HOSTING OFFERS FROM THE SILESIAN AND OPOLSKIE VOIVODESHIPS (POLAND) FOR THE MARIE SKŁODOWSKA-CURIE INDIVIDUAL FELLOWSHIPS IN HORIZON 2020








We are looking for **enthusiastic and experienced researchers of any nationality** interested in submitting a joint application for the

Marie Skłodowska-Curie Individual Fellowships!

More information about this call can be found at:

H2020-MSCA-IF-2020

TABLE OF CONTEST:

I. THE SILESIAN UNIVERSITY OF TECHNOLOGY

The Silesian University of Technology (SUT), is the oldest technical university in the region and one of the most prestigious in Poland. It was established in 1945 as a scientific and educational facility for Upper Silesia, the most industrialized area in Poland, and one of the most industrialized in Europe. For over 70 years of its history, it has always been a public institution, playing a cultural and opinion forming role in the region.

15 educational units of the University – 13 faculties, one college and a scientific-didactic centre – currently offer almost 60 study programmes and about 200 specializations, including the whole spectrum of engineering studies. Aside from technical programmes, candidates may also study administration, business analytics, mathematics, sociology and management – including project management – as well as foreign languages and pedagogy.

RESEARCH UNIVERSITY
EXCELLENCE INITIATIVE
Ministry of Science and Higher Education

The Silesian University of Technology occupy leading positions in both national and international rankings. SUT is among the 10 top universities in Poland to be awarded the status of a research university in the competition **"Excellence Initiative – Research University"** (Polish abbreviated name "IDUB") sponsored by the Ministry of Science and Higher Education. The purpose of this program is to support the competition winners as universities which have what it takes to successfully compete with the best universities in Europe and the world. It ranked 5th among technical universities and 13th among all universities in Poland in the "Perspektywy" Educational Foundation Ranking. Two study programmes: environmental engineering and logistics were considered the best in Poland, which allowed SUT to rank 4th in the whole country in terms of engineering study programmes. In the SCImago Institutions Ranking (SIR), an international classification of higher education institutions, Silesian University of Technology was awarded the 4th place in Poland and 17th in Eastern Europe. According to the report made by Sedlak & Sedlak company, 1 in 12 chairmen in Poland graduated from SUT. Meanwhile, the "Rzeczpospolita" journal states, that our university is second nationwide, when it comes to successful people. Finally, the "Wprost" magazine, graduates from SUT are 4th in Poland in terms of most wanted by the employers.

Moreover, the institution was recently honoured with an **"HR Excellence in Research"** Logo, which confirms that the university operates in accordance with the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. SUT was also awarded an ELSEVIER Research Impact Leaders 2016 award in the Engineering and Technology category, focusing on the impact of the university on the visibility of Polish science worldwide.

HR EXCELLENCE IN RESEARCH

As a prestigious European technical university, the Silesian University of Technology hosts innovative research and development activities, and educates highly professional staff for the knowledge-based society and economy. It also actively stimulates the growth of the region and the local communities. Due to the constant improvement of processes and organization, the university is a friendly and open place for the academic community, in terms of work and development.

The Silesian University of Technology is a higher education institution that respects the universal values and academic traditions. It is a modern and widely recognized European institution, one of the top Polish technical universities, educating the elite of the society and supporting the dynamic development of the economy with due regard for the ethical values and the highest quality of research and teaching activities.

Until now, SUT promoted over 180,000 engineers, over 4,500 doctorates and almost 900 postdoctorals. Graduates of our university often occupy managerial, directorial and other high positions in industrial corporations, which can be proven by numerous rankings conducted by independent research institutions. Wide range of courses and high quality of education are factors that distinguish the Silesian University of Technology among all technical universities in Poland.

FACULTY OF ARCHITECTURE

SHORT DESCRIPTION

Faculty of Architecture is an educational and research unit of the Silesian University of Technology. It carries out projects and research in the fields of modern urban and spatial planning, theory and history of architecture, revitalization of municipal areas, restoration and conservation of historic buildings, as well as quality assessment and management of such buildings. Artistic projects include interior and furniture design, functional graphics, sculpture, painting and drawing. The Faculty enjoys strong support from local professionals. Among the academic staff there are successful practitioners, whose presence enlivens and benefits educational environment. The unit is entitled to award BSc, MSc and PhD academic degrees in Architecture and Urban Planning.

The Faculty has about 80 employees and approximately 500 students. It hosted numerous events and conferences including BIWA (Interdisciplinary Research in Architecture), RMW (Region-City-Country), ULAR (Urban Landscape Renewal) or TEDxSilesianUniversityofTechnology.

We have Erasmus partnerships with over 20 European architecture schools, including Vrije Universiteit Brussel, Fachhochschule Aachen, Chalmers University of Technology, Kopenhavens Tekniske Skole, Gazi University Ankara, Izmir Institute of Technology. The Faculty of Architecture is also a member of EAAE – European Association for Architectural Education and ECLAS – European Council of Landscape Architecture Schools. It also cooperates with organizations and institutions in many countries, e.g. with IAPS (International Association for People-Environment Studies), Internationale Bauausstellung (IBA) Furst-Puckler-Land in Germany, Romualdo Del Bianco Foundation in Italy, National Preservation of Cultural Heritage Old Halich in Ukraine.

Our students participate in international design workshops and, within the framework of ERASMUS program, they can study at 23 partner universities. The Faculty has fruitful collaboration with creative professional organizations, including, among others, Union of Polish Architects, Society of Polish Town Planners, Chamber of Polish Architects, Chamber of Polish Town Planners and local self-governments.

The Faculty of Architecture is situated in the campus of SUT, near the historic centre of Gliwice.

The Faculty of Architecture consists of the following units:

- Department of Urban and Spatial Planning
- Department of Housing and Public Architecture Design
- Department of Theory, Design and History of Architecture
- Department of Fine Arts and Design
- Department of Design and Qualitative Research in Architecture

KEY RESEARCH AREAS

- Architectural design research - trends and changes in Polish architecture, studies on dwellings and commercial buildings and their transformations, technical bases for adaptation of the environment for the disabled people, etc. Housing design, new housing typologies, affordable housing, municipal housing policy, etc.

- Town planning and Urban design - dealing with current issues of Silesian municipalities, considering environment protection, landscaping, land use, urban design and master planning of new urban areas like residential areas, industrial and special zones, such as airport cities

- Regeneration of post-industrial and urban areas - research and design studios in the formula of PBL (Problem Based Learning). The scope of work ranges from identifying the potential and problems on a district scale, through formulation of regeneration strategies, in order to solve specific design issues. Numerous projects were completed for Silesian municipalities, as well as organizations such as coal mines, landscape parks etc.

- Qualitative research in built environment, public spaces quality analysis, place-making process analysis through participatory action research with local communities, facility management, ergonomic arrangement of architectural and urban spaces, effectiveness of space use, attractiveness of the customer's position, sustainable development and the impact of climate change on architecture, quality of the internal environment; Used methods and techniques: POE (Post Occupancy Evaluation), Design Thinking and other. Design for aging society (**http://www.lab60plus.pl/en**)

- Landscape design, environment protection and biodiversity enrichment, habitat creation, nature valuation, designing parks and greenery of urbanized areas. Design connected with BREEAM certification.

- Diagnosing transformation in architecture and construction of the housing stock, testing methods, analysis using statistical methods and reports of changes introduced in the test substance, measures for housing resource evaluation by their users, formulating comprehensive assessment methods for housing stock in general, using elements of statistics, analysis of spatial solutions and macrosocial determinants that contribute to human residence space.

- History of architecture and town planning, theory of architecture and urbanism, building conservation and cultural heritage protection focused on design in cultural context, local identity and humanistic approach to environmental issues in the design process. Projects and publications concerning heritage: historical housing estates, old towns revitalisation, post-industrial heritage. Developing models of cooperation between the University and Local Administration, Self-Government and Public Institutions

CONTACT PERSON

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Vice-Dean for cooperation with socio-economic environment
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+48 793090078 / +48 32 237 13 18

www.polsl.pl/en/Pages/RAr.aspx

FACULTY OF AUTOMATIC CONTROL, ELECTRONICS AND COMPUTER SCIENCE

SHORT DESCRIPTION

The Faculty of Automatic Control, Electronics and Computer Science (AEI), which employs over 200 professors, assistants and lecturers. The Faculty carries out research in the following disciplines: automatic control, electronics, informatics, biotechnology and biocybernetics. The Faculty has had outstanding achievements in scientific and applied research including industrial research and target projects. These include: the formulation of new steering algorithms (adaptive, predictive and changeable), significant contribution to the creation and modification of the existing methods of adjuster design, the creation of the FUZZY-FLOU system, which is used in the decision making process, drawing up and implementation of the steering system for the sheet metal etching process at Columbus Steelworks in the RSA, the creation of program modules which guarantee the safety of information in computer systems, creation of advanced Business Intelligence applications, development of communication technologies for the new generation of Internet, development of distributed data mining algorithms for industrial applications and many others. The Faculty has an active cooperation with 90 foreign universities and research institutes and also with almost one hundred Polish enterprises.

KEY RESEARCH AREAS

- **THE SENSOR NETWORKS THAT ARE USED IN SMART MANUFACTURING:**

  The sensor networks that are used in smart manufacturing are a key factor in the transformation that is currently occurring in industry. It is a multidisciplinary area and a one of critical components of the new approach to smart manufacturing. The support for digitalisation will be enabled by artificial intelligence that is built into cooperating sensors and actuators. Such an approach enables applications that are based on classical industrial networks, which are susceptible to errors and that are not transparent, to be changed into self-adaptive and flexible smart production systems. This objective is achievable due to the SUT/AEI research potential in the three scientific disciplines that comprise the name of the AEI Faculty – Automatic Control, Electronics and Informatics. Smart Sensor Networks will support the knowledge-building process in a more flexible, efficient and autonomous way than is the case with the classical systems that are based on a centralised data warehouse.

  Contact person: Associate Professor: Rafal Cupek, e-mail: rafal.cupek@polsl.pl

- **CYBER-PHYSICAL PRODUCTION SYSTEMS:**

  Cyber-Physical Production Systems (CPPS) as well as the expanding Internet of Things and Services (IoTS) have significantly affected value creation, business models and the organisation of work within the domain of industrial production. CPPS provide a connection between the virtual and physical worlds, which are then combined with various capabilities. The technical features of a smart factory differ fundamentally from a traditional factory in that they have : (i) Diverse Resources – in order to produce multiple types of small-lot products, more resources of different types should be able to coexist in the system; (ii) Dynamic Routing – when switching between different types of products, the resources that are required and the route to link these resources should be reconfigured automatically and online; (iii) Comprehensive Connections – the machines, products, information systems and people are connected and interact with each other through a high-speed network infrastructure; (iv) Deep Convergence – a smart factory operates in a networked environment in which an industrial wireless network and the cloud integrate all of the physical artefacts and information systems in order to form the IoTS and (v) Self-Organisation – the control function distributes to multiple entities. These smart entities negotiate with each other to organise themselves in order to cope with the system dynamics and (vi) Big Data – smart artefacts can produce massive amounts of data; a high bandwidth network can transfer these data and the cloud can process the large amounts of data. For this reason, traditional industrial networks have to be replaced by cloud-assisted industrial wireless networks that can reliably support a smart factory by implementing Cyber-Physical Systems (CPS) and the Internet of Things and Services (IoTS).

