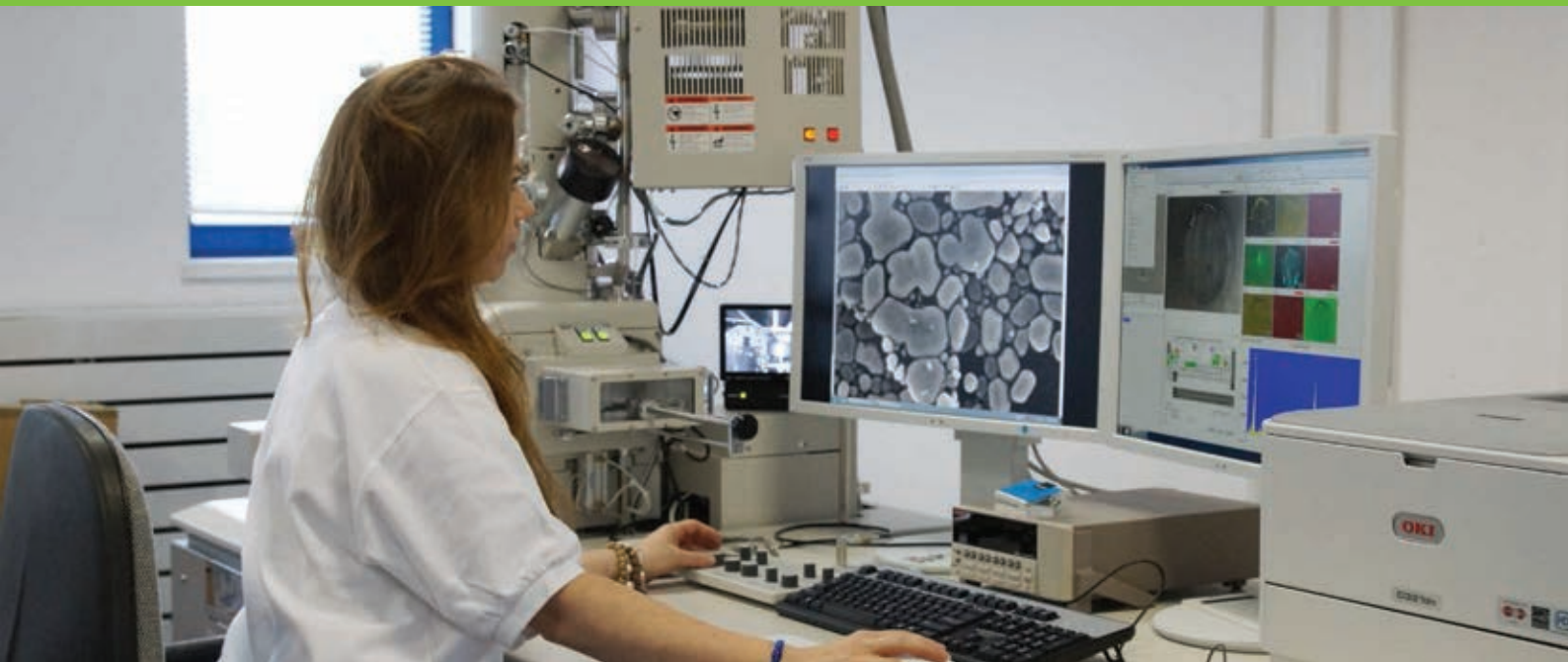
ANALYSES AND MEASUREMENTS WE PERFORM

We use specialised analytical equipment and measuring instruments including:

- Hitachi SU-70 Analytical Field Emission SEM coupled with an X-Ray Microanalysis EDS NSS 312 by Thermo Scientifc;
- Jobin Yvon JY 10000 RF Glow Discharge Optical Emission Spectrometer;
- Nikon MM-40/L3FA Measuring Microscope;
- Taylor Hobson CCI profilemeter;
- Taylor Hobson Form Talysurf PGI 830 measurement system;
- Future-Tech Corp FM-800 microhardness tester;
- Brüker XRD D8 DISCOVER X-ray diffraction system; and
- Kabid-Press KP15002P hardness tester.

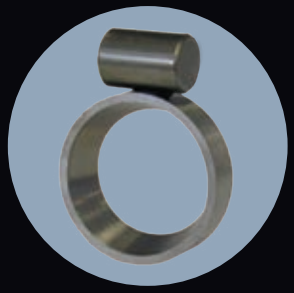
WE PERFORM

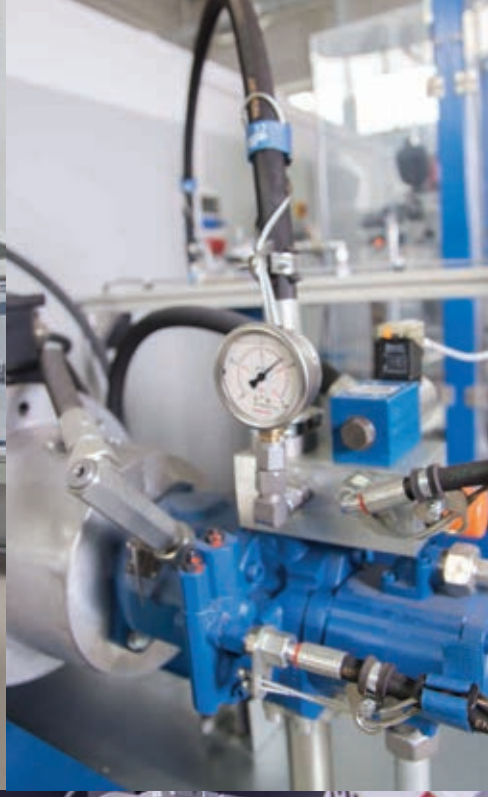
- Nano- and microscale analyses and measurements – surface stereometry and surface roughness;
- Micro- and miliscale analyses and measurements – surface imaging and elemental analysis (point, linear, surface), element distribution in the surface layer, surface microhardness measurements or phase and physical and mechanical analyses (stresses);
- Macroscale analyses and measurements – surface hardness.



