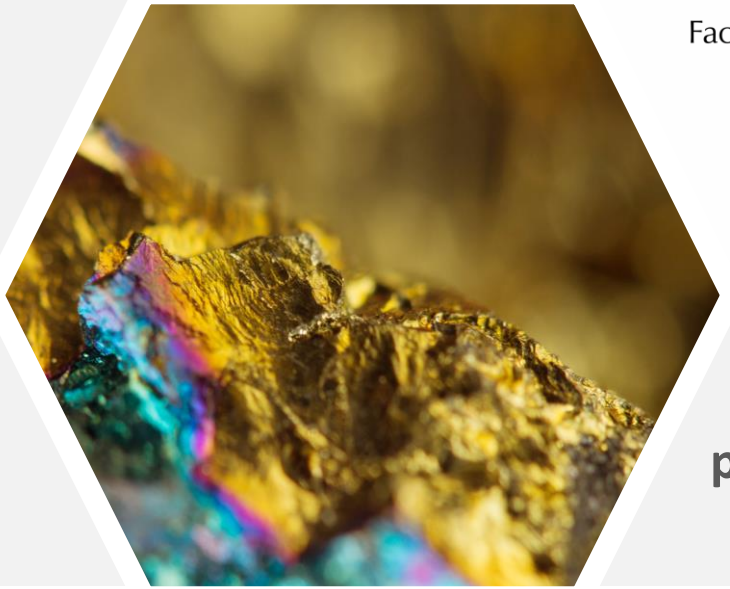
Faculty of Geoengineering, Mining and Geology



Faculty of Geoengineering, Mining and Geology

pwr.edu.pl/en

Wrocław University of Science and Technology

IR EXCELLENCE IN RESEARCI

unite! University Network for Innovation, Technology and Engineering

Wrocław University of Science and Technology

History of the Faculty

The Faculty of Geoengineering, Mining and Geology of Wrocław University of Science and Technology (Wrocław Tech) has a nearly fifty years' history of providing education to students, as well as conducting scientific and technical research. The Faculty was founded in 1968 and since its very beginning has been responding to the needs of the developing domestic economy and the regional raw material based industry of Lower Silesia.

Faculty of Geoengineering, Mining and Geology

Wrocław University of Science and Technology

Faculty on the Campus

- The Faculty was established in 1968
- In February 2013 we moved to the new Geocentrum building
- Since November 2019 we have a new laboratory building GEO-3EM beside Geocentrum
- The GEO buildings are connected with the main WUST campus by a cable car
- Our campus is close to the city center but it is very green and quiet

Faculty of Geoengineering, Mining and Geology

15 Na Grobli st., 50-421 Wrocław

building L-1 (GEOCENTRUM)

wggg.pwr.edu.pl/en/

Faculty of Geoengineering, Mining and Geology

Wrocław University of Science and Technology

Faculty Leadership

Dean

Professor Radosław Zimroz, DSc, PhD, Eng.

Vice-Dean for General Affairs

Gabriela Paszkowska, PhD

Vice-Dean for Educational Affairs

Karolina Adach-Pawelus, PhD, Eng.

Vice-Dean Research and Development

Justyna Woźniak, PhD, DSc

Vice-Dean for Student Affairs

Tadeusz Głowacki, PhD, Eng.

Faculty of Geoengineering, Mining and Geology

Wroclaw University of Science and Technology

Figures

724

1st degree students (full-time + part-time)

125

2nd master's degree (PL+ENG)

135

Graduates

4

Industrial doctorates

31

Professors

23

Associated full-time PhD

107

Academic staff

Faculty of Geoengineering, Mining and Geology

figures as of **31 December 2023**

Faculty of Geoengineering, Mining and Geology

Wrocław University of Science and Technology

Mission and Strategy

Mission and Strategy of the Faculty of Geoengineering, Mining and Geology are consistent with the strategy of the Wrocław University of Science and Technology.

It is based on the five directions:

- education,
- research and innovation,
- cooperation with the environment,
- people,
- more intense promotion of our study programs.

Faculty of Geoengineering, Mining and Geology

Wroclaw University of Science and Technology

Faculty Structure

Faculty of Geoengineering, Mining and Geology

Department of Mining

kg.pwr.edu.pl
+48 71 320 48 76

Department of Mining

Head – **Prof. Robert Król,** DSc, PhD, Eng.

Deputy head – **Urszula Kaźmierczak**, PhD, DSc, Eng.

Deputy head – **Zbigniew Krysa**, PhD, Eng.

Department of Geodesy and Geoinformatics

kgig.pwr.edu.pl
+48 71 320 68 75

Department of Geodesy and Geoinformatics

Head – **Jan Blachowski**, PhD, DSc, Eng.