  Contact person: Associate Professor: Adam Ziebinski, e-mail: adam.ziebinski@polsl.pl

- **EDGE COMPUTING AND DATA MINING SOLUTIONS TO OPTIMISE DATA- AND KNOWLEDGE-DRIVEN MANUFACTURING:**

  The adaptation of distributed artificial intelligence and data mining solutions to optimise data- and knowledge-driven manufacturing. Enterprises are increasingly using new information technologies such as communication and wireless identification, RFID, the IoT (Internet of Things) or Cloud Computing. On the one hand, the information that describes both the product itself and the production process has become more and more precise , while on the other hand, the huge volume of data makes it difficult to interpret that information correctly. One of the most effective solutions for coping with the big data problem is to move from centralised decision-support systems to distributed artificial intelligence, which processes the information locally in cooperation with its neighbourhood. Edge computing refers to the technologies that enable computations to be performed at the edge of the network while the "edge" is defined as any computing and network resource along the path between the data sources and cloud data centres . The rationale behind edge computing is that computing should happen near the data sources and is driven by the following factors: (i) a push from the cloud services – the data needs to be processed at the edge in order to ensure a shorter response time, more efficient processing and less network pressure; (ii) a pull from the IoT – the raw data that is produced by the IoT devices will be enormous, which will render conventional cloud computing not efficient enough to handle all of these data. Most of the data that is produced by the IoT should never be transmitted to the cloud, instead it should be consumed at the edge of a network; (iii) a change from data consumer to data producer – in the cloud-computing paradigm, the end devices at the edge usually play the role of data consumers but a change from data consumer to data producer/consumer requires placing more functions at the edge and (iv) data privacy – in edge processing, the data at the edge still belongs to the data producer, which protects user privacy better than uploading raw data to the cloud.

  Contact person: Associate Professor: Dariusz Mrozek, e-mail: dariusz.mrozek@polsl.pl

https://www.polsl.pl/en/faculties/RAU/Pages/History.aspx

FACULTY OF APPLIED MATHEMATICS

SHORT DESCRIPTION

Faculty of Applied Mathematics of the Silesian University of Technology is an A CLASS unit where scientists work in Priority Research Field of Artificial Intelligence nominated for prestigious evaluation of the Ministry of Science and Higher Education. Researchers hosted at the Faculty will have a great chance to participate in innovative international projects and research, cooperate with various universities in EU, America and Asia which will provide the Researcher excellent support during the stay and opportunities to develop career after. Finally, SUT have plenty of accommodation choices which provide all social life needs, sport and close access to any commercial venues. The Silesian University of Technology was recently honoured with an "HR Excellence in Research" Logo, which confirms that SUT operates in accordance with the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. SUT was also awarded an ELSEVIER Research Impact Leaders award in Engineering and Technology category for visibility of the science worldwide. The workers, students, interns and PhD candidates at SUT have access to licensed programs for educational units like Wolfram Mathematica, Statistica, Matlab, MS Visual Studio, etc.

POTENTIAL TOPICS OF INTERNSHIP (BUT NOT LIMITED TO):

- Artificial Intelligence including neural networks, evolutionary computation, expert systems, etc.
- Image processing, vision, detection and perception methods,
- Mathematical modelling and optimization

CONTACT PERSON

Prof. Marcin Woźniak, e-mail: marcin.wozniak@polsl.pl

https://www.polsl.pl/en/faculties/RMS/Pages/History.aspx

FACULTY OF MATERIALS ENGINEERING

SHORT DESCRIPTION

The main research activities of the Faculty of Materials Engineering are focused on the development of knowledge-based materials for demanding applications, and advanced characterization methods and analysis. Our Faculty is a well-equipped research and education centre which has a nationwide importance, strong links with industry, as well as excellent international collaboration.

The structure of Faculty of Materials Engineering consists four Departments:

- Department of Production Engineering;
- Department of Metallurgy and Recycling;
- Department of Advanced Materials and Technology;
- Department of Industrial Computer Science.

Our graduates are prepared for solving the complex, interdisciplinary problems from the area of materials engineering, including design, manufacturing and research in the field of advanced materials and new technology, organization and management of production (Lean manufacturing, Industry 4.0) also occupational health and safety management. In addition, they have skills that are necessary for creative work in the field of industrial application of computer science as well as environmental protection and waste utilization.

Major scientific activities include: designing technology and structure of metallic, ceramic, polymer and composite materials, including nano-components and nano-materials as well as studies on new metal-ceramic coatings with nano-additions. Moreover, scientists are working on mathematical modelling, computer design, simulation and optimization of different foundry processes, and assessing impact of severe plastic deformation (SPD) on microstructure and properties of various materials. At the same time, studies on the kinetics of welding processes, waste formation and destruction, as well as advanced works in the field of light metal casting and their composites, and surface engineering to obtain protective coatings and layers for automotive and aviation industry are conducted.

Scientists' activities are also focused on environmental protection issues particularly on materials and products recycling processes.

KEY RESEARCH AREAS

The Department of Advanced Materials and Technologies at The Faculty of Materials Engineering is equipped with a number of unique research facilities (such as a device for simultaneous compression and torsion, a device for compression with additional transverse motion of a die, a rolling stand with additional transverse rolls motion and a brand new KOBO extrusion press) that provide excellent opportunities to study an effect of severe plastic deformation (SPD) on microstructure and properties of various metallic alloys, porous workpieces as well as metal matrix composites. The SPD effect in a workpiece is obtained by the strain path control which is executed by selecting specific combinations of process parameters (such as the compression/rolling/extrusion velocity as well as the amplitude and the frequency of transverse die motion).
Contact person: Marek Tkocz, e-mail: marek.tkocz@polsl.pl

In the **Surface Engineering and Aviation Technology Laboratory**, operating within the structure of the Department of Advanced Materials and Technology at the Faculty of Materials Engineering, protective coatings and layers are tested. Oxidation tests are possible under isothermal, cyclic and thermal shocks, flammability tests, erosion laboratory tests, roughness and coating thickness measurements. We test the properties of paint coatings: thickness measurement using the non-destructive method, adhesion measurement using the score grid method, adhesion measurement using the mandrel bend test, pencil hardness measurement.
Contact person: Bogusław Mendala, e-mail: boguslaw.mendala@polsl.pl

The Metal Matrix Composites Laboratory at the Faculty of Materials Engineering are carried out research in the field of composite materials operating in the complex loading conditions, especially in various friction coupling (e.g. piston-ring-cylinder). Our research and technological equipment enable the production and assessment of the properties of light metal alloy composites in gravity, centrifugal and infiltration processes. At the same time, investigation on the development and the production of locally reinforced composites, as well as composites with interpenetrating phases (IPCs composites with isotropic properties) are conducted.
Contact person: Anna Dolata anna.dolata@polsl.pl

PROPOSED RESEARCH AREAS

- Qualitative and quantitative studies of the selected Ni-based superalloys' microstructures preceded by the sample preparation and their microstructure revealing – **contact** agnieszka.szczotok@polsl.pl
- Designing of new metal-ceramic coatings with nano -additions, including processing of the multiphase initial powders' morphology, coating formation, and characterization of its structure and properties – **contact** hanna.myalska@polsl.pl
- Optimization of adhesive joints between polymer matrix composites and metals: macro- and micromechanical, physicochemical and technological aspects – **contact** mateusz.koziol@polsl.pl
- Designing the chemical composition and structural investigations of creep-resistant magnesium alloys – **contact** tomasz.rzychon@polsl.pl

https://www.polsl.pl/en/faculties/RM/Pages/History.aspx

DEPARTMENT OF ENGINEERING MATERIALS AND BIOMATERIALS, FACULTY OF MECHANICAL ENGINEERING

SHORT DESCRIPTION

The Department of Engineering Materials and Biomaterials of the Silesian University of Technology is the largest internal organisational unit of one of the four oldest and largest faculties of the Silesian University of Technology - the Faculty of Mechanical Engineering. The specific activities are carried out in the areas of the particular materials processes and engineering materials groups:

- **Modelling and simulating materials phenomena and properties of materials in the application to the development of the materials design** including numerical methods (Finite Elements Method, Artificial Intelligence) for the modelling and the simulation of processes occurring during heat and surface treatment, including determining the temperature field changes, phase transformations.
- **Forming the structure and properties of surface layers and core of the engineering materials including forming the structure and properties of engineering materials** and development of technologies for producing the surface layers, especially processes like: PVD, CVD, thermo-chemical treatment, laser treatment, HVOF spraying.
- **Nanomaterials and nanotechnology** including the development of technologies for producing the metallic glasses and nanocrystalline materials. Investigation of electrical conductivity mechanism of carbon nanotubes coated with precious metal nanocrystals.
- **Corrosion resistant materials for automotive industry and power engineering** including the development of the corrosion resistant materials, for various environments, to be used in various industrial conditions, along with the improvement of the structure and properties investigation methods.
- **Biomaterials** in the area of introducing the new generation of biomaterials along with processes and equipment developed for them, to enable to extend the scope of medical operations and implanting of artificial organs. Selective laser sintering technology in medical applications, biocompatible composite material based on polymer modeling and simulation investigation of implants, 3D printing in medical application.
- **Constructional and special materials** related to heat and thermo-plastic treatment of steels for automotive and machine industry, the influence of heat treatment and hot and cold plastic deformation on phase transitions, studies of microstructure changes of AHSS steel, duplex steel.

CONTACT PERSON

Associate Professor: Rafal Babilas, e-mail: rafal.babilas@polsl.pl

https://www.polsl.pl/en/faculties/RMT/Pages/History.aspx

DEPARTMENT OF TRANSPORT SYSTEMS AND TRAFFIC ENGINEERING, FACULTY OF TRANSPORT AND AVIATION ENGINEERING

SHORT DESCRIPTION

Department of Transport Systems and Traffic Engineering has experience in the implementation of multidisciplinary international projects - among others 5 research and development projects under the ERANET program related to the sustainable development of transport, including electromobility in the dimension of personal cars and buses.

The main research areas of the department are:

- traffic measurements, analysis and prognosis, travel behaviour
- transport systems modeling (e.g. Four Step Transportation Model – trip generation, trip distribution, modal split and traffic assignment) and optimization of the transport networks
- road traffic engineering and intelligent transport systems
- videodetection, image recognition, cognitive science in transport, stereovision, non-destructive testing of pavement conditions.

PROPOSED RESEARCH AREAS

We are looking for a passionate postdoc to apply for EU Marie Sklodowska-Curie Individual Fellowships program, within the following thematic areas:

- sustainable transport
- environmental friendly transport means
- electromobility
- Intelligent Transport Systems
- Smart cities
- travel behavior

CONTACT PERSON

DSc. PhD. Eng. Grzegorz Sierpiński, prof. SUT

Head of Department

email: grzegorz.sierpinski@polsl.pl

https://www.polsl.pl/en/faculties/RT/Pages/History.aspx

DIVISION OF GEOCHRONOLOGY AND ENVIRONMENTAL ISOTOPES, INSTITUTE OF PHYSICS – CENTRE FOR SCIENCE AND EDUCATION

SHORT DESCRIPTION

What do we do?