TRIBOTESTERS WE SELL

- T-01M pin-on-disc tribotesters.
- T-02U universal four-ball tribotesters.
- T-05 block-on ring tribotesters.
- T-07 dry sand abrasive tribotesters.
- T-09 pin and vee block tribotesters.
- T-10 ball-on-disc tribotesters for precise testing of thin coatings.
- T-11 elevated temperature pin/ball-on-disc tribotesters (up to 300°C).
- T-12U back-to-back spur gear test rigs.
- T-13 crossed-cylinder Brugger tribotesters.
- T-15 elevated temperature ring-on-disc tribotesters (up to 300°C).
- T-17 reciprocating tribotesters with pin-on-plate tribosystem.
- T-20 slurry abrasive ball-cratering tribotesters.
- T-21 high temperature ball-on-disc tribotesters (up to 800°C).
- T-30 back-to-back bevel gear test rigs.
- T-32 pulsators for cyclic testing of gear tooth bending fatigue strength.





MAINTENANCE AND SUPPORT

We provide warranty and post-warranty maintenance and support for our tribotesters.

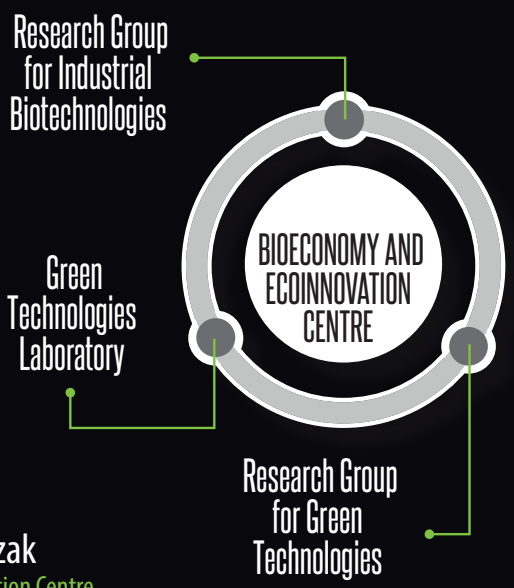
INTERNSHIPS

We are open to and offer internship programmes (in Polish and English).

BIOECONOMY AND ECOINNOVATION CENTRE

The Centre carries out R&D activity and provides services in the field of sustainable economy, which particularly aim to reduce the environmental impact of technological processes, focus on the manufacture of environmentally friendly consumables, are directed at closing and integrating industrial water circulation systems, while at the same enabling the recovery of raw materials and extending the service life of operating and process fluids and wastewater lifecycle.

The Centre has great R&D potential as it is in possession of a unique R&D and technological infrastructure, which includes advanced control and measuring equipment, and employs highly qualified specialists (in chemical technology, biotechnology, chemical engineering and process engineering, as well as environmental engineering).



CONTACT:

dr inż. Anna Kowalik-Klimczak

Head of the Bioeconomy and Ecoinnovation Centre

cbie@itee.lukasiewicz.gov.pl

T.: (+48) 48 364 42 41 ext. 218

Our experience in the implementation of the EU and publicly funded R&D projects as well as scientific and technical achievements guarantee the highest quality of the services we provide

- technologies for rational resource management
- circular economy
- composites and greases
- systems for wastewater and operating fluid treatment
- filtration materials and biomaterials

TESTED MATERIALS

- Water and wastewater
- Biomass
- Antifreeze fluids
- Lubricating oils, greases, and fuels
- Antibacterial materials
- Membranes and sorbents

OUR SERVICES

- Physical and chemical, mechanical, and rheological analyses of lubricants, water and wastewater.
- Microbiological analyses of a wide range of materials.
- Analyses and modification of composites, biomaterials and environmentally friendly lubricants.
- Development of technologies and devices for the treatment of industrial oils and technological fluids.
- Selection of process parameters for industrial wastewater treatment and regeneration of used technological fluids and industrial oils.
- Development of methods of biomass thermal conversion and industrial waste management.
- Advanced instrumental analyses employing specialised analytical instrumentation.
- Expert opinions.

We provide R&D organisations and enterprises with our expertise and R&D potential, which we offer on favourable terms under joint projects and as part of commissioned services.

OUR PRODUCTS

- Environmentally friendly lubricants and additives.
- Regenerative polymer composites.
- Filtration devices.
- Biochar-based sorbents.

SCOPE OF ACCREDITATION

POLSKIE CENTRUM AKREDYTACJI
POLISH CENTRE FOR ACCREDITATION

PCA

CERTYFIKAT AKREDYTACJI
LABORATORIUM BADAWCZEGO
ACCREDITATION CERTIFICATE OF TESTING LABORATORY
Nr AB 1496

SIEĆ BADAWCZA ŁUKASIEWICZ –
INSTYTUT TECHNOLOGII EKSPLOATACJI
LABORATORIUM TECHNOLOGII PRODEKOLOGICZNYCH

PCA
POLSKIE CENTRUM AKREDYTACJI
BADANIA

AB 1496

- Kinematic viscosity of diesel oil.
- 2-FAL content in insulating oils (HPLC).

ANALYTICAL EQUIPMENT

- Chromatography instrumentation (GC/MS and HPLC).
- Spectrometers (Ramana, ICP-MS, XRF, ASA, FTIR, UV-VIS).
- COD, BOD, carbon/nitrogen, protein,/fat/lactose analysers.
- Karl Fisher titrator for the determination of water content.
- Rotational rheometer and DWS.
- Oxidation stability apparatus.
- 3D digital microscope (magnification up to 5,000x).
- Porosimeter (pore size from 0.013 to 500 µm).
- Gas sorption analyzer.
- Calorimeters (DSC, bomb calorimeter).
- Instruments for measuring physical and chemical parameters of fuels, lubricating oils, greases and antifreeze fluids.





PROCESS EQUIPMENT

- Integrated membrane system for the recovery of water and raw materials from industrial wastewater.
- Systems for laboratory and pilot testing of the filtration and separation efficiency of polymeric and ceramic membranes.
- Wastewater treatment systems based on the ozone/UV process and sorption on activated carbon/ion-exchange resins.
- CIP station for washing and disinfection of technological pipelines.
- Bioreactors.
- Automatic film coater.
- Reactor for homogenization of polymeric casting solutions.
- Furnaces for biomass thermal processing.
- Mobile filtration devices for the treatment of insulating, machine, and hydraulic oils as well as antifreeze fluids.
- Mixers and homogenizers for processing greases and composites.