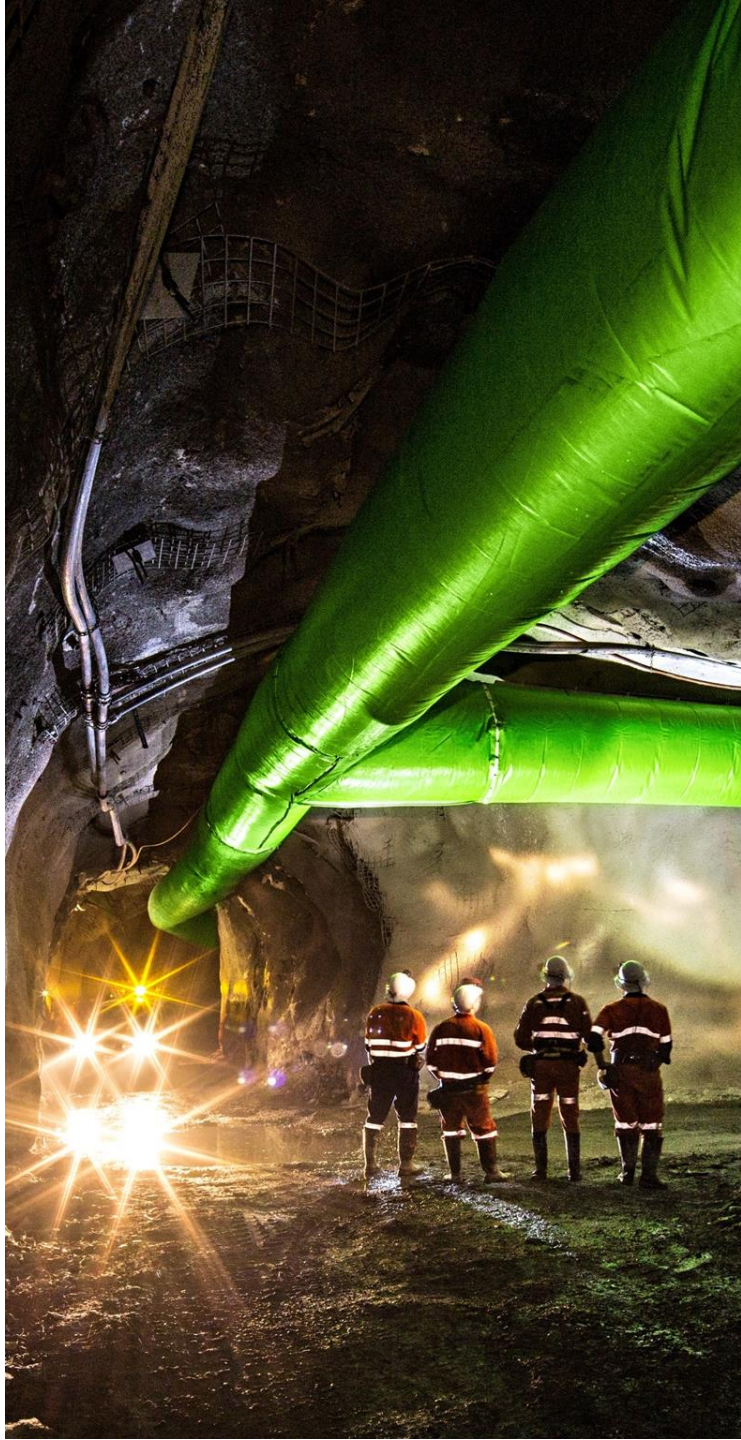
Deputy head – **Justyna Górniak-Zimroz**, PhD, DSc, Eng.

Deputy head – **Anna Kopeć**, PhD, Eng.

Wroclaw University of Science and Technology

Accomplishments

- Obtaining domestic and foreign grants (NCN, NCBiR, NAWA, MEiN, Horizon 2020, Research Fund for Coal and Steel), teaching projects (EIT KIC, FERS) and others.
- In the years 2020-2023, Faculty employees received **over 100** distinctions, awards and medals.
- Individual successes of employees (membership in associations, scientific councils, important roles at the university and in business, honorary distinctions.



Faculty of Geoengineering, Mining and Geology

Wroclaw University of Science and Technology

Priority Research Areas

- Information Technology, Data Science, and Artificial Intelligence
- Sustainable Living Environment
- Extreme Technologies
- Basic Research for Technology and Innovation

Faculty of Geoengineering, Mining and Geology

Wrocław University of Science and Technology

GEO-3EM - ENERGY ECOLOGY EDUCATION

The Wrocław Tech GEO-3EM complex is a research and technology transfer centre, unique in European scale. Its construction cost over PLN 100 million, and a large part of the funds came from the EU subsidy.

Laboratories

- Laboratory of Earth Sciences and Mineral Engineering
- Laboratory of Modeling Techniques in Mining
- Laboratory of Machine Systems in Mining
- 2 Accredited Laboratories: (1) Belt Conveying Laboratory and (2) Work Safety Laboratory

wggg.pwr.edu.pl/en/research/laboratories

Faculty of Geoengineering, Mining and Geology

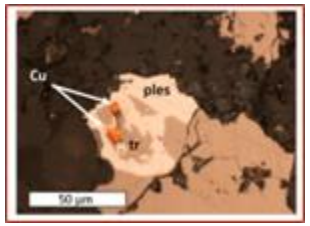
Wroclaw University of Science and Technology

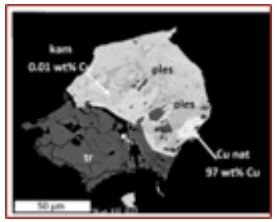
Laboratory of Earth Sciences and Mineral Engineering

Main areas of research

- Researching efficient methods for extracting and processing minerals.
- Studying soil and rock mechanics to improve construction and mining practices.
- Investigating the impact of mining activities on the environment and developing sustainable practices.
- Using advanced tools – such as the **EPMA cameca SX five FE electron probe microanalizer** – to analyse mineral composition and properties.