Our Division is a unique scientific unit, where nineteen persons delve into the fundamentals of physical isotope methods and their applications. We are engaged in interdisciplinary research projects in Earth and environmental sciences, archaeology and history. We also offer expertise services for national and foreign institutions.

Two Laboratories are functioning within the Division:

1. Radiocarbon and Mass Spectrometry Laboratory
   - Radiocarbon measurements with various techniques (LSC, AMS)
   - Light stable isotope determinations (HCNO) with IRMS
2. Luminescence Dating Laboratory
   - Dosimetric dating methods (OSL, TL)
   - Radioisotope measurements (γ and α spectrometry, e.g. ^{137}Cs, ^{210}Pb)

Owing to wide international cooperation, distinctive scientific achievements and a top level of staff qualifications, the Division gained a status of EU Centre of Excellence GADAM (Gliwice Absolute DAting Methods) within 5th EU Framework Programme in 2003.

Why do we do it?

The isotope methods find its applications to construct the calendar timescales for Earth and human history for geology, geomorphology, palaeoclimate, palaeogeography. They also allow to trace natural environmental processes and human impact. Isotopes have proved to be invaluable tools for biological research, like palaeobotany or dendrology, for anthropology, archaeology and paleozoology - e.g. for diet reconstructions.

How do we do it?

We have all essential equipment to carry out the sophisticated research tasks.
The Radiocarbon and Mass Spectrometry Laboratory is equipped with:

- Isotope ratio mass spectrometer ISOPRIME with elemental analyser and MultiFlow device for organic and inorganic samples
- Two LSC Quantulus 1220 spectrometers
- Two LSC ICELS spectrometers
- Prototype multichannel LSC spectrometer for fast measurements
- Automated graphitization equipment AGE-3 with elemental analyser for graphite production
- Vacuum lines and fully furnished chemical preparation laboratories
- New accelerator mass spectrometer (AMS) is scheduled for installation in 2022

The Luminescence Dating Laboratory is equipped with:

- Two luminescence readers Riso TL-DA-20
- Luminescence reader Daybreak 1150
- Luminescence reader Daybreak 2200
- Two compact systems for dose rate measurements µDose
- Semiconductor alpha-ray spectrometer manufactured by Canberra
- Three semiconductor gamma-ray spectrometers manufactured by Canberra
- Grain size analyser Malvern Mastersizer 2000
- Fully furnished chemical preparation laboratories

What do we offer?

- Work with a team of specialist in various isotope methods
- Gain experience in multidisciplinary research
- Get involved in international cooperation

CONTACT PERSON

Dr hab. eng. Natalia Piotrowska, prof. in SUT, Head of the Division of Geochronology and Environmental Isotopes, e-mail: natalia.piotrowska@polsl.pl

https://www.polsl.pl/en/faculties/RIF/Pages/History.aspx

II. ŁUKASIEWICZ RESEARCH NETWORK-INSTITUTE OF HEAVY ORGANIC SYNTHESIS "BLACHOWNIA"

SHORT DESCRIPTION

Łukasiewicz Research Network-Institute of Heavy Organic Synthesis "Blachownia" is an R&D center working within the sector of organic chemistry. Since 1952, we are a reliable business partner for domestic and foreign clients in the development, processing and improvement of manufacturing technologies and production and sale of chemical products. We are a member of the group of the best research institutes in Poland, called Łukasiewicz Research Network. Operating in line with the Science is Business model, we network with business owners and offer solutions designed to help them enhance business operations and build game-changing technologies. Our mission is: "Creative people who are passionate about developing innovations that help drive forward the national economy". Łukasiewicz-ICSO "Blachownia" carries on R&D and implementation work, performs chemical research, tests and analyses.

The competence and experience of our research staff is proved by numerous publications, patents and commercial implementations:

- 893 technologies implemented
- 1703 patents gained, including 59 abroad
- 2158 scientific publications in Poland and abroad
- 1846 lectures, announcements and posters presented
- 14 international contracts for technology transfer signed

The high level of R&D works conducted by our Institute is reflected in a number of state and ministerial prizes and awards as well as numerous medals at international and Polish exhibitions of innovations, research and new technologies.

Possessing a modern measuring and research infrastructure, we provide complex services: research, analyses, advisory and design.

Our main research areas are:

- organic synthesis and technology,
- acrylic, phenolic, epoxy resins, polycarbonates and others, as well as resins properties modifications,
- gases separation, hydrogen and pressure processes,
- renewable raw-materials processing technologies,
- petro- and carbochemical processes,
- homo- and heterogenic catalysis,
- polymers and plastics technology and chemistry and their modification and processing,
- surfactants and household chemistry,
- auxiliaries for various industry branches,
- chemical analyses,
- physical chemistry,
- chemical engineering,
- environmental protection and wastes utilization.

We widely cooperate with domestic and foreign organizations. We participate in scientific and industrial consortia, scientific networks, EU research programmes and technological platforms.

In order to meet the expectations of the industrial partners our processes, technological solutions, branch products and provided services are adapted to worldwide standards. Our Analytical Department performs analyses according to Good Laboratory Practice (GLP) rules.

Łukasiewicz-ICSO "Blachownia" allows its specialists to improve their professional skills and invests in young, ambitious and creative people. We also give a chance of an independent, scientific development for graduates of universities, especially in chemistry specialization. 66% of our employees possess degrees.

Areas selected for potential MSCA fellows:

Supervisor	Email	Department	Free key words
Damian Kiełkiewicz	damian.kielkiewicz@icso.lukasiewicz.gov.pl	Advanced Materials Department	Plastics processing Resins technologies Recycling
Marek Warzała	marek.warzala@icso.lukasiewicz.gov.pl	Bioeconomy Department	Biofuels Specialty chemicals Ecological products
Jan Wójcik	jan.wojcik@icso.lukasiewicz.gov.pl	High-Pressure Processes Department	Hydrogenation processes Alkoxylation processes Petro and carbochemical processes High-pressure synthesis

CONTACT PERSONS

Katarzyna Czekajło, e-mail: katarzyna.czekajlo@icso.lukasiewicz.gov.pl , tel. 0048 77 487-32-61

Katarzyna Hałambiec, e-mail: katarzyna.halambiec@icso.lukasiewicz.gov.pl, tel. 0048 77 487-33-49, +48 694 465 926

http://www.icso.com.pl/en/

III. ŁUKASIEWICZ RESEARCH NETWORK - INSTITUTE OF NON-FERROUS METALS

SHORT DESCRIPTION

Łukasiewicz - Institute of Non-Ferrous Metals is a leading research centre of Polish non-ferrous industry. Complex activities of the Institute cover all stages of metallic materials production in general: from ore beneficiation to fabrication of modern product meeting all environmental standards, while on the other hand they focus also on very specific fields such as chemical power sources. Many of the developed solutions have been implemented in industry, also in small and medium enterprises, not only in non-ferrous sector, but also in other branches. The Institute specializes in R&D targeted at development of new technologies from lab to pilot scale, optimisation of industrial processes, modernisation of production lines, construction of equipment, measurement and analytical services. Our customers are provided with access to the newest technologies, modern laboratories and high capacity pilot installations. Close scientific cooperation with the leading academic centres and industry in Poland and long-standing experience resulting from activities in the European Research Area have created appropriate conditions for continuous development of the research personnel and possibilities to provide customers with competitive and innovative solutions.

PROPOSED RESEARCH AREAS

The broad research capacities of the Institute are mirrored in its offer to host interested researchers.

We will be happy to welcome scientists in the following areas:

Material science and processing:

- development of innovative new-generation materials by melting, casting, plastic working, mechanical synthesis, chemical methods, hot isostatic pressing, melt spinning etc.
- application of plasma spraying technique, spark plasma sintering, additive manufacturing technologies, production of composites with application of liquid-phase methods, plating and production of protective coatings and layers
- development of soft magnetic amorphous materials and nanocomposites for power electronic application, development of new groups of input materials for Additive Manufacturing, processing of powders by application of plasma atomization.

Mineral processing and extractive metallurgy:

- development of technologies for enrichment of primary and secondary mineral resources as well as end of life products, design and delivery of custom-made equipment for non-ferrous industry, such as flotation machines and classification systems
- pyrometallurgical technologies for production of metals from ores, concentrates, scrap and waste, and metal fire refining techniques.
- metals recovery from primary and secondary materials using hydrometallurgical techniques i.e. leaching, solvent extraction, ion exchange, precipitation, electrowinning & electrodeposition.
- design and synthesis of the selected crown ethers derivatives to obtain highly selective extraction compounds in the processes of selected metals separation for mining, metallurgical industries and an industrial wastewater and brine treatment processes.

Analytical chemistry:

- development and application of analytical techniques, and development and production of certified reference materials.

Batteries:

- R&D focused on materials for lithium batteries, in particular lithium-sulfur batteries. Synthesis of carbonaceous materials, preparation of carbon-sulfur composites, structural and electrochemical characterization of the cells, development of a Li-S battery prototypes.

CONTACT PERSON
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http://www.imn.gliwice.pl/index/en

IV. ŁUKASIEWICZ RESEARCH NETWORK - INSTITUTE OF FERROUS METALLURGY

DEPARTMENT OF ANALYTICAL CHEMISTRY

SHORT DESCRIPTION

Spectrometer ICP-OES Agilent 5100 SVDV

Comprehensive analytics covering:

Analysis of samples for:
- the needs of the steel industry (raw materials, products, waste),
- aviation industry (nickel alloys, cobalt alloys, aluminum alloys, titanium alloys, copper alloys),
- testing the chemical composition of ceramic materials,
- noble metals content for the automotive industry,
- environmental analytics: water, sewage, water extracts,

The following methods are used in the above analysis: ICP OES , GF AAS, WD XRF spark OES, GD OES.

Analysis of:
- iron ores, with the use of fusion technique for sample preparation,
- industrial dusts collected or applied on the filters,

with use of WD XRF technique, Rigaku Primus II spectrometer.

Gaseous elements (O,N,H) **content analysis** in steels, nickel and titanium alloys and also in powders, with use of TCHEN600 Leco analyser.

The scope of research for the needs of the Primary Processes Department
As part of cooperation, samples of raw materials, products and technological waste of iron metallurgy are examined for chemical composition. Tested samples require proper preparation for analysis. Classic methods: volumetric and gravimetric, are used in analytical processes. Multi-element analyzes in the range of low and medium concentrations of analytes are carried out using the WD XRF as well as ICP OES technique. The GF AAS technique is used for traces.