CENTRE
FOR VOCATIONAL EDUCATION RESEARCH AND INNOVATION MANAGEMENT

The Centre is a specialised nationally and internationally unique organisational unit of the Łukasiewicz Research Network – Institute for Sustainable Technologies whose activity is centred around the development of systems, models and tools supporting the integration of the vocational education (both formal and non-formal) with the industry and the labour market, as well as systems supporting commercialisation of innovative technologies and knowledge dissemination and transfer.

The Centre deals with important and highly topical research problems in the field of work pedagogy, andragogy, intellectual capital in enterprises, behavioural economics of organisations, and other scientific disciplines concerning the issues and challenges faced by modern workplaces. The Centre also conducts occupational studies, analyses and forecasts concerning new professions, qualifications, skills and competencies required on the labour market and connected with the digital transformation and sustainable economy and energy.

CONTACT:

dr inż. Krzysztof Symela

Head of the Centre for Vocational Education Research and Innovation Management

krzysztof.symela@itee.lukasiewicz.gov.pl

T.: (+48) 48 364 42 41 ext. 262


Rigips
Erasmus+


Łukasiewicz
W innowacyjnej
nauce i gospodarce
Renov Up

The Centre for Vocational Education Research and Innovation Management actively cooperates with the acclaimed Polish academic and scientific centres (e.g. the Maria Grzegorzewska University in Warsaw, the Kazimierz Wielki University in Bydgoszcz, the University of Rzeszów, the John Paul Catholic University of Lublin, the Maria Curie-Skłodowska University in Lublin, the Pedagogical University of Krakow, the University of Zielona Góra, the Jan Dlugosz University in Częstochowa, the Jan Kochanowski University of Kielce, the Kazimierz Pulaski University of Technology and Humanities in Radom, the AGH University of Science and Technology in Kraków, the Warsaw, Kraków, Łodź, Białystok and Lublin Universities of Technology or the Educational Research Institute in Warsaw), as well as renowned international universities and research institutions (e.g. the Ruhr University Bochum (Germany), the Academy of Education Sciences of Ukraine – Institute of Pedagogical and Adult Education in Kiev (Ukraine), the University College of Teacher Education in Vienna (Austria), the Tallinn University (Estonia), the NIREAS-IWRC – University of Cyprus (Cuprus), the Trnava University (Slovakia), the University of Pitesti (Romania), the European Association of Institutes for Vocational Training, the Association for the Education of Adults, the Federal Institute for Vocational Education and Training (Germany)). The Centre also cooperates with employer associations and organisations as well as research and vocational development and training centres (e.g. the KGHM CUPRUM sp. z o.o. – Research and Development Centre, the Polish Federation of Engineering Associations, the Polish Craft Association, the Chamber of Commerce and Industry of the Radom Region, the Future Industry Platform, and the Union of Vocational Education Centres). The Centre participates in the implementation of numerous national (e.g. Human Resources Development Operational Programme (RZL), Human Capital Operational Programme (PO KL), POWER or programmes financed by the National Centre for Research and Development (NCBR)) and international projects (e.g. PHARE, TESSA, SPRED, SMART, TERM, Leonardo da Vinci, COST, Erasmus+ INTRERREG, LIFE or HORIZON EUROPE) in which it carries out research the results of which are applied into practice.

THE CENTRE'S CORE ACTIVITIES ARE AS FOLLOWS

- developing innovative solutions in the area of continuing vocational education as well as educational and career guidance and counselling; developing novel teaching methods for formal and non-formal education employing digital solutions (e.g. VR/AR);
- drafting descriptions of professions; conducting occupational studies, analyses and forecasts concerning new professions, qualifications, skills and competencies; as well as developing job competence models and tools to identify employees' competency gaps;
- providing vocational teachers and career counsellors with methodological and substantive support (also designing multimedia educational packages);
- developing and applying foresight and Futures Literacy methods to forecast future research directions and technologies, mainly with reference to activities and fields of specialisation outlined in the Institute's Statute, with concurrent consideration of national and international scientific and economic development priorities, as specified in Smart Specialisations, and professional and personal development requirements;
- developing and applying methods for transferring and commercialising research results; analysing commercialisation and valuation procedures applicable to research results; managing knowledge transformation and technology transfer processes; designing systems to support marketing and commercialisation activities at R&D organisations;
- providing services of an Entity for External Quality Assurance of Market Qualifications to competent ministers responsible for skills and qualifications as entered in the Integrated Qualifications System; and
- accrediting and certifying vocational education curricula as part of the Polish Modular Education Network; organising internships, apprenticeships and dual training for students of vocational and technical schools.


Q4EDU
SYSTEMY SUCHEJ ZABUDOWY
Erasmus+
PLASTERING AND DRYWALL SYSTEMS
CYPRUS
social innovation-based model for the analysis of enterprise open
EUROPEAN CONTEXTS FOR THE DEVELOPMENT OF CONTINUING VOCATIONAL EDUCATION IN POLAND