Contact:
Prof. Tadeusz Przylibski PhD, DSc
tadeusz.przylibski@pwr.edu.pl
+ 48 71 320 68 12
kg.pwr.edu.pl





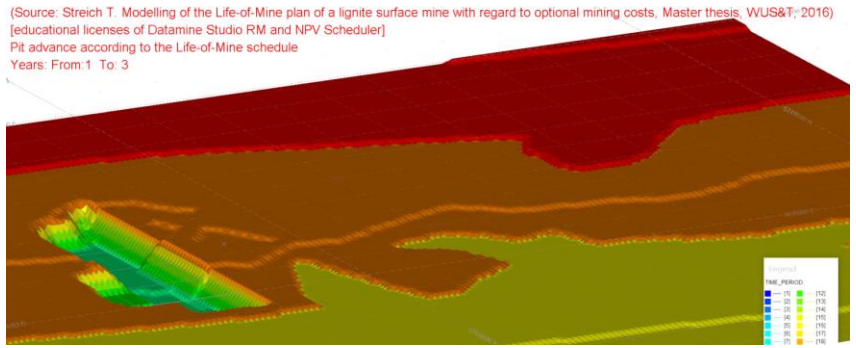
Faculty of Geoengineering, Mining and Geology

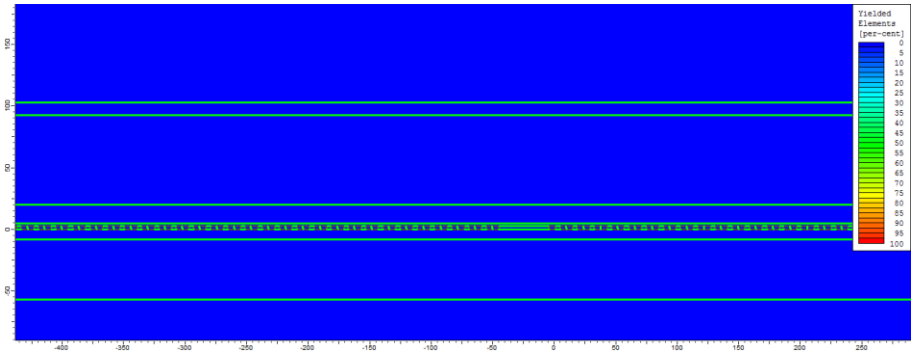
Wroclaw University of Science and Technology

Laboratory of Modeling Techniques in Mining

Main areas of research

- Developing and applying statistical methods to estimate the quantity and quality of mineral resources.
- Creating models to optimize the layout and operation of mines, ensuring efficient and safe extraction of resources.
- Using computer simulations to analyze and improve mining processes, including the movement of materials and the performance of mining equipment.
- Modeling the environmental impacts of mining activities to develop strategies for minimizing negative effects.
- Assessing and managing risks associated with mining operations under natural hazard conditions.





Contact:
kg.pwr.edu.pl

Faculty of Geoengineering, Mining and Geology

Wroclaw University of Science and Technology

Laboratory of Machine Systems in Mining

Main areas of research

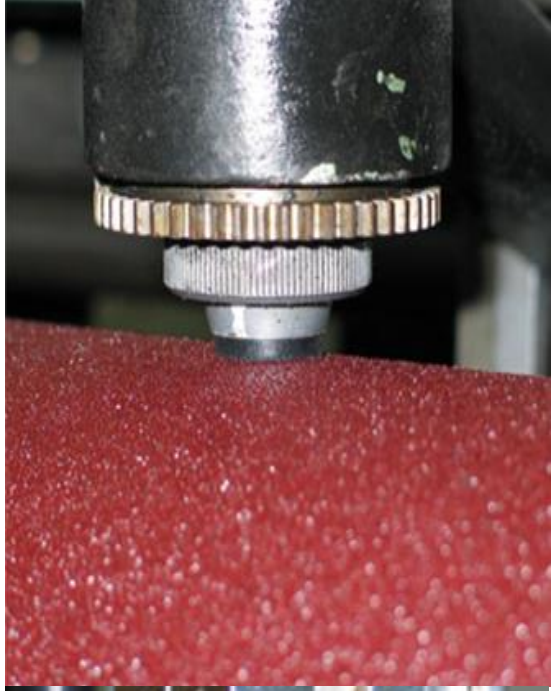
- Developing methods for diagnosing the condition of mining machinery to ensure optimal performance and prevent failures.
- Implementing systems to predict and prevent machinery breakdowns, thereby increasing operational efficiency and safety.
- Using data analytics and modeling to optimize mining processes, improving productivity and reducing costs.

Contact:
Prof. Robert Król, DSc, PhD, Eng.
robert.krol@pwr.edu.pl
+48 71 320 48 76
kg.pwr.edu.pl

Wroclaw University of Science and Technology

Accredited laboratories

Belt Conveying Laboratory, accreditation no. AB 710



Scope of research:

- test of strength and elongation of the belt
- testing the strength properties of rubber
- abrasion resistance test

Objects of research

- plastic and rubber products.

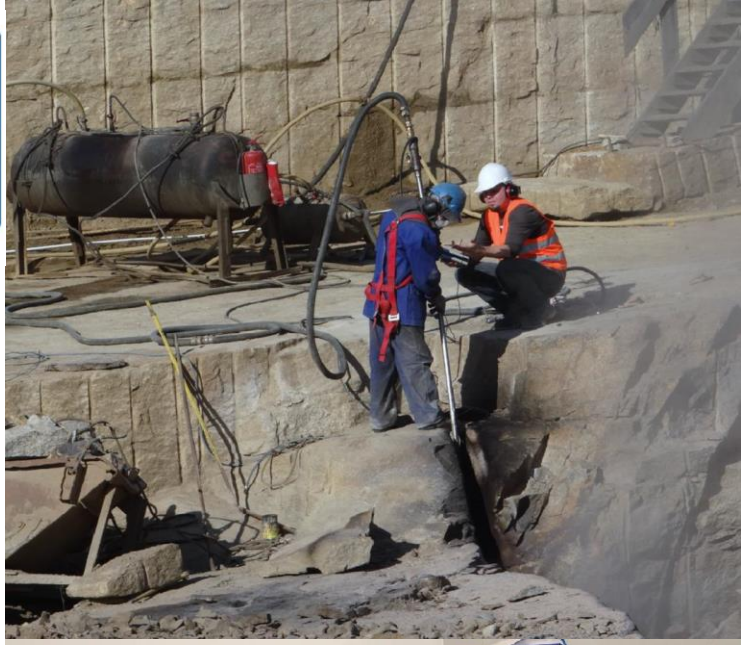
Contact:
Prof. Monika Hardygóra, DSc, PhD, Eng.
monika.hardygora@pwr.edu.pl
+48 71 320 68 56
www.ltt.pwr.edu.pl