CONTACT PERSON

Michał Kubecki, e-mail: michal.kubecki@imz.pl

https://www.imz.pl/en/aktualnosci.php?wid=28

DEPARTMENT OF MATERIALS FOR POWER ENGINEERING

SHORT DESCRIPTION

Department of Materials for Power Engineering at the Łukasiewicz Research Network – Institute for Ferrous Metallurgy deals with performance specialist material tests of power engineering equipment, which include:

One-sample machines for creep tests manufactured by Ł-IMŻ

- short and long term creep tests,
- determination of creep test and creep rate at the temperatures ranging from 500 to 1100˚C,
- diagnostics material tests (non-destructive and destructive methods) of pressure components of power engineering equipment following long term exploitation in creep conditions, for the purpose of the assessment of microstructure, internal damages and determination of the degree of wear,
- determining of residual life as well as available residual life and time of subsequent safe operations of materials and welded joints following long term exploitation in creep conditions,
- identification of damage processes and determining reasons for breakdowns.

We also carry out expert opinions and analyses mainly concerning definition of the reasons for breakdowns of pressure components of power engineering equipment. Furthermore, we research and also participate in the development of new materials.

CONTACT PERSONS

Hanna Purzyńska, Michał Szulc

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https://www.imz.pl/en/aktualnosci.php?wid=29

DEPARTMENT OF PRIMARY PROCESSES

SHORT DESCRIPTION

Area of research: Sintering process - Innovative primary technologies and materials recycling deemed to be key for Europe in realization of the programme of effective and sustainable use of resources.

ATON MOS system for neutralization of exhaust gases from sintering line

The researches curried out in this field at Ł-IMŻ includes sintering of:

- iron ores mixes, including: selection of mixtures composition with a varying share of various lump ores (fines) and concentrates, the possibility of alternative coal-bearing materials usage in sinter mixtures, optimization of the share of iron-bearing waste in sinter mixtures,
- ferrous bearing waste such as: sludges, scale slurry, steelmaking dusts,
- as well as mineral materials (eg: mine waste from a coal mine).

Ł-IMŻ has the necessary equipment to conduct this type of researches, including:

- modern line for semi-industrial simulation of sintering processes with the possibility of analyzing the composition of gases behind the sintering pan and before the installation of flue gas purification and on the clean side (in the chimney), together with devices for the preparation of sintering mixtures and tests of the physicochemical and technological properties of sinters, including:
  - device for material composition blending,
  - high-intensive mixer for preparation of sinter mixes by blending and pelletizing, equipped with independent drives of the pan and mixer, with smooth regulation of spins,
  - automated drop device for tests of sinter strength and simulation of the processes of sinter destruction, e.g., as a result of technological transfers on the way from sinter belt to blast furnace,
  - ISO test to obtain data for simulation of the grain degradation process of blast furnace sinters (determination of sinters strength),
  - devices for sieve analysis of sinter: multi-deck vibrating screen and single-deck vibrating screen, facilitating execution of inter-operation and final grain analysis as well as screen for sieve analysis of raw and dry granulate in order to control the process of sinter mix granulation,
  - devices for determination of reducibility (RDI and RI according to standards ISO 4696-1:2007 and ISO 4696-2:2007 as well as ISO 4695:2007) of blast furnace sinter (or other to be used in further processing in reduction process),
  - range of auxiliary equipment for preparation of material and samples, in that grinders, dryers, etc.,
- thermal analyzer enabling simultaneous analysis of TG-DTA and interchangeably TG-DSC and coupled with it quadrupole mass spectrometer NETZSCH QMS 403 Aëolos for thermal analysis of raw materials as well as physical simulation of physical and chemical processes in microscale during heating (determination of unbound water content, volatile mater content, decomposition and melting temperatures, oxidation and reduction processes temperatures and effects),
- chemical laboratory that performs chemical composition analysis of raw materials and sinters, including: classical methods (by weight and titration and spectrophotometric methods as well) and instrumental methods: GF AAS and OES ICP (Analytical Chemistry Department of Ł-IMŻ),
- X-ray diffractometer Empyrean by PANalytical for testing the phase composition of polycrystalline materials (Department of Investigations of Properties and Structure of Materials of Ł-IMŻ),
- high resolution scanning electron microscope for chemical composition analysis in micro areas (BL department of Ł-IMŻ)

Topic examples:

- Research on the impact of the blast furnace sinter phase composition on its physicochemical properties,
- The use of alternative fuels in the sintering process of iron ores,
- Sintering with simultaneous dezincification of steel sludges,
- Recycling of iron-bearing waste by sintering process,
- Separation of valuable components contained in metallurgical waste for their reuse in non-metallurgical processes.

CONTACT PERSON

Marian Niesler, e-mail: marian.niesler@imz.pl

https://www.imz.pl/en/aktualnosci.php?wid=31

DEPARTMENT OF PROCESS SIMULATION

SHORT DESCRIPTION

Fields of research:
Universal simulator of metallurgical processes - Gleeble 3800 system facilitates performance of tests in scope of: thermo-mechanical treatment of metallic materials, impact of thermo-mechanical loads on degradation of microstructure and properties of steel, accelerated creep processes, as well as carry out physical simulation of continuous casting of steel, welding of technical materials and continuous annealing of plates for car bodies.

Loading units of Gleeble Simulator are servo-hydraulic devices and their characteristic feature is resistance heating system for samples. This system facilitates obtaining very homogenous distribution of temperature in sample volume, maximum heating temperature may reach 2000°C in turn, the maximum heating rate reach to 10000°C/s (depending on the type of used sample). The set used in the Institute for Ferrous Metallurgy makes it possible to deform sample by compression or extension; it is also possible to combine both types of deformation.

Majority of the research activities of the Department is related to the physical simulation and modelling of the thermomechanical processing of metals and alloys as well as to the phase transformation investigation and modelling. The development of the new steel grades and the method of processing is the focus of the research activities. Also, the MaxStrain simulator enables the development of the new processing routes aimed at obtaining the ultra-fine-grained structures or nanostructures.

In the recent years substantial research efforts of the Department have been oriented at the phase transformations investigation and mathematical modelling. This starts with the tests performed using the DIL A/D/T dilatometer and is completed with mathematical modelling using conventional models as well as Cellular Automata based advanced models.

Research direction:
The current development direction in the Department of Process Simulation are researches carry on structure of degradation processes under the synergistic effects of thermo-mechanical fatigue and creep at ultra high temperatures. The main purpose of this research is to develop the characteristics of high-temperature processes of structure degradation in the conditions of the synergistic effect of thermo-mechanical fatigue and creep for materials used in the aviation and space industry, able to work at temperatures up to 2000°C. A well-defined measure of material structure damage caused by cyclic operational loads is crucial for monitoring this type of process in operating conditions, enabling sufficiently early detection of hazardous material states. Detection of damage's conditions guarantees observation of the behaviour of construction materials under the influence of cyclic loads, thanks to which it is possible to improve the prediction of fatigue life and increase operational safety.

CONTACT PERSON

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https://www.imz.pl/en/aktualnosci.php?wid=32

V. THE OPOLE UNIVERSITY OF TECHNOLOGY

The Opole University of Technology based in the city of Opole *(Poland)* looks forward to receiving **Expressions of Interests** from enthusiastic and experienced researchers of any nationality **interested in submitting a joint application for the Marie Skłodowska-Curie Individual Fellowships**.

Opole University of Technology is an internationally oriented high-tech Polish university with focus on education and research mostly in the area of technical science, but also in the fields of management, tourism, sport and physiotherapy. Our scientific and educational potential is built by high-class academic and research staff. Thanks to collaboration with the finest local companies and valuable foreign partnerships, our students get a first-hand practical knowledge and skills adjusted to the requirements of the current global market standards, and our research transcends traditional fields of engineering, combining the specialized technical sciences with economics, administration, sport and medical sciences.

Opole University of Technology is composed of seven faculties:

- **Civil Engineering & Architecture**
- **Economics and Management**
- **Electrical Engineering, Automatic Control and Informatics**
- **Mechanical Engineering**
- **Production Engineering & Logistics**
- **Physical Education & Physiotherapy**
- **Faculty of Technical Systems Engineering**

Candidates who meet the eligibility requirements as of the fellowship deadline on 9th September 2020 must have at least four years' full-time equivalent research experience *(which can include doctoral studies)*, and/or be in possession of a doctoral degree and cannot have spent more than 12 months of the past 3 years in Poland.

Expressions of Interests including your research proposal and CV should be sent by 31 May 2020 to Joanna Drozd, who will assist you in contacting the relevant Faculty.

CONTACT INFORMATION

Joanna Drozd
EU Programmes Specialist
European Projects Office
e-mail: fundusze@po.edu.pl

LOCATION

Opole University of Technology, Poland
ul. Prószkowska 76
45-758 Opole
www.po.opole.pl

FACULTY OF CIVIL ENGINEERING AND ARCHITECTURE (FCEA)

SHORT DESCRIPTION

Scientific research conducted at FCEA includes such unique and vital issues as: mechanics of building structures, seismic and wind engineering, Structural Health Monitoring, monitoring or reinforced concrete structures, bridge engineering, thermal affects on building structures, fire resistance of building structures, thermomechanics, non-destructive testing of structures, the interaction of building structures with subsoil, contemporary issues of building structures physics, the building materials engineering in the field of composite materials based on cement and gypsum binding agents, and utilization of industrial waste materials in building materials industry.

The research workers of the FCEA have proved to have significant potential of scientific research, which enables them to conduct research within the fields mentioned above at highest possible standards. This has been confirmed by their achievements recognized both nationwide and worldwide, their active participation in numerous domestic and foreign scientific conferences as well as their scientific output represented by a plentiful supply of domestic and foreign publications.

PROPOSED RESEARCH AREAS

- Seismic engineering
- Structural Health Monitoring
- Monitoring or reinforced concrete structures
- Bridge and culvert engineering
- Protection of buildings against progressive collapse and explosions
- Static and dynamic of structures and buildings
- Wind engineering
- Soil-structure interaction
- Thermomechanics and physics of buildings
- Building materials engineering

CONTACT PERSONS

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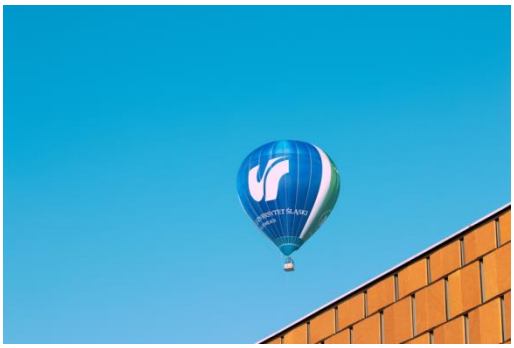
VI. THE UNIVERSITY OF SILESIA



The University of Silesia in Katowice is one of the largest and most dynamically developing public universities in Poland. Founded in 1968, the University of Silesia quickly established a reputation as a vibrant academic institution and an important interdisciplinary research hub. With a tradition of launching new programmes to best meet the needs of rapidly changing labour markets, the University of Silesia offers students a variety of programs and specialized fields of study. With outstanding research teams and well-equipped laboratories, we are an important player in the global research arena.

Internationalization is a priority for the University of Silesia. Our efforts in this regard translate into a variety of EU financed initiatives directed at students and academics alike. These undertakings focus upon the development and upgrading of our research and educational infrastructure and, simultaneously, are oriented toward the advancement of learning that caters directly to the development of the region.