OUR SERVICES

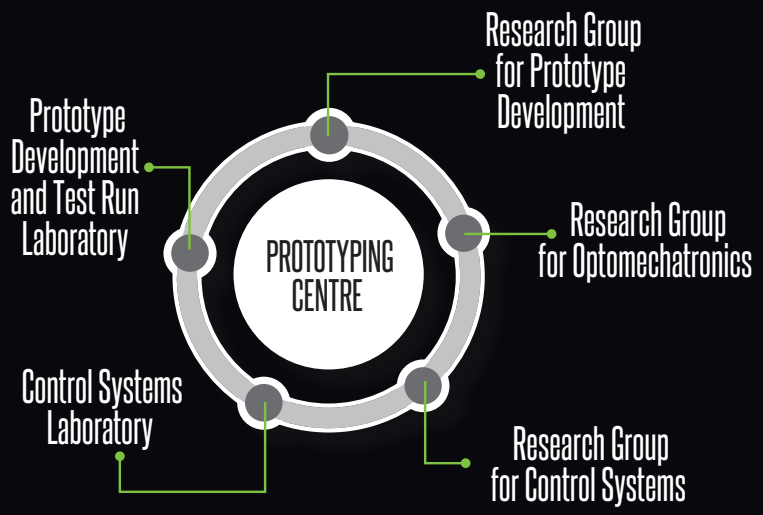
- Holding consultations concerning new market qualifications entered in the Integrated Qualifications System; services of an Entity for External Quality Assurance of Market Qualifications provided to competent ministers responsible for skills and qualifications (https://www.itee.lukasiewicz.gov.pl/zintegrowany-rejestr-kwalifikacji).
- Drafting descriptions of professions to be added to the "INFOdoradca+ Informacje o zawodach" database (https://psz.praca.gov.pl/rynek-pracy/bazy-danych/infodoradca).
- Editing and publishing the Edukacja Ustawiczna Dorosłych – Journal of Continuing Education (40 points according to the journal ranking list published by the Polish Ministry of Education and Science) and popularising research results in articles published in it (https://edukacjaustawicznadoroslych.eu).
- Producing forecasts and drafting analysis and expert reports on labour market needs, vocational qualification and competency building, and professional development of educators.
- Providing services of an Innovation Laboratory (i-Lab) concerning the development of teachers, vocational educators and innovative enterprise employees' competencies and teamwork skills.
- Accrediting institutions offering formal and non-formal education and curricula as part of the Polish Modular Education Network.

PROTOTYPING CENTRE

It enables effective further development of innovative product solutions originating from scientific centres and manufacturing entities. The activities carried out meet the market's current demand for specialised design and development services in the field of prototype machine and equipment construction:

- Designing and developing prototypes and specialised technological lines.
- Analysing and conducting test runs of prototypes and experimental installations, studying technological processes, and conducting other research, development and implementation activities.
- Developing electronic control systems for machines and technological processes.
- Offering advanced systems and methods for multi-parameter quality control employing mechatronic and optomechatronic technologies.
- Offering specialised equipment supporting industrial technological processes.
- Providing manufacturing services as regards machining, electrical discharge machining, sheet metal cutting and bending, welding, powder and wet coating, and 3D printing.

Contact us to benefit from our expertise and years of valuable experience in advanced scientific analyses as well as R&D and implementation activities.



CONTACT:

dr hab. inż. Andrzej Zbrowski
Deputy Director for Research Development

andrzej.zbrowski@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 306

INQUIRIES AND OFFERS:

Artur Lalewicz
Product Manager

artur.lalewicz@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 93 88 M.: 607 506 552

OUR SYSTEMS

ADVANCED TECHNOLOGICAL SYSTEMS

for precision machining of unique machine elements and devices manufactured through a one-off production

ADVANCED TECHNOLOGICAL SYSTEMS

for incremental manufacturing of complex structural elements used in innovative prototype machines, devices as well as research and test instruments

ADVANCED MEASURING SYSTEMS

for controlling quality of precise prototype machine elements manufactured through incremental production and precision machining that employs reverse engineering

ISO SYSTEM

Our highly qualified staff use modern technological and analytical instruments and monitor each and every stage of the manufacturing process, which ensures top quality of the services we offer. The ISO 9001 compliant quality control system also imposes on us an obligation to carry out due diligence checks on suppliers and to employ in our manufacturing processes only the best certified raw materials

Research Group for Prototype Development

The Research Group for Prototype Development was established to further develop innovative product solutions originating from research organisations and enterprises.

The Group's activities are centred around the development of new structural design solutions for:

- machine prototypes and specialised technological lines;
- control and measuring instruments and test stands;
- special equipment and tools for science and industry; and
- equipment supporting production processes and maintenance of technological objects.

The Group also conducts studies and analyses including:

- environmental tests (materials and equipment);
- determination of performance characteristics of air handling units with heat recuperation; and
- determination of performance characteristics of air-to-air and air-to-water heat pumps.

The Research Group for Prototype Development conducts implementation research, designs and manufactures prototype control systems, and also provides training services revolving around new design and manufacturing techniques.

CONTACT:

dr inż. Tomasz Samborski

Head of the Research Group for Prototype Development

konstrukcje@itee.lukasiewicz.gov.pl

T.: (+48) 48 364 42 41 ext. 232

Research Group for Optomechatronics

The Research Group for Optomechatronics is involved in scientific, R&D and implementation activities concerning mechatronic technologies used in systems supporting production and maintenance processes as well as research and test instruments. The Group's activities are centred around:

- advanced systems and methods for multi-parameter quality control employing optomechatronic technologies;
- hybrid systems for monitoring technological processes employing optical inspection and thermography;
- robotic manipulators and systems for industry and science;
- research and test instruments for the R&D sector and industry; and
- automatic material, raw material and product identification using hyperspectral imaging.

CONTACT:

dr inż. Jordan Mężyk

Head of the Research Group for Optomechatronics

optomechatronika@itee.lukasiewicz.gov.pl

T.: (+48) 48 364 42 41 ext. 316

Research Group for Control Systems

The Group's core activities concern designing and manufacturing:

- microprocessor systems, including real-time systems;
- specialised electronic devices in the area of control and supply systems for plasma sources and other power electronic circuits for plasma and vacuum devices including high-power radio frequency generators and high-power pulse waveform generators;
- control systems for technological (mainly plasma and vacuum) processes; and
- control systems for research and test instruments.

Our equipment:

- Programming engineering and microprocessor technologies, including digital signal processors (DSPs) and field-programmable gate arrays (FPGAs).
- Surface mount technologies – set of high-power waveform meters.
- Software for control system identification, modelling, and simulation.
- SCADA and HMI software.
- EMC test equipment.