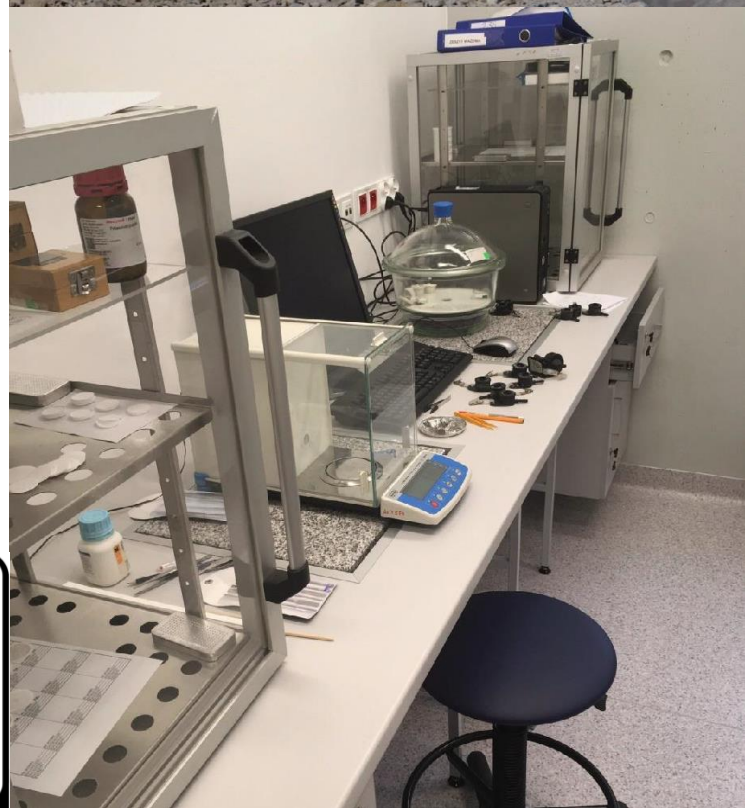
Faculty of Geoengineering, Mining and Geology

Wrocław University of Science and Technology

Laboratory of Occupational Health and Safety

AB 905





Accredited studies in the work environment:

- Air: industrial dust, inorganic substances, concentration/content of crystalline silica
- Noise,
- Ultrasonic noise,
- Mechanical vibrations affecting the human body through the upper limbs,
- Mechanical vibrations with a general effect on the human body.

Accredited studies in the general environment:

- Noise from installations, devices, and industrial plants.

Contact:
Monika Maślakiewicz, Eng
monika.maslakiewicz@pwr.edu.pl +48 782 070 760

Faculty of Geoengineering, Mining and Geology

Wroclaw University of Science and Technology

Other laboratories

- Laboratory of Geology and Planetary Sciences
- Laboratory of Geodesy and GPS
- Laboratory of GIS and Photogrammetry
- Laboratory of Mining Aerology
- Laboratory Rock and Minerals Research
- Laboratory of Rock Mechanics
- Laboratory of Mineral Processing
- Laboratory of Mining Machines
- Laboratory of Mine Modeling and Mining Optimization
- Geostatistics Laboratory
- Chemistry and Isotopes Laboratory

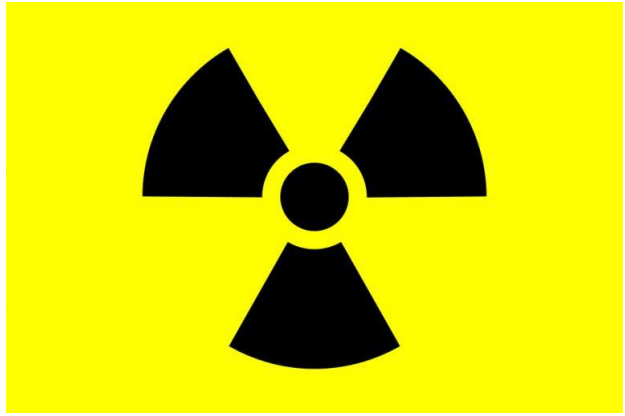
Discover collaboration opportunities at the Faculty of Geoengineering, Mining and Geology's website: wggg.pwr.edu.pl/en/research