Fellow researchers interested in cooperation within any of the outlined research fields, are kindly invited to use data contacts mentioned below or contact Project Department Manager: Aleksandra Pieniążek, e-mail: aleksandra.pieniazek@us.edu.pl, phone: +48 32 359 2262

INSTITUTE OF MATERIALS ENGINEERING

SHORT DESCRIPTION

The Institute of Materials Engineering is a dynamically operating research unit in the field of materials science and materials engineering. The research tasks are of an interdisciplinary nature and cover issues in the field of solid-state physics, material science, physicochemistry of materials and technologies of their production and processing. The distinguishing feature of the research carried out by the Institute in the area of material engineering is the exploration of correlation between properties and structure of matter at the nano and micro levels.

The most important research areas of the Institute include advanced multifunctional materials for modern technology applications (e.g. liquid crystals, monocrystals, ceramics, nanomaterials, amorphous systems, composites, alloys with shape memory), modern biomaterials for human and veterinary medicine, advanced engineering construction materials (e.g. for tribological, aerospace applications and materials with increased corrosion resistance), materials for obtaining and storing clean energy.
Research on modern materials for technical applications covers several groups of innovative structural, functional and multifunctional materials. Strongly developed groups of engineering materials include intelligent materials, mono-crystals, ceramic composites and ceramic materials with multifunctional properties (e.g.: electroceramic materials with piezo, pyro-, and ferroelectric properties based on multi-component electroceramics), liquid crystal materials, materials with shape memory. The research concerns also methods of enrichment and protection of surface layers of engineering materials (including hybrid systems). The institute's researchers also deal with the synthesis and characterization of functional polymeric materials from the group of electroactive polymers such as polypirol, polyaniline and polyophylene with derivatives and hydrogel materials used in contactology, as well as production of materials for rapid 3D prototyping of implants with biostatic coatings and innovative materials for metabolomic applications (non-invasive diagnostics of lung and respiratory diseases).

The interdisciplinary nature of the research conducted so far has shown the possibility of transferring the acquired knowledge to the area of nanomaterials, including nanomedicine.
Apart from cognitive aspects, the research conducted at the Institute is also of an application nature. The result of the research conducted in recent years is several dozen patents, patent applications and utility models. Many patents were the basis for implementations and several major patents were awarded. The Institute also implements projects financed by the Polish National Science Centre. The research groups of the Institute widely cooperate with the business environment. Joint projects of application nature are regularly carried out.

The Institute has specialist laboratories equipped with high quality research equipment and measuring stands, distinguishing itself from other research units in Poland operating in the field of materials engineering.

OFFER OF A SPECIFIC RESEARCH PROJECTS CONDUCTED IN THE INSTITUTE OF MATERIALS ENGINEERING:

RESEARCH GROUP: ELECTROCERAMICS WITH OPTICAL PROPERTIES

LEADER: PROF. DR HAB. INŻ. JULIAN PLEWA, E-MAIL: JULIAN.PLEWA@US.EDU.PL

TOPIC 1. CERAMIC SUPERCONDUCTORS

Topic description:

Massive superconducting ceramics from the group of cuprates are produced by melt texturing. The experimental work includes: powder synthesis of yttrium cuprates, shaping into solid bodies and the melt texturing process. The superconducting monoliths should have

a cylindrical shape and remain mechanically stable. The massive superconductors can be used as permanent magnets. The aim of this work is made to achieve a state of technology that is standard in some laboratories worldwide. To the investigations, different chemical and physical methods are used to determine i.e. the oxygen content, copper ion value, phase composition, texture and microstructure of the ceramic superconductor. The quality of the superconducting solid samples is tested by the levitation test. Obtained results, i.e. prepared materials or demonstrators could be used for academic researching and students classes.

TOPIC 2. LUMINESCENT MATERIALS FOR IR RANGE

Topic description:

The phosphors with the emission in the IR range are currently in demand as interesting materials for medical applications. As the IR radiation passes through the tissue, new ideas come up to build some systems that could be used for diagnostic applications. Research is carried out in order to devices that use IR radiation for diagnostic purposes During studies some oxide systems will be tested as host materials for the IR phosphors, and both 4d metals and rare earth metals will used as activators. To the synthesis of pure powder, some special preparation methods are used and lead to get selected combination of host and activators. Obtained materials will show an IR emission with the selected excitations.

TOPIC 3. FERROELECTRIC CERAMICS

Topic description:

The aim of this project is to produce modified ferroelectric ceramics, which is sintered as a sandwich, built from two or more units. The individual ceramic components layer should have different chemical compositions. To the investigations materials with ferroelectric (dielectric, piezoelectric) properties will use, which can emit in the visible range, due to the doping with the rare earth ions. In the first step, ceramic powder of each compositions are synthesized, which be subsequently converted to the ceramics plates and in last should be sintered together to form of electro-ceramic materials. It is desirable to obtain the sandwich ceramics as translucent elements. For this reasons, as a host materials the complex oxides with the structure of perovskites will used, i.e. titanates, titanium zirconates, copper titanates, although they have a light pastel powder color, but provide a possibility for the incorporation of activators (from the group of rare earth metals). Such ferroelectric-optical sandwich ceramics find application i.e. as demonstrators for the signal conversion.

RESEARCH GROUP: GROUP OF POLYMER FUNCTIONAL MATERIALS

LEADER: DR ENG. SYLWIA GOLBA (DR ENG. JUSTYNA JUREK-SULIGA)

E-MAIL: SYLWIA.GOLBA@US.EDU.PL (JUSTYNA.JUREK-SULIGA@US.EDU.PL)

TOPIC 4. SYNTHESIS AND MATERIALS STUDY ON ELECTROACTIVE POLYMERS FOR NEURAL APPLICATIONS

Topic description:

The work involves synthesis and study of electroactive materials to obtain stable polymer layers characterized by morphological order, containing selected pharmaceutically active compounds (PAC). They will provide efficient intelligent platforms for the controlled release of these substances. Research will also be conducted to determine the possibility of using the produced materials in the treatment of neurodegenerative diseases such as Alzheimer's or Parkinson's disease. The experimental part as well as scope of conducted research is verified by the collaborating partners with scientific background in the field of neurology.

RESEARCH GROUP: GROUP OF SEMICONDUCTING MATERIALS

LEADER: DR HAB. DARIUSZ CHROBAK, PROF. UŚ, E-MAIL: DARIUSZ.CHROBAK@US.EDU.PL

Scientific area: mechanical properties of semiconductors, simulations of materials properties

TOPIC 5. ORIGIN OF INCIPIENT PLASTICITY IN VARIOUS SEMICONDUCTING CRYSTALS

Topic description:

The subject of this research is strictly related to the scientific activity that determines the development of nanotechnology, for which knowledge of physical phenomena occurring in the localized stress fields is important. The project involves experimental research and theoretical modelling aimed at revealing the mechanism of the "elastic-plastic transition", i.e. the interruption of the reversible elastic deformation pathway and transformation of the material into a plastic state. The elastic-plastic transition is often explained by nucleation of dislocations but the case of semiconductor crystals is more complex as understanding of their nanoscale plasticity requires consideration of phase transformations. Peculiarities of plastic deformation of dislocation-free Si and GaAs crystals elicit questions about the phenomenon responsible for elastic-plastic transition of other widely used semiconductors. The experimental studies of the "elastic-plastic transition" will be carried out using various methods of studying the structure of materials including nano-indentation, TEM and SEM. They will be complemented by theoretical research (modelling) using quantum "ab initio" and classical molecular dynamics methods.

RESEARCH GROUP 1: FUNCTIONAL LIQUID CRYSTAL AND CERAMIC MATERIALS WITH PEROVSKITE, AURIVILLIUS AND DION JACOBSON STRUCTURE

LEADER: DR HAB. MAŁGORZATA ADAMCZYK-HABRAJSKA PROF. UŚ

E-MAIL: **MALGORZATA.ADAMCZYK-HABRAJSKA@US.EDU.PL**

RESEARCH GROUP 2: CERAMIC MATERIALS WITH FUNCTIONAL PROPERTIES

LEADER: DR HAB. DARIUSZ BOCHENEK PROF. UŚ, E-MAIL: **DARIUSZ.BOCHENEK@US.EDU.PL**

TOPIC 6: FUNCTIONAL CERAMIC MATERIALS

Topic description:

The work includes a technological process and comprehensive measurements of ceramic materials with functional properties. Refers to the design and production of new ceramic materials with improved electrophysical parameters in electronics, microelectronics and related applications. In the technological process, in addition to classic and already well-proven technologies, it is possible to use innovative methods of synthesis and sintering of ceramic powders. Research topics mainly concern the analysis of microstructural, electrical, pyroelectric and piezoelectric properties of ceramic materials. The experimental part and the scope of conducted research is provided by years of experience of the ceramics group in the control of synthesis and microstructure of ceramic materials with functional properties (ferroelectrics, piezoelectrics and multiferroics) and ceramic-polymer composites.

CONTACT PERSON AT THE INSTITUTE OF MATERIALS ENGINEERING FOR INTERNATIONAL COOPERATION:

dr Magdalena Szklarska, tel: 32 3497524, e-mail: magdalena.szklarska@us.edu.pl

https://us.edu.pl/en/in-iim

INSTITUTE OF CHEMISTRY

SHORT DESCRIPTION

The Institute of Chemistry is one of the leading scientific research centres recognized in both Poland and abroad. Our researchers conduct their work within the larger Faculty of Science and Technology of the University of Silesia in Katowice, which is regulated by the Ministry of Science and Higher Education. The Faculty and Institute has met the high standards and regulations of the ministry and is officially recognised as a Category A scientific research centre, among the highest rank in Poland. The Institute of Chemistry conducts scientific projects in the area of both fundamental and applied research in the fields of non-commercial experimental research, computational chemistry (quantum chemistry and molecular modelling), molecular design and organic synthesis with potential to find applications in industry. We are internationally renowned within the fields of quantum chemistry, chromatography, chemometrics and chemoinformatics. Our research is carried out in cooperation with leading national and international research teams and the results are published in prestigious scientific periodicals.

THE MOST IMPORTANT RESEARCH AREAS AT THE INSTITUTE OF CHEMISTRY

- Analytical techniques: XRF, EPR, NMR, ICP, IR-Raman spectroscopy,
- Chromatography,
- Chemometrics, analysis and modelling of complex instrumental signals,
- New materials, synthesis and testing of properties,
- Physical Chemistry of condensed phases,
- Theory - new theoretical techniques and applications,
- Chemical synthesis - cutting edge interdisciplinary studies in the borderline of chemistry and biology.