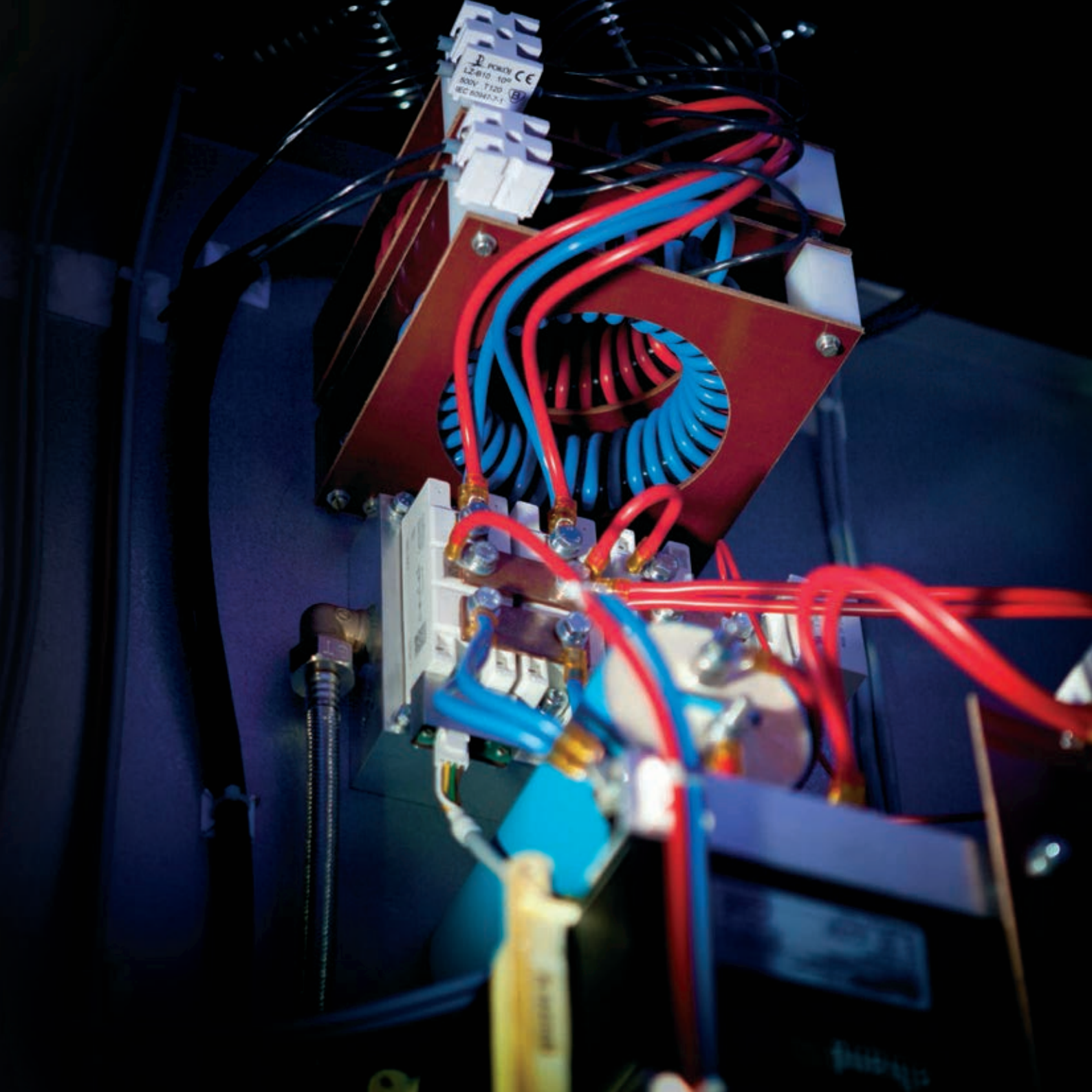
Control Systems Laboratory

The Laboratory tests electrical equipment for compliance with requirements contained in standards harmonised with Directive 2014/30/EU of the European Parliament and of the Council relating to electromagnetic compatibility. The tests are intended to support manufacturers and distributors in product CE marking.
In 2014, the Laboratory was accredited by the Polish Centre for Accreditation to conduct electromagnetic compatibility tests: Scope of Accreditation no. AB 1476.

CONTACT:

dr inż. Andrzej Majcher
Head of the Research Group for Control Systems

systemy-sterowania@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 272



Prototype Development and Test Run Laboratory

The Laboratory provides services concerning manufacture of complex geometry parts and components and in high-precision manufacturing. The Laboratory's offer includes elements manufactured mainly through a one-off (prototype), job or small batch production and made from various materials (e.g. stainless steel, titanium, aluminium alloys, non-ferrous metal alloys or plastics).
We specialise in manufacturing complex geometry parts and components as well as in high-precision manufacturing, for which we employ latest technologies and modern CNC machines, e.g.: DMG MORI, +GF+, DURMAZLAR, HACO FAT, PTV, HEXAGON, Brown & Sharpe dea, Smartech 3D Metrology or Smart Solutions.

The main areas of the Laboratory's activity include the following:

- Developing prototypes and specialised technological lines, also as commissioned by other research departments at the Institute.
- Analysing and conducting test runs of prototypes and experimental installations, studying technological processes, and conducting other R&D activities commissioned by other research departments at the Institute.
- Developing electronic control systems for machines and technological processes.
- Implementing innovative solutions developed at the Institute.
- Providing specialised manufacturing services.
- Providing post-warranty support (including manufacture of spare parts).
- Cooperating with other R&D organisations and enterprises as regards experimental manufacturing.

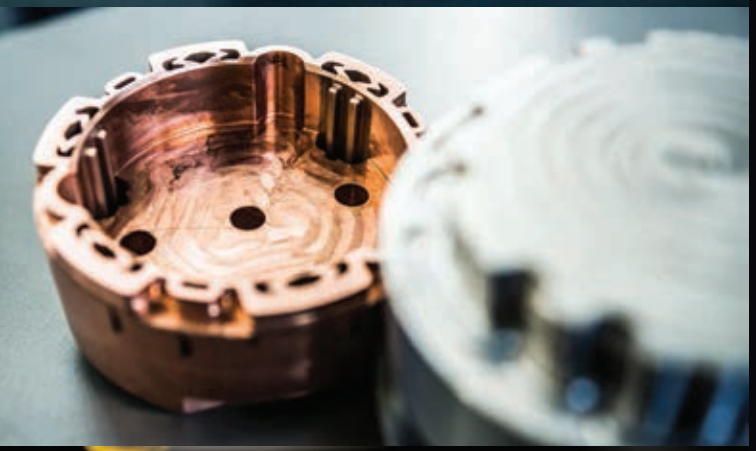
CONTACT:

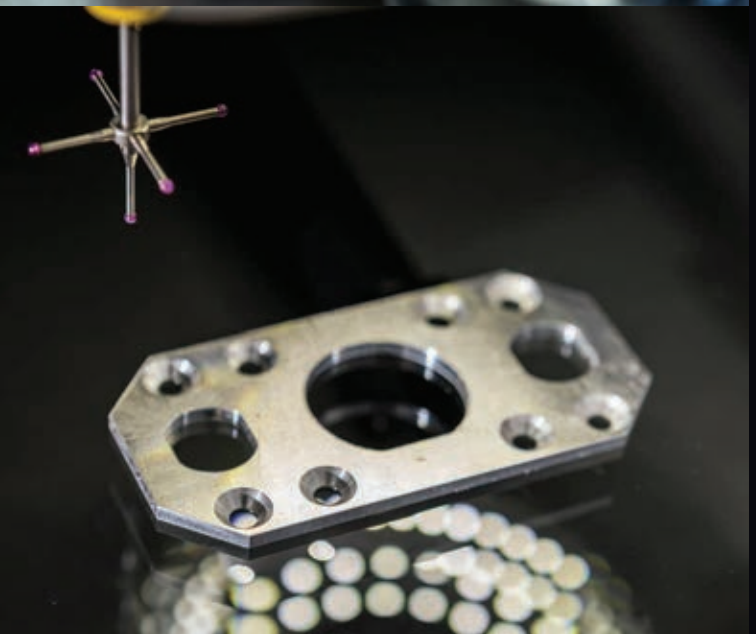
dr inż. Tomasz Ryba

Head of the Prototype Development and Test Run Laboratory

lpu@itee.lukasiewicz.gov.pl

T.: (+48) 48 364 42 41 ext. 422



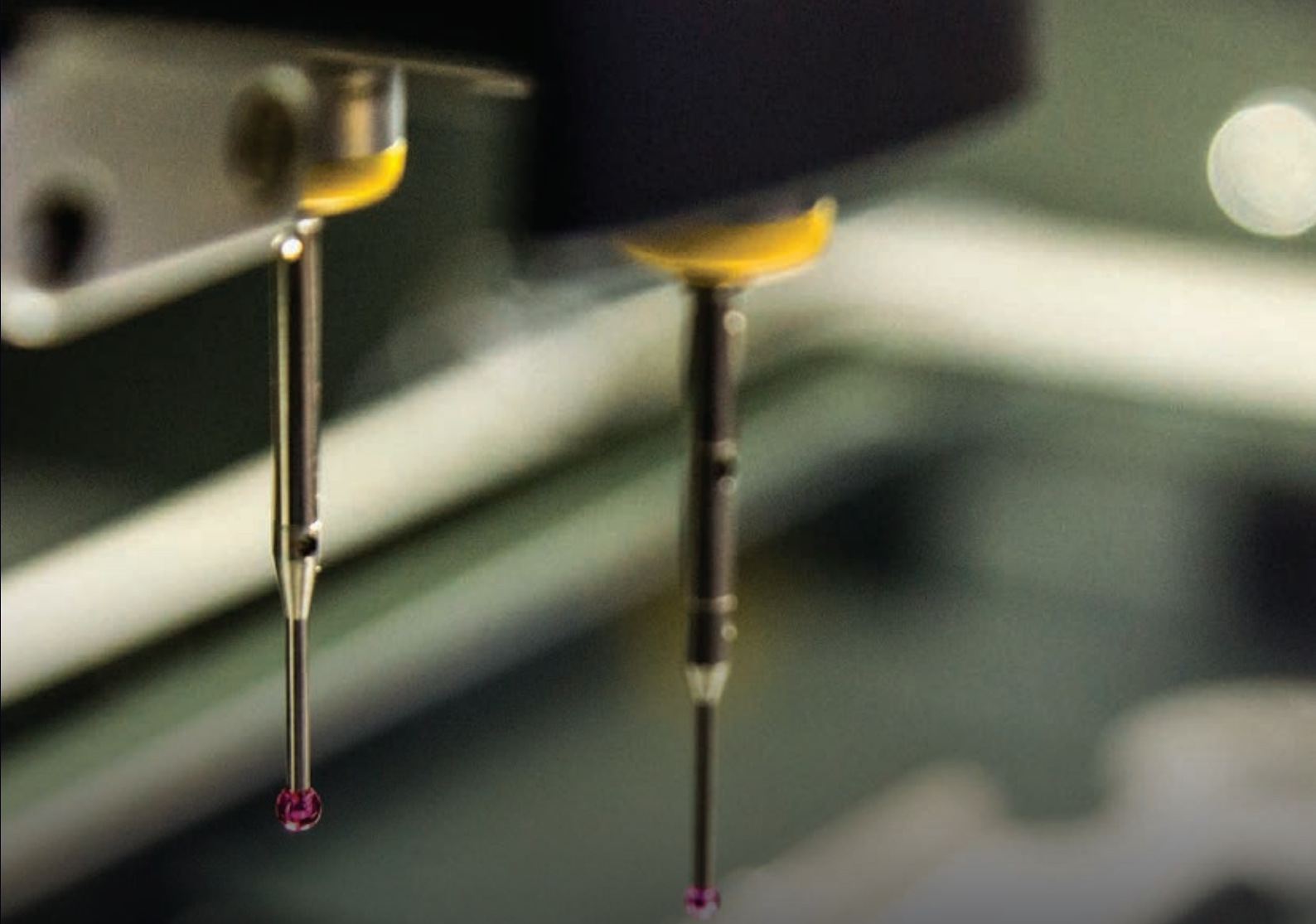


OUR SERVICES

- Tool design, development and reconditioning.
- Machining, milling, turning, drilling, etc.
- Wire and sinker electrical discharge machining.
- Sheet metal plasma and waterjet cutting.
- Sheet metal bending with an edge press.
- Welding (Mig/Mag and Tig methods).
- Powder and wet coating.
- Measuring and 3D scanning services.
- 3D printing systems.

CUSTOMER CENTRICITY

We complete each engagement and assignment with the utmost professional care and in line with design documentation. We are able to build customers' trust and maintain good business relations, by guaranteeing attractive prices, timeliness and professional customer service.