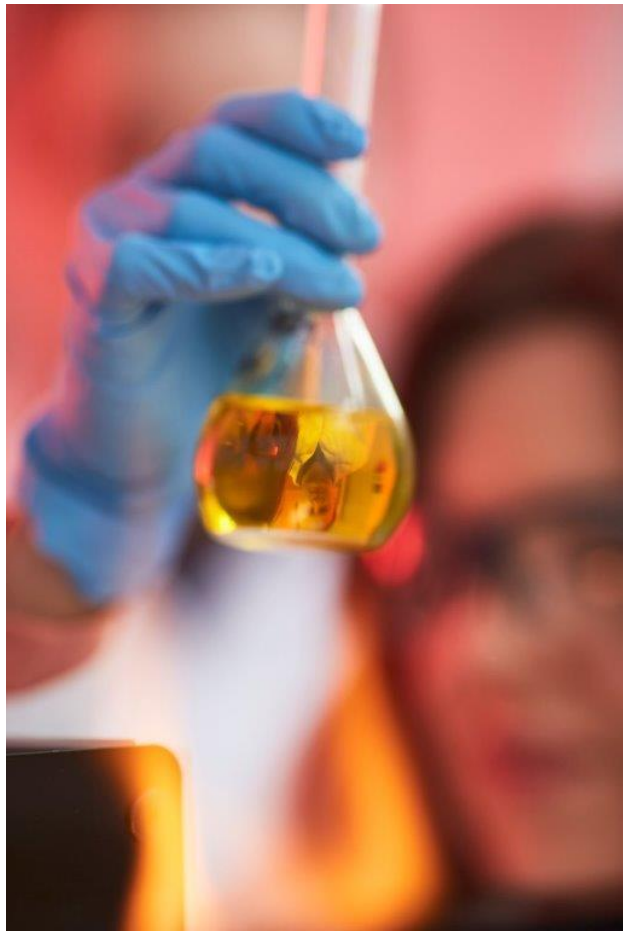
Wroclaw University of Science and Technology

Chemistry and Isotopes Laboratory

Main areas of research:

- Conducting comprehensive analyses of terrestrial and extraterrestrial environmental samples, in which comprehensive analyses of any matter can be performed, especially natural rocks, minerals, waters and gases
- Assessment of exposure to ionizing radiation (α, β, γ)
- Measurements of ^{222}Rn activity concentration in water and air
- Measurements of ^{226}Ra activity concentration in water, rocks and soils
- Measurements of radon derivative activity concentration and potential energy of α radiation in air
- Analysis of basic physicochemical properties of groundwater and surface water
- Analysis of the chemical composition of geogenic gases (CO_2, H_2S, CH_4, N_2, H_2, O_2, He, Ar)



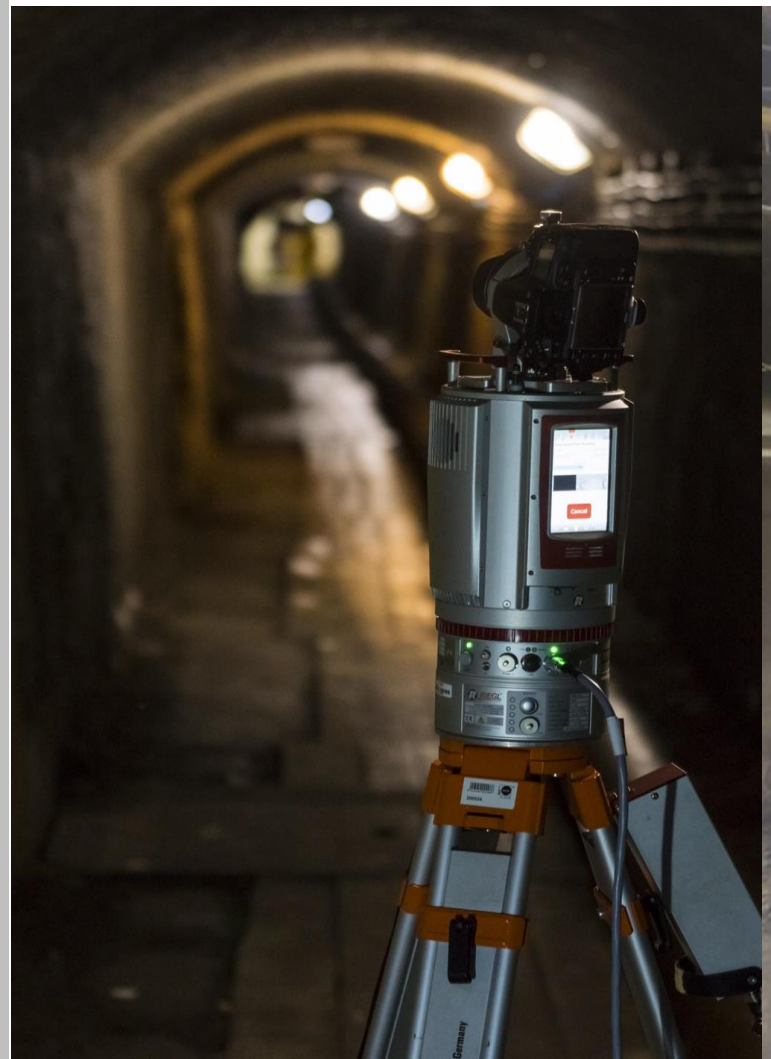


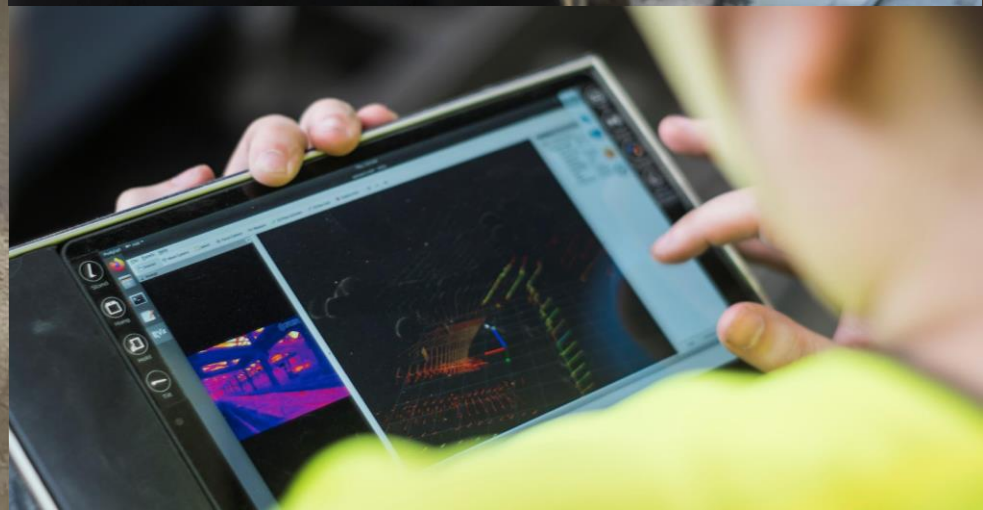
Wroclaw University of Science and Technology

Digital Mining Centre

Research in the field of the automation, digitalization and overall modernization of the mining industry.