EXAMPLES OF RESEARCH PROJECTS

- Projects in medicinal chemistry and chemical biology focusing on the synthesis of novel heterocyclic compounds as anticancer and antimicrobial agents, their mechanism of action and practical applications.
- Projects in nanomedicine, developing a water-soluble [60]fullerene derivatives for cancer nanotechnology studies, which include inhibition of protein kinases, photodynamic therapy of cancer and siRNA transfection.
- Energy storage - new materials and methods of conversion, generation and storage of renewable energy.
- New catalysts for industrial applications.
- Application of chromatography to extract and analyze natural antioxidants.
- Modeling of multivariate and multimodal data using chemometric methods. Hyperspectral imaging.
- Identification of authentic products based on chemical fingerprints.
- Construction of diagnostic models based on omics approaches.
- IoNanofluids - preparation, stability, structure and physicochemical properties of ionic liquids with carbon nanostructures as energy storage materials.
- Molecular springs as a new method of compact thermal energy storage.
- Development of luminescent materials doped with transition metal and/or rare earths for potential applications in photonics, such as solid-state lasers, up-conversion luminescence systems, temperature sensors and active optical fibers.
- Determination of trace and ultratrace metal ions by X-ray fluorescence and atomic spectrometry. Development of new micro-analytical methods based on nanomaterials. Modification of carbon-based nanomaterials for preconcentration, speciation and selective determination of metal ions.
- Design, synthesis and testing of functional properties of novel materials, in particular, drugs (HIV integrase inhibitors, anticancer iron chelators) and nanocatalysts of the potential use in heterogenous environmental catalysis (CO2 methanation, biomass conversion).
- Development of novel functional materials based on coordination compounds; design, synthesis, photophysical, and electrochemical study of luminescent coordination compounds; examination of photophysical processes in metal-organic chromophores; investigation of structure-properties relationships of metal complexes that have potential applications.
- Diels-Alder cycloaddition and Annulative Pi-Expansion, reactions under high (>10 000 MPa) and low (<0.1Pa) pressure, synthesis of non-fullerene organic n-conductors.
- Synthesis of low and high molecular weight organic semiconductors, evaluation of the structural,

spectroscopic and thermal properties of the materials for organic electronics.
- Synthesis and evaluation of the photophysical and electrochemical properties of organic (semi)conductors and derivatives exhibiting aggregation-induced emission.
- Development of quantum chemistry methods for dissociation curves of open-shell molecules with closed-shell reference.
- Modeling of electronic spectra and fotochemistry of B12 vitamin and its derivatives.
- Modeling of intermolecular interactions in molecular crystals.
- Molecular properties from density functional theory and coupled cluster based methods.

CONTACT PERSON

prof. Mirosław Chorążewski, e-mail: miroslaw.chorazewski@us.edu.pl

https://us.edu.pl/en/in-ich

INSTITUTE OF PHYSICS

SHORT DESCRIPTION

The August Chełkowski Institute of Physics, which is part of the Faculty of Science and Technology, located on the Chorzów campus of the University of Silesia, enjoys long traditions of development of physics in the Silesian region. It is one of the first Institutes to be created in the Silesian "Alma Mater". Currently, the Institute boasts the "A" scientific category, according to a comprehensive assessment of the quality of scientific or research and development activities of scientific units, carried out by the Polish Evaluation Committee of Scientific Units, and its researchers organized in teams conduct world-class research. The Institute cooperates with many scientific centers around the world, and the financing of research conducted at the Institute is largely based on external funds (grants). Moreover, now when the rapid progress of technology driven by the development of science is taking place, the role of institutions involved in scientific research and education in the field of sciences is changing. In particular, more and more research is conducted at the interface of various disciplines of science: physics, chemistry, computer science and materials engineering, as well as on the border of the so-called basic and application research. The Institute of Physics keeps up with these changes, which makes it an institution recognizable both in Poland and in the world. It should be emphasized that the recognition of the Institute in the world of science is also largely determined by the proper selection of research topics implemented by its employees, such as: theoretical physics of elementary particles, theoretical physics of condensed matter, experimental nuclear physics, experimental condensed matter physics, biophysics and medical physics, modeling and obtaining pharmacological substances and the creation of innovative amorphous drugs, computer modeling of soft matter properties, physicochemistry of synthesis and high pressure polymerization or physical aspects quantum information processing methods.

CONTACT PERSONS

prof. Seweryn Kowalski, e-mail: seweryn.kowalski@us.edu.pl

prof. Anna Bajorek, e-mail: anna.bajorek@us.edu.pl

https://us.edu.pl/en/in-ifiz

INSTITUTE OF COMPUTER SCIENCE

PROPOSED RESEARCH AREAS

AREA: MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

Different and often new strategies in machine learning, image processing and pattern recognition cause that these areas are constantly developing in the theoretical layer as well as in practical implementations. In our research group we are looking for people who are interested in machine learning and artificial intelligence mainly developed/used for biometrics, support of medical decision in ophthalmology, blood analysis, signal processing and many others. These endeavors can be realized by post-docs with high skills in programming, mathematics, statistics and algorithms building. We are most interested in people with knowledge of the theory and practice of classification and artificial intelligence domain. This basic knowledge allows constructing the new models of single and ensemble classifiers, and finally validating and testing the hypotheses by means of own as well as benchmark datasets. Candidates to work should present CV with list of mentioned above experiences.

Contact person: Piotr Porwik, e-mail: piotr.porwik@us.edu.pl

AREA: SENSORS TECHNOLOGY AND DATA TRANSMISION

Recent developments in smart sensor technology have opened new perspectives for advanced applications of wireless sensor networks (WSNs) in many domains including healthcare, automation, infrastructure, and environment. The smart sensor nodes in WSN enable complex processing and analysis of sensed data with increased computational power. WSNs have become an important part of 5G mobile technology that open new perspectives for advanced applications of smart sensors in future Internet of Things.

Typical WSNs are composed of nodes that sense their environment by using built-in sensors and transmit the sensor readings to a sink node. In contrast, smart sensor nodes have an additional ability to process the collected data, make decisions, and recognize relevant events based on the sensed information before sharing it with other nodes. Instead of transmitting raw data readings, the smart sensor nodes report the detected events. Moreover, to recognize the important events in larger regions, many smart nodes must cooperate.

The research objective is to develop new algorithms for detecting events by smart sensor nodes in a cooperative way. The key issue in applications of WSNs is the limited lifetime of battery-powered sensor nodes. Thus, the new algorithms for smart sensor nodes have to effectively utilize the energy resources.

Contact person: Bartłomiej Płaczek, e-mail: bartlomiej.placzek@us.edu.pl

AREA: GEOMETRICAL MULTIRESOLUTION IMAGE REPRESENTATIONS

Geometrical multiresolution sparse representations are very efficient in image coding and processing. Going beyond the known wavelets theory this wide area of research is related to such families of functions like wedgelets, beamlets, multiwedgelets, smoothlets, curvelets, shearlets, brushlets, etc. Recently, also the compressed sensing theory has emerged which allows for efficient sensing sparse and compressible signals. Since its invention this theory has gathered many practical applications, also in image processing. We are looking for researchers in computer science both PhD students and post-docs who want to do the research in the area of geometrical multiresolution image representations applied to image processing. High skills of programming (including OpenCV) are recommended.

Contact person: Agnieszka Lisowska, e-mail: agnieszka.lisowska@us.edu.pl

https://us.edu.pl/instytut/ii/en/

INSTITUTE OF LINGUISTICS

SHORT DESCRIPTION

Institute of Linguistics is a vibrant institution that assembles scholars conducting research both in different languages and in manifold areas of language. Their research concerns both the language structure (Phonetics and Phonology, Morphology, Syntax, Semantics), and the specialised and interdisciplinary branches of linguistics, e.g. Historical Linguistics, Applied Linguistics (including Language Pedagogy, Translation and Interpreting, Lexicography, and Speech Therapy), Cognitive Linguistics, Sociolinguistics, Psycholinguistics, and Ethnolinguistics.

Depending on the language, however, the scope of investigation differs. As for the researchers of the Polish language, they explore the following areas and branches of linguistics: the history of Polish, Lexicology, (both contemporary and historical), Sociolinguistics, Stylistics, Semantics (including historical semantics), Onomastics, Ethnolinguistics, and speech therapy.

Research in English revolves around both theoretical and applied issues. On the one hand, it focuses on the very substance of English: Phonetics and Phonology, Morphology (including comparative morphology), Constructions and Syntax, Semantics, and Pragmatics. At the same time, it concerns such branches of linguistics as Historical linguistics, Sociolinguistics (especially specialist languages, e.g. academic discourse), Cognitive linguistics, and Psycholinguistics. On the other hand, it concerns such applied areas as Second and Foreign Language Pedagogy, Translation and Interpreting.

As for the researchers working in German, their interest focuses on the German language, Contrastive Linguistics, and Sociolinguistics (especially specialist languages). In the area of applied linguistics, they explore the Language Pedagogy of German, Translation, Lexicography and Lexicology.

The investigation conducted in French, Spanish, and Italian addresses such branches of linguistics as Text linguistics, Cognitive linguistics, and Ethnolinguistics. Within applied linguistics, the researchers concentrate on Lexicography, Language Pedagogy, and Translation.

The research in Russian and Slavonic languages is directed to Ethnolinguistics and such branches of applied linguistics as Comparative linguistics and Translation.

The Institute runs a number of research projects, has well-equipped laboratories, and cooperates with many Polish and international scientific organisations.

CONTACT PERSON

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https://us.edu.pl/instytut/ij

INSTITUTE OF PHILOSOPHY

SHORT DESCRIPTION

In our Institute we offer 3 fields of studies: philosophy (BA, MA, PhD), philosophical counseling & coaching (BA, MA), and cognitive science (BA, MA). Within these fields we offer 13 specialties, among many others "Philosophy of New Media", "Classical Philosophy", "Philosophical Counseling & Coaching" or "Life Coaching" and "Business Coaching". Our staff strive to connect high level didactics with in-depth reaserch in different fields connected with philosophy, philosophical counseling and widely understood cognitive science.

CONTACT PERSON

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https://us.edu.pl/en/in-ifil/

INSTITUTE OF LITERARY STUDIES

SHORT DESCRIPTION

The Institute of Literary Studies conducts high quality research in traditional fields of literary studies, including history and theory of literature, literary criticism, art of interpretation, as well as comparative literature, translation studies and rhetoric. Markedly – with total concurrence of the main trends in the world contemporary literary studies and aiming at more than just knowledge creation — The Institute endues interdisciplinary research, allowing transcultural interests and pursuits to be efficiently generated, elucidated, implicated and applied to the new worlds our researchers , students and communities will encounter:

- New humanities (digital humanities, environmental humanities, migration studies, postumanism, cognitive humanities, Holocaust research, history of emotions, ecocriticism, animal studies)
- Literary criticism in cultural context (cultural heritage research, geopoetics, relations between Polish and other national cultures, multiculturalism, gender studies, cultural memory studies, new regionalism)
- Interdisciplinary literary research (new forms of literature, new media, literature vs. computer games, literature vs. new technology, mass culture and mass communication)
- Comparative literature (Polish literature in the world, comparative and intersemiotic research).