OUR SYSTEMS

- Advanced technological systems for precision machining of unique machine elements and devices manufactured through one-off production (turning centres or 4- and 5-axis machining centres).
- Advanced technological systems for incremental manufacturing of complex structural elements used in innovative prototype machines, devices as well as research and test instruments (3D printing systems).
- Advanced measuring systems for controlling quality of precise prototype machine elements manufactured through incremental production and precision machining employing reverse engineering (coordinate measuring machines, 7-axis measuring arm, 3D scanner).

RESEARCH SUPPORT DEPARTMENT

The Research Support Department assists other research departments at the Institute in drafting project proposals, by verifying documents for formal and legal compliance with specific programme guidelines and for funding opportunities. The Department also networks with other organisational units at the Institute as regards research project initiation and implementation.

The Department supports the Institute's R&D and implementation activities by:

- providing information on call for proposals through access to guidelines and documentation, in-house training, and coordination of training courses and workshops organised by funding agencies (e.g. the Ministry of Education and Science, the Ministry of Economic Development and Technology, the National Centre for Research and Development, the Polish Agency for Enterprise Development, the Office of the Marshal of the Mazowieckie Voivodeship, etc.);
- preparing project and grant proposals; and
- networking with potential consortium partners, especially abroad, e.g. through matchmaking sessions organised under the Horizon Europe programme.

CONTACT:

dr Andrzej Stępnikowski

Head of the Research Support Department

andrzej.stepnikowski@itee.lukasiewicz.gov.pl

T.: (+48) 48 364 42 41 ext. 214

NATIONAL AND INTERNATIONAL PROJECTS

FRAMEWORK PROGRAMME

HORIZON EUROPE, ERASMUS+, INTERREG PROGRAMMES

COMMERCIALISATION AND SALES DEPARTMENT

The Commercialisation and Sales Department assists all Institute's research centres and departments in the commercialisation of their research results and stimulates sales and activities that contribute to building the Institute's reputation and boost the effectiveness of the commercialisation process.

The Department's core activities are as follows:

- winning potential customers, building and maintaining relationships with companies and other institutes forming the Łukasiewicz Research Network;
- establishing cooperation with Polish companies to implement projects and carry out assignments commissioned directly by the industry;
- expanding the offer: developing new products (services), e-catalogues for Polish and foreign audiences, diversifying the portfolio of services, preparing case studies based on previous experience as regards cooperation with the market, success stories and presentations;
- organising business meetings and study visits as part of ongoing or planned R&D projects implemented in cooperation with international and national R&D organisations and universities;
- market, technology portfolio and competitive monitoring;
- increasing the Institute's digital presence;
- undertaking pre-implementation activities (preparation of documents and patent applications, patent protection);
- increasing the Institute's activity in the "Łukasiewicz Challenges" system; and
- defining sales goals for individual departments.

CONTACT:

dr Marzena Walasik

Deputy Director for Finance, Operations and Commercialisation

marzena.walasik@itee.lukasiewicz.gov.pl

T.: (+48) 48 364 42 41 ext. 308

COMMERCIALISATION OF RESEARCH RESULTS

SERVICES PROPOSALS

TECHNICAL DATA SHEETS

SCIENTIFIC PUBLISHING DEPARTMENT

Publisher of monographs: Biblioteka Polskiej Nauki i Techniki [Polish Science and Technology series, Biblioteka Problemów Budowy i Eksploatacji Maszyn [Machine Construction and Maintenance series], Biblioteka Pedagogiki Pracy [Work Pedagogy series] and scientific journals.
Editing, printing and publishing services including design, typesetting, translations, computer-to-plate imaging (CTP), multicolour offset printing, sewn binding, glued binding, online publishing, as well as publishing research results of institutes forming the Łukasiewicz Research Network.
The Scientific Publishing Department publishes results of research carried out under national and international projects and also establishes cooperation with scientific and cultural institutions.
The works published by the Scientific Publishing Department are presented at many national and international exhibitions, fairs, conferences, congresses and seminars.
The Scientific Publishing Department also has a wide distribution network for journals, books and electronic publications, which can also be bought online.

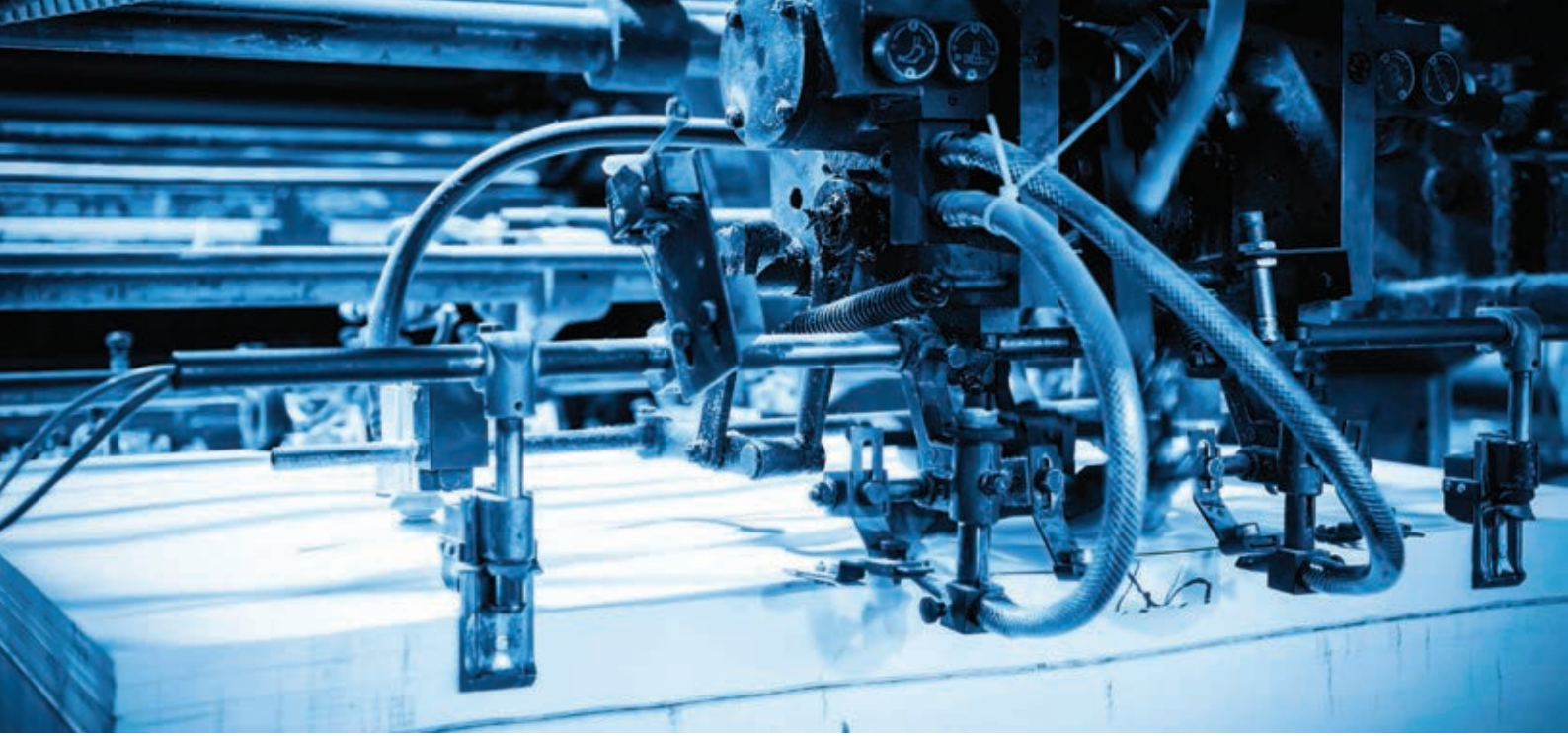
CONTACT:
Marcin Olifirowicz
Head of Scientific Publishing Department, Editor-in-Chief
marcin.olifirowicz@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 230, 265