Contact:
Prof. Radosław Zimroz, DSc, PhD, Eng.
radoslaw.zimroz@pwr.edu.pl
+48 71 320 68 49
https://dmc.pwr.edu.pl/





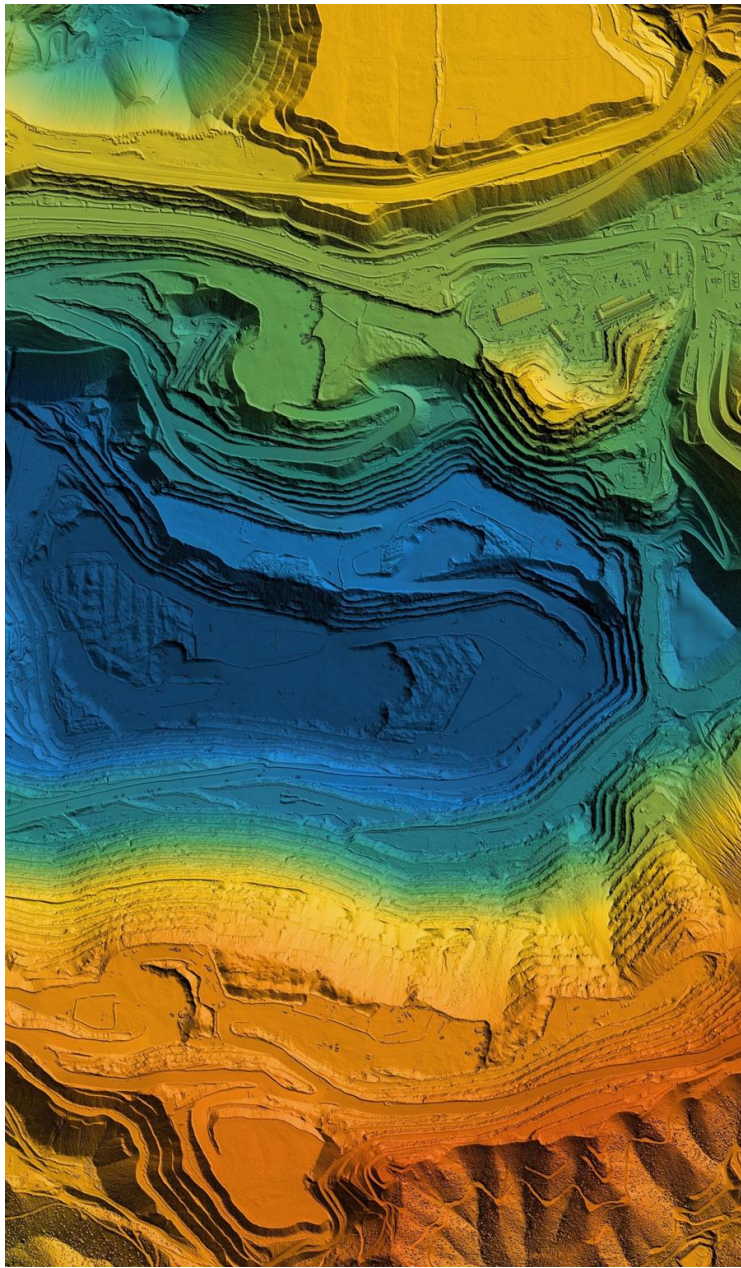
Faculty of Geoengineering, Mining and Geology

Wroclaw University of Science and Technology

Department of Geodesy and Geoinformatics

Basic areas of the research activities:

- development of SAR data for the needs of expertise and research in mining areas, urban environments, and other application,
- determination and forecast of deformation mining and post-mining areas,
- data acquisition and processing photogrammetry and remote sensing,
- time-space analysis of the condition of engineering and industrial facilities,
- hydrotechnical and road construction,
- monitoring the structure and safety of structures, in earthworks bases laser scanning and geodetic measurements (3D/4D).