PROPOSED RESEARCH AREAS

- **Ancient Greek Rhetoric and Law**

  The oratory of classical Athens (5th-4th century BCE) has become the model for the subsequent generations of both theoreticians and practitioners of rhetoric in classical antiquity. This is also one of the main reasons for its relatively good state of preservation and survival. The goal was to study in detail, but also to imitate and to emulate, the rhetorical proficiency of the Athenian orators. Since the bulk of their oratorical output consisted of forensic speeches, the study of Greek law was naturally part of later rhetorical curricula, but rather as an afterthought than a goal in itself. This state of affairs persisted after antiquity throughout the greater part of the modern age. Only in the last century did Greek law became a proper object of scholarly reflection and interest in itself; and only the last couple of decades have witnessed an exponential growth of interest in this subject (Carey 2018). As a result, it is frequently claimed nowadays that Greek law should be studied by legal scholars with proper training in jurisprudence. Yet, with the ever-growing collection of supplementary sources, such as epigraphic data, it has become all too easy to forget that Greek law, although carved in stone indeed, is known to us primarily through the medium of Athenian oratorical practice. That is, its citations, its interpretation, its use (and abuse) are always highly dependent on the rhetorical exigencies of a particular forensic case, from which we happen to possess a surviving speech. Our field of study therefore, though placing law before rhetoric as an object of inquiry, acknowledges the fact that the latter was the principal medium through which it became known, not only to us, but also to the original audiences of Athenian forensic oratory. As a result, the most promising way of approaching Greek law is not necessarily by arbitrarily imposing on it a set of completely alien and irrelevant categories, such as those drawn from Roman law (and its modern successors), but through a detailed and meticulous literary and linguistic study, which takes its cues both from the time-honoured scholarship on rhetorical principles, and from the modern developments in the reflection on language and literature, such as cognitive linguistics.

- **Neobyzantinism – the reception of Byzantium**

  In the last years Katowice has become one of the most important centers for studying the reception of Byzantium (its history, culture and literature) in various media in the post-Byzantine world (since 16th century onwards). Especially welcome would be applicants interested in the reception of Byzantine motifs in literature (and especially in less popular literatures) as well as applicants interested in the imagery of Byzantium in popular culture.

- **Animals in Byzantium**

  Animals in Byzantium remain a largely unstudied subject, there exist only a handful of texts dealing with this issue. Both Byzantinists and classical philologists working in Katowice tackle various problems related to this topic such as the reception of ancient zoological texts in Middle Ages, the power dynamics between humans and non-human animals, cultural entomology, anthro-zoosemiotics etc. Especially welcome would be applicants working on any aspect on animal studies in Middle and Later Byzantine periods.

- **Polish and Portuguese Literatures and Cultures**

  The project is meant to present Portuguese inspirations in Polish literature and Polish influence on Portuguese writers, artists, translators, and will trace and allocate the points of sameness and difference within the two cultures/literatures, for example, Messianism, national creations of myths. The interdisciplinary research requires scholars representing different research fields, namely, Polish and Portuguese studies, cultural studies, comparative literature, history, history of art. The prospective applicant is expected to build on and widen the existing knowledge in the project designated fields, and disclose avenues of deeper understanding of both the creative and the real worlds of researched cultures/literatures.

CONTACT PERSON

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https://us.edu.pl/en/in-il

INSTITUTE OF CULTURE STUDIES

SHORT DESCRIPTION

The Institute of Culture Studies founded in 2019 developed from three old-established units of University of Silesia: Institute of Ethnology and Culture Anthropology, Institute of Culture Studies and Institute of Scientific Information and Library Studies. New Institute of Culture Studies acts as a focal point for bachelors, masters, doctoral and postgraduate teaching as well as a hub for research programmes that span all three of disciplines: cultural anthropology, culture studies and library studies. Our researchers are internationally recognized. We currently host a several research projects, including large, international collaborative projects, and engage in ethnographic research or scientific collaboration in different parts of the world (Sudan, Iraq, Serbia, China, Germany, Austria, Czech Republic, Dominikana Republic, Italy, UK). The Institute is one of Poland's leading centres of Silesian and the transformation of (post)industrial communities studies. Strategy of the institute is based on five research areas: media culture, cultural heritage, cultural ecology, information society, performativity in culture that represent actual and resent scientific interest of ethnologists and cultural experts from University of Silesia.

CONTACT PERSON

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https://us.edu.pl/en/in-inok

INSTITUTE OF EARTH SCIENCES

SHORT DESCRIPTION

The Institute of Earth Sciences specializes in multifaceted studies of inanimate nature and the environment covering all components of the Earth system as well as processes occurring in it. We carry out basic research aiming at explanation of processes occurring on the surface and inside the Earth, as well as application research focused on solving contemporary problems related to the functioning of the environment. We offer the opportunity to conduct research in the broadly understood geology, geomorphology, hydrology, hydrogeology, climatology and glaciology. Our distinguishing features are interdisciplinary research aimed at explaining global ecosystem changes in the history of the Earth, evolution of the Earth's lithosphere, and polar research in all their cognitive aspects. The Faculty boasts a very high quality of R&D and education – Category A according to the parametrisation of the Ministry of Science and Higher Education (2013 and 2020) and had the status of a Leading National Research Centre

PROPOSED RESEARCH AREAS

- **Research area 1**

The subject of the proposed research is Coal-derived carbon influx in contaminated soils and sediments in industrialized areas across Silesia. Within the cooperation, samples of soils and waste rocks from various locations within Silesia will be collected. The aim will be to determine the amount and type of organic matter in soils and various types of waste rocks in relation to different type of previous industrial activity. The applied methods of investigation will include among others optical microscopy, gas chromatography-mass spectrometry, determination of element content. The research will help to understand the processes that lead to alteration of the soils and rocks and allow applying the appropriate methods for their management.

- **Research area 2**

The "Cryosphere and Geoinformation" research team in cooperation with the Centre for Polar Studies offer collaboration in the studies of the Arctic and high mountain environments. The team is currently conducting advanced studies on:

• understanding the conditions determining changes glaciers' dynamics, extent, thermal structure, mass balance, glacial zones, drainage system and calving intensity (focusing on Svalbard);

• determining trends of changes in the snow cover properties and its environmental effects;

• recognition of rainfall-runoff transformation processes in Arctic catchments;

recognition and age determination of permafrost in mountain and Arctic environments;

geomorphological studies in periglacial areas including landforms evolution;

• recognition of the impact of changes in the high mountain cryosphere on the morphodynamics of slopes and valleys, and on aquatic and terrestrial ecosystems;

• digital adaptation of geomorphological maps, studies on digital elevation models, geomorphological classification and recognition of the landforms development by quantitative methods;

• recognition of the role of active fault zones in speleogenesis and morphogenesis of glaciated and postglacial areas.

The above studies are based on geoinformation technologies and spatial data obtained in situ using geophysical, geochemical, geodetic, photogrammetric, remote sensing and GIS methods.

CONTACT PERSON

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https://us.edu.pl/en/in-inoz

INSTITUTE OF SOCIAL AND ECONOMIC GEOGRAPHY AND SPATIAL MANAGEMENT

SHORT DESCRIPTION

The Institute of Social and Economic Geography and Spatial Management at the University of Silesia in Katowice is one of the most important research and teaching centers in the field of geography in Poland. The unit originally with the status of Economic Geography Department was established in the 1970s. Over several dozen years, despite relatively small employment, we managed to achieve significant success in the field of scientific research and higher education. As part of the specialization: economic and social geography and spatial management, three full professors and 8 associate professors were promoted during this period; 20 doctor degrees were also awarded. For many years, the main goal of the development policy in the unit has been to strengthen the scientific achievements by publishing articles in journals with high IF and scientific monographs. The Institute and its employees cooperated with many research units and universities mainly in Europe (Germany, Czech Republic, Great Britain, Romania, Italy, Serbia, Ukraine) and the USA. The Institute also develops cooperation with non-academic units - government institutions, research institutes, business and local and regional self-government. The result is joint ventures improving management and governance in many substantive and decision-making dimensions. The Institute's employees are also involved in work for the benefit of local communities, including activities that cultivate regional identity. The Institute employs people born in 3 different countries, and multiculturalism and tolerance is one of the pillars of good cooperation in our Team.

DESCRIPTION OF RESEARCH

The Institute of Social and Economic Geography and Spatial Management at the University of Silesia in Katowice continues many years of research in several important scientific issues:

- processes of urbanization and also development of urban agglomerations and metropolises,
- local and regional demographic structures and processes,
- regional and economic development of cities and regions,
- global and regional social and cultural changes,
- spatial management in the current and past approach,
- tourism and spatial heritage, including post-industrialism and transformation issues.

CONTACT PERSON

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https://us.edu.pl/in-igseigp

INSTITUTE OF SOCIOLOGY

SHORT DESCRIPTION

The Institute of Sociology is a part of the Faculty of Social Science University of Silesia. It has been a major centre for the development of sociological thought for more than forty years. It has been educating 'actors' of development of Silesian Region and Poland providing them with knowledge of regional and state development trends. More than 40 people work at the Institute of Sociology. The Institute's employees are laureates of prizes as well as participants of scientific and research internships financed by national (NCN) and foreign funds (Visegrad Fund, University of Peloponnese, Corinth, BECO [AUF], British Gas NEA, Agence Universitaire de La Francophonie, Fulbright Poland).

The Institute of Sociology is located in the heart of the biggest Polish conurbation, the former industrial region, populated by 2 million inhabitants. At present it is becoming a significant service centre whose economy is based on human creativity and intellectual potential. The sociologists from the Institute of Sociology focus their research on the developmental challenges of Upper Silesia and they take active role in the national and international debate on the region and its future.

KEY RESEARCH AREAS

- industrial transformation,
- regional culture,
- regional and local development,
- urban space, - metropolisation processes,
- labour market,
- sociology of politics,
- social planning,
- social problems and social policy,
- social work in the deprived urban areas,
- sociological aspects of the family, value and religion,
- ethnic groups, social minorities,
- cultural studies.

CONTACT PERSON

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https://us.edu.pl/en/in-is/

INSTITUTE OF POLITICAL SCIENCE

SHORT DESCRIPTION

The Institute of Political Science was established on October 1, 1975. It emerged as a separate entity from the Institute of Philosophy, Sociology and Political Science. In 1978, it was renamed as the Institute of Political Science and Journalism, and it kept operating under this name until 2019. Then, on 1 October 2019, the unit returned to its roots, restoring its original name. As part of the scientific research carried out, the Institute works primarily with researchers from two regions: the Mediterranean Basin and Central and Eastern Europe. Its output includes numerous scientific internships, study visits, publications and research projects. It has also started working with researchers from Norway, USA and Taiwan.

RESEARCH AREAS

Currently, the Institute pursues basic research in two directions, and the results are actively applied in the environment of the University of Silesia, as well as internationally. The first area involves anti-corruption activities. The following research projects have been carried out at the Institute in relation to it: Counteracting corruption in local self-government entities (2015), Corruption in administration (2016), and Political corruption (2017). An Integrated Anti-Corruption Protection System has been developed on the basis of the research conducted (including studies published in high-scoring journals), and it is being implemented in nationwide and international local government, business and educational entities. The second area of research involves the prevention of depopulation, which is a major problem in the Upper Silesia and Dąbrowa Basin region, but also a matter of concern for Polish cities and other European countries. The research includes analyses of depopulation sources, designing expert opinions to stop unfavourable trends, undertaking international cooperation aimed at exchanging experiences, and implementing projects to strengthen young people's attachment to the region (e.g. the University of the Best).