MACHINE CONSTRUCTION AND MAINTENANCE SERIES

POLISH SCIENCE AND TECHNOLOGY SERIES

WORK PEDAGOGY SERIES

SCIENTIFIC JOURNALS



PUBLISHING SERVICES

- Peer reviewing and editing scientific publications, articles and monographs.
- Translations.
- Consultations with authors and scientific editors.
- End-to-end publishing services: typesetting, paging, design, photo scanning, proof-reading, editing, cover designing, redaction.
- E-book designing.
- Promotional material designing (leaflets, posters, catalogues).
- Promotion and distribution.

PRINTING SERVICES

- Computer-to-plate imaging (CTP).
- Book printing (short-run and medium-run printing).
- Ephemera printing: calendars, brochures, leaflets, posters, marketing materials, letterheads, etc.
- Seamless, sewn, glued, hardcover, and wire binding.
- Hot laminating (paper and cardboard).
- Printing runs as requested by the Client.

OUR PARTNERS

- Ministry of Economic Development and Technology
- Ministry of Education and Science
- Universities (Warsaw University of Technology, Gdańsk University of Technology, Poznań University of Technology, Rzeszów University of Technology, Kielce University of Technology, University of Warsaw, Jagiellonian University)
- Institute of National Remembrance
- Chancellery of the Polish Parliament (Sejm)
- Polish Agency for Enterprise Development and the Centre for Education Development
- Institutes forming the Łukasiewicz Research Network
- National Centre for Culture
- Museums, cultural centres, regional institutions

MANAGEMENT

Dr Tomasz Dąbrowski
Managing Director

tomasz.dabrowski@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 302

dr hab. inż. Andrzej Zbrowski
Deputy Director for Research Development

andrzej.zbrowski@itee.lukasiewicz.gov.pl
T.: (+48) 448 364 42 41 ext. 305

dr Marzena Walasik
Deputy Director for Finance,
Operations and Commercialisation

marzena.walasik@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 308

prof. dr hab. inż. Marian Szczerek
Research and Professional Development Advisor

marian.szczerek@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 307

prof. dr hab. inż. Jerzy Smolik
Head of the Surface Engineering Centre

jerzy.smolik@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 251

dr inż. Anna Kowalik-Klimczak
Head of Bioeconomy and Ecoinnovation Centre

anna.kowalik-klimczak@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 218

Wojciech Karsznia
Chief Planning and Procurement Officer

wojciech.karsznia@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 312

Marcin Olifirowicz
Head of the Organisation and Coordination Department
Head of Scientific Publishing Department, Editor-in-Chief

marcin.olifirowicz@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 230, 265

dr hab. inż. Remigiusz Michalczewski
Head of Tribology Centre

tribologia@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 247

dr inż. Krzysztof Symela
Head of the Centre for Vocational Education
Research and Innovation Management

krzysztof.symela@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 262

dr Andrzej Stępnikowski
Head of the Research Support Department

andrzej.stepnikowski@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 214

Tomasz Wąsowski
Legal Counsel

tomasz.wasowski@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 350

dr inż. Tomasz Samborski
Head of the Research Group for Prototype Development

tomasz.samborski@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 232

dr inż. Andrzej Majcher
Head of the Research Group for Control Systems

andrzej.majcher@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 272

dr hab. inż. Elżbieta Rogoś
Head of the Research Group for Green Technologies

elzbieta.rogos@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 282

dr Ludmiła Walaszczyk
Head of the Research Group for Behavioural Management in Innovation

ludmila.walaszczyk@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 339

Agnieszka Grzybowska
Head of the Finance and Controlling Department

agnieszka.grzybowska@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 204

dr inż. Jordan Mężyk
Head of the Research Group for Optomechatronics

jordan.mezyk@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 316

dr inż. Tomasz Ryba
Head of the Prototype Development and Test Run Laboratory

tomasz.ryba@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 422

dr hab. inż. Remigiusz Michalczewski
Head of the Research Group for Model Tribology Testing

remigiusz.michalczewski@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 247

dr hab. inż. Jarosław Molenda
Head of the Green Technologies Laboratory

jaroslaw.molenda@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 289

Andrzej Woś
Head of the Administration Department

andrzej.wos@itee.lukasiewicz.gov.pl
T.: (+48) 48 364 42 41 ext. 258

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Łukasiewicz
Institute for Sustainable Technologies

Łukasiewicz Research Network
Institute for Sustainable Technologies
ul. Pułaskiego 6/10, 26-600 Radom