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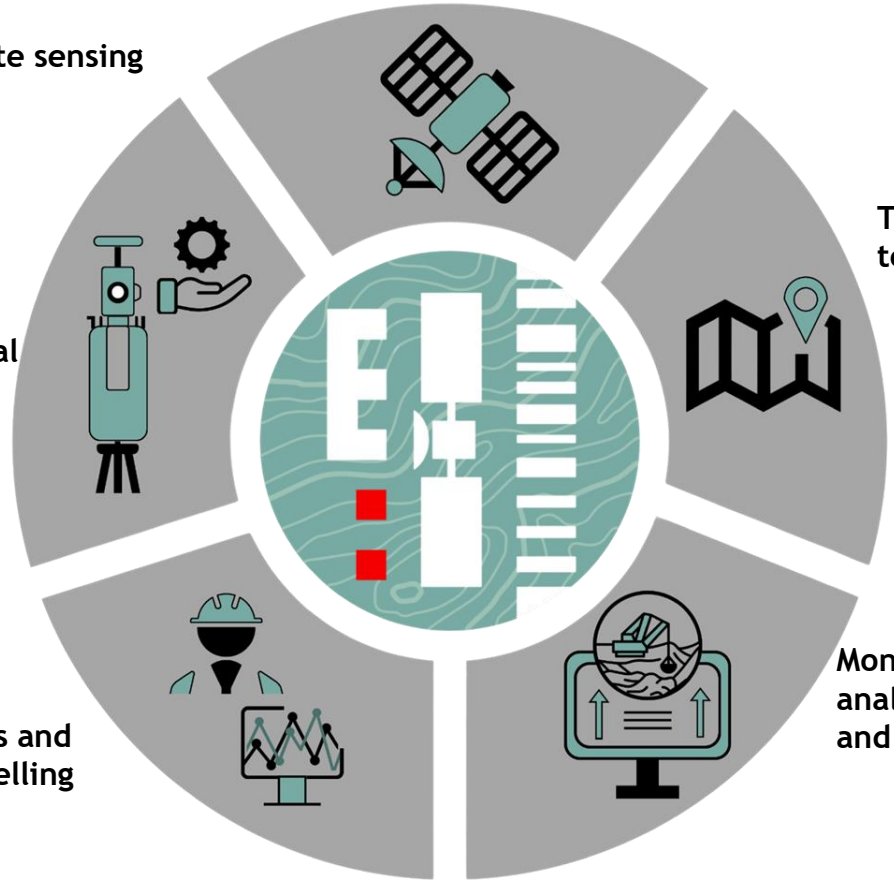
+48 71 320 68 75

Faculty of Geoengineering, Mining and Geology

Department of Geodesy and Geoinformatics. Fields of interest



Wroclaw University of Science and Technology
Department of Geodesy and Geoinformatics
Faculty of Geoengineering, Mining and Geology

Wroclaw
University
of Science
and Technology

Research. Main areas of expertise

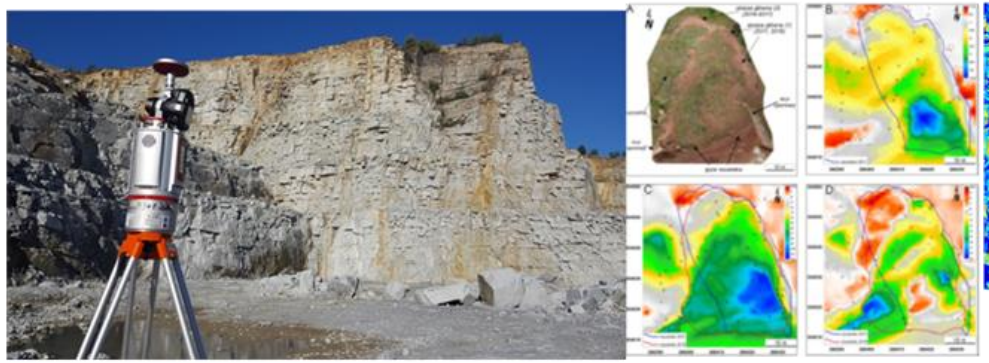
Mobile Laser Scanning System (MLS LiDAR)

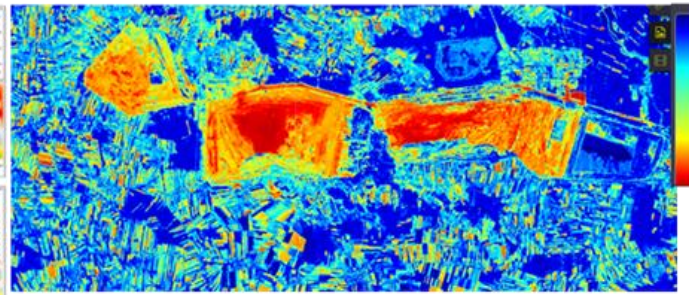
Remote sensing (Sentinel)

Vegetation Index NDVI

Photogrammetry

Landslides and quarries monitoring





Humidity Index

Department
of Geodesy
and Geoinformatics

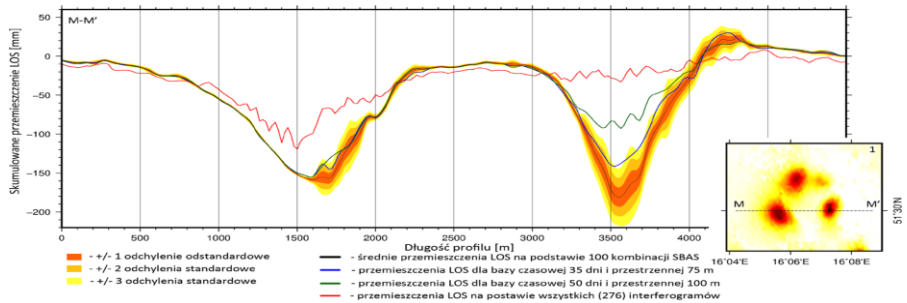
Faculty of Geoengineering,
Mining and Geology

Research. Main areas of expertise

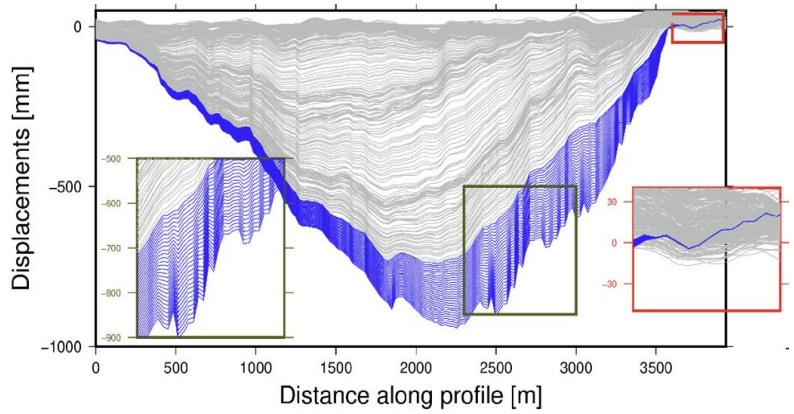
Area 1. Satellite SAR data processing:

- monitoring of ground movements displacement in mining, urban and other areas,
- prediction of ground movements based on InSAR time series and machine learning,
- determination of ground movement accuracy based on InSAR techniques,
- application of SAR data in monitoring of polar regions.

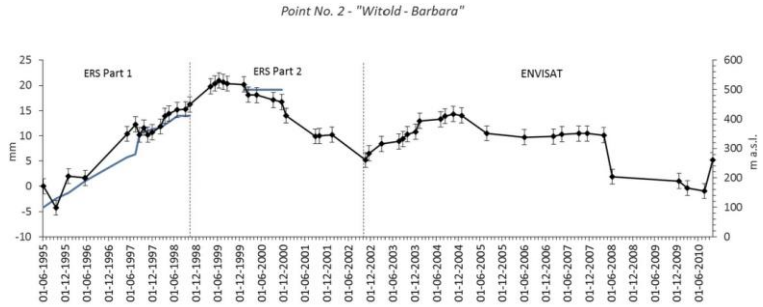
Examples



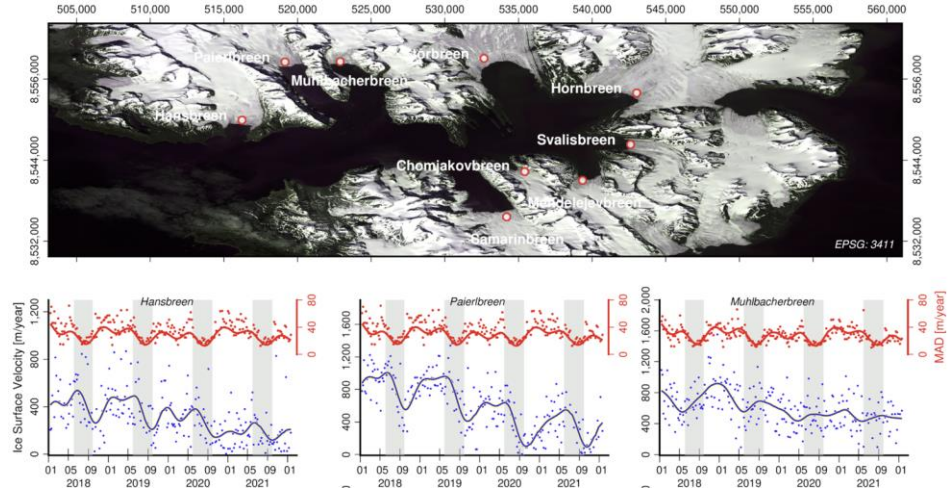
Kopeć 2021 Doctoral thesis



Milczarek and Cieślik 2022 https://doi.org/10.3390/rs14194755



Blachowski et al. 2019 https://doi.org/10.3390/su11030884



Milczarek, Kopeć 2022 https://doi.org/10.3390/rs14215429

Wrocław University of Science and Technology

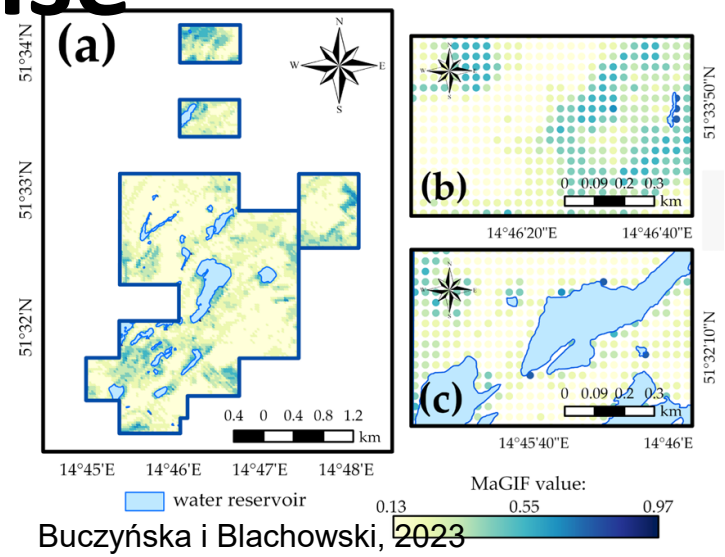
Department of Geodesy and Geoinformatics

Faculty of Geoengineering, Mining and Geology

Research. Main areas of expertise

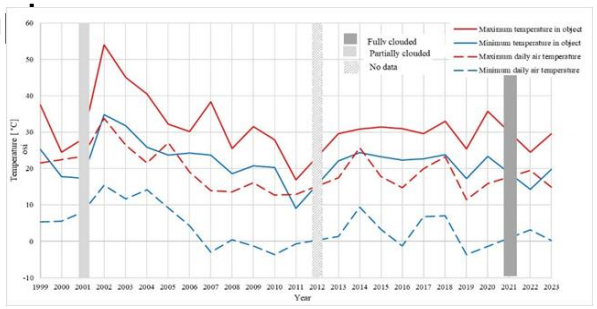
Area 2. Remote sensing and spatial statistics