- **DEPOPULATION**

Silesia is the European cross-border region that has registered a significant decline of population in last 30 years. The phenomenon of depopulation within the Upper Silesian conurbation is even more visible, because it is one of the most urbanized areas in Poland. The sources of this phenomenon can be departure of its residents to Western European, internal migration (especially moving from cities to rural areas), the prevalence of deaths over live births, changing the family model and the lack of social security. According to the forecast of the Central Statistical Office in Poland, by 2030 most conurbation cities will lose over 8% of the population, while rural regions in the southern part of the region will gain over 10% of new residents. The process of depopulation of post-industrial cities and population of rural areas is currently one of the most important phenomena characterizing the region and one of the most important research problems. Therefore the Institute of Political Science of the University of Silesia in Katowice is searching for a person with experience in the study, grants and publications of depopulation processes to join comparative research works.

- **MIGRATIONS**

Silesia is a typical European cross-border region. That is why it is a special area in which studies of migratory movements always have had a great importance. It can be assumed that the history of Silesia is inseparably connected with the history of various national groups who over several centuries have been arriving here and transforming the social, political, economic and cultural reality of the region. In the beginning of the 20th century the part of Upper Silesia has become a part of the reborn Polish state. But in 1945 Poland has experienced another, significant changes of borders that has affected Silesia and its inhabitants in a very serious way. The process of intensive and tragic migrations was observed in Silesia at the period between 1945 and 1948. In two decades of the 1970s and 1980s many Silesians have left the region (without the possibility of return), going mainly to West Germany. At the same time, many migrants from other parts of Poland have come to Silesia, as well as to the Dąbrowa Basin, in search of well-paid jobs in heavy industry. Currently, in times of intensive migration movements in Europe, Silesia is still an attractive region. For this reason, the importance of migratory movements in the region for social, political, economic and cultural processes in contemporary Europe is an interesting and actual research problem. It is also an important topic in the context of the progressive depopulation of the Silesian conurbation. Therefore the Institute of Political Science of the University of Silesia in Katowice is searching for a person with experience in the study, grants and publications of migratory processes to join comparative research works.

- **(ANTI)CORRUPTION**

One of the main areas of the implementation studies conducted at the Institute of Political Science involves anti-corruption research. The activity of experts from the IPS in the field of counteracting various forms of

corruption is important both in terms of activity aimed at improving the functioning of public institutions, but also – as a consequence – in terms of increasing civic institutional trust, which has been low for many years.

The research initiatives and scientific explorations undertaken by IPS employees have developed a strong foundation of trust in the external environment, at a regional, national and international level. As a result, our experts are invited to cooperate and provide consultancy within the framework of watchdog activities implemented in local government and business entities. Our employees are regularly invited to conduct anti-corruption training in external environment entities.

Drawing on his own research and experience, University of Silesia Professor Waldemar Wojtasik, PhD, created an Integrated Anti-Corruption Protection System. It contains an analysis of the status quo, taking into account the conditions contributing to the level of corruption risks. On this basis, measures are proposed to control the corruption risk level, with a focus on active management. This combines influencing awareness, shaping the expected ethical attitudes, and a system of normative safeguards. Apart from having a preventive function, this approach also makes it possible to respond to the risk of a corruption incident occurring, e.g. through the procedures in place for notifying about legitimate suspicions.

The IACPS also includes activities directly addressed to institutions' employees. The agent in corruption is the human individual, and their awareness, knowledge, strong psychological attitude, and internal canons of integrity and diligence are precisely the starting points that should be adopted for anti-corruption activities. The IACPS is implemented by University of Silesia employees. They are people with extensive experience with regard to the design and implementation of anti-corruption systems in private-owned and state-owned businesses, public offices and other bodies, as well as with regard to working with entities experienced in the field of corruption prevention (e.g. the Central Anti-Corruption Bureau and the Sejm's Bureau of Analyses). The team is composed of lawyers, economists and management specialists. They engage in corruption prevention in practice, but also carry out scientific and research work supporting the planned educational and preventive programmes.

The international area of implementation of anti-corruption tools includes the implementation of European regulations and certified anti-corruption training for Polish representations of US and British companies, as well as companies working with entities from the UK and the USA. They comply with the requirements of the UK Bribery Act and of the Foreign Corrupt Practices Act and constitute, in an increasingly large number of cases, a basic condition to be met in order to undertake business and administrative cooperation. Following the entry into force of the UK Bribery Act and of the US Foreign Corrupt Practices Act, the competent bodies may prosecute corruption offences committed when negotiating international transactions. The operating mechanism is simple – a company operating in the USA or in the UK may be held responsible for the actions of its subsidiaries, also outside the respective countries' jurisdiction. Consequently, foreign business partners may be liable for possible corruption activities perpetrated on their behalf in any country in the world, including Poland.

CONTACT PERSONS

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https://us.edu.pl/en/in-inp/

INSTITUTE OF PEDAGOGY

SHORT DESCRIPTION

The Institute of Pedagogy operates as a research unit located in the structure of the Faculty of Social Sciences of the University of Silesia in Katowice. It was created thanks to the combination of research potential - researchers from the Faculty of Pedagogy and Psychology and the Faculty of Ethnology and Education Sciences in Cieszyn as part of the reform of the structure of the University of Silesia in 2019.
The Institute employs over 120 research and teaching staff, including 9 full professors and 39 with the degree of habilitated doctor.
The Scientific Council of the Institute of Pedagogy (disciplinary council) has the right to confer doctoral and postdoctoral degrees in the field of social sciences. The Institute publishes scientific periodicals: "Chowanna", "Intercultural Education" and "International Journal of Research in E-learning".

RESEARCH AREAS

As part of their scientific activities, the employees of the Institute of Pedagogy also cooperate with researchers and academic centers from many countries (Great Britain, Malta, Kenya, Ukraine, Czech Republic, Slovakia, France, Austria), international organizations (Council of the Baltic Sea States) and various institutions and national organizations (Ombudsman for Children, Institute of Children's Rights, Ministry of Justice, Ministry of National Education), as well as with local government units and educational institutions.

Research conducted at the Institute is developed in directions corresponding to global trends: in the areas of education, health promotion, development and optimization of the quality of life of individuals, groups and societies in the conditions of growing multiculturalism and socio-cultural, ethnic, religious and economic diversity. Part of the research is interdisciplinary and is carried out in teams with representatives of other social sciences, but also theological sciences or humanities. Research is carried out with the help of modern scientific methods and with high ethical standards, as well as with respect for human rights, with particular respect for subjectivity and the use of activating participatory methods.

The main areas of research currently developed at the Institute include:

- Education and other activities in the context of contemporary and future social, cultural, technological, economic and climate changes;
- Well-being and sustainable development of individuals, groups and environments in the pedagogical perspective - possibilities of optimization in the profiles of age, gender, health, fitness level and social adaptation, religion, ethnicity, race and other differences;
- Interdisciplinary studies of childhood and adolescence;
- Democratization of social life, equality, accessibility and social inclusion, and the development of civil society - threats and opportunities for optimization from the perspective of various groups and environments;
- Pedagogical potential of culture in the context of the challenges of liquid modernity and anticipating the future

CONTACT PERSON

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https://us.edu.pl/en/in-ipe/

INSTITUTE OF LAW

SHORT DESCRIPTION

The Faculty of Law and Administration of the University of Silesia in Katowice, Poland is one of the leading faculties in Poland, recently top-ranked among the three best law faculties in Poland. The Faculty has been awarded also with a distinctive grade by the National Accreditation Commission. Members of the Faculty conduct highly qualified research in law. We offer studies in three main programmes: law, administration and business-law. The number of students totals 500 at regular courses and 300 as part-time (extramural) students yearly. The Faculty also offers a wide range of modules to foreign students within the frame of the Erasmus+ programme. There is a special offer for PhD students: in cooperation with foreign universities we conduct the prestigious international programme, called "The Programme in European Private Law for Postgraduates (PEPP)",. We have also specialized schools, "the School of Chinese Law and Culture" and "the School of U.S Law".

The number of academic teachers employed in the Institute of Law totals 120. The research covers all the main fields of law: theory and philosophy of law, constitutional law, administrative law, civil law, penal law, private and public international law. In particular, the studies recently carried out in the Institute of Law concerned such issues as human rights, equality and protection of vulnerable persons, gender gap, protection of religious freedom, animal protection, international conflicts, different aspects of criminalistics and criminology, the role of the criminal law in children protection, the contract law in the private international law, cross-boarder litigation, tenancy law and housing policy, European company law, competition law, insolvency law, labour law, protection of personal data.
Members of our Institute of Law have authored a large number of academic publications. They take part in domestic and international academic groups and participate in many international conferences. We have obtained numerous research grants. The international cooperation makes it possible to participate organize important international events, among others the Climate Law and Governance Day 2018 - Conference within the COP24 2018 UN Conference, which was held in Katowice.

CONTACT PERSON

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https://us.edu.pl/en/in-inpr/

INSTITUTE OF FINE ARTS

SHORT DESCRIPTION

Our activity is strictly connected with fine arts: painting, sculpture, performance, drawing, graphic arts, graphic design, comics and craft art (ceramics, glass, fabric). We are looking for contact with all artist and artist-scientists who understand that art is important. Art is one of most important parts of human live.
We are also a part of University – it means that our artistic works must be connected with knowledge, science. So we are open for any creative cooperation. Art meets science!

CONTACT PERSON

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https://us.edu.pl/en/in-isp/

KRZYSZTOF KIEŚLOWSKI FILM SCHOOL

SHORT DESCRIPTION

Krzysztof Kieślowski Film School teaches and conducts research in film and television directing, cinematography, artistic photography and cinema and film production. It includes research on the history and artistic and technological aspects of contemporary photography. Research on artistic aspects of Polish and European film industry in historical and contemporary perspective. It also includes research on the effects of political and economic conditions on the artistic shape of the cinema and its national and European identity.
We are looking for a researcher with their research plans of analyzing the issue of methods of analysis of audiovisual work, film narration, composition of film image, impact of new technologies on the language and poetics of the film and the issues of the DoP and director's workshop determining its final shape.

CONTACT PERSON

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https://us.edu.pl/in-isft

WHO CAN APPLY?

This action is meant to support **the best, most promising individual researchers** from anywhere in the world.

Only **experienced researchers** can apply. This means you will have your doctoral degree or at least four years full-time research experience by the time of the call deadline.

WHAT CAN BE FUNDED?

All research areas can be funded except those covered by the EURATOM Treaty as referred to in article 4 and Annex I. **Mobility across borders** is a must. Cross-sectoral mobility is also encouraged.

WHAT DOES THE FUNDING COVER?

The grant provides an **allowance to cover your living, mobility and family costs.** The grant is awarded to your host organisation, usually a university, research centre or a company in Europe. The research costs and overheads of the host organisation(s) are also supported!

European Fellowships last from **12 to 24 months.** Global Fellowships are composed of an outgoing phase in a Third Country between 12 and 24 months, and a mandatory 12-month return period to a host organisation located in a Member State or Associated Country.

HOW DO I APPLY?

You submit a **research proposal**, including your CV. The proposal is **written jointly with your chosen host organisation**.

Proposals are submitted in reply to a **call for proposals** published right here
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/msca-if-2020

Deadline: **09 September 2020**

JOIN US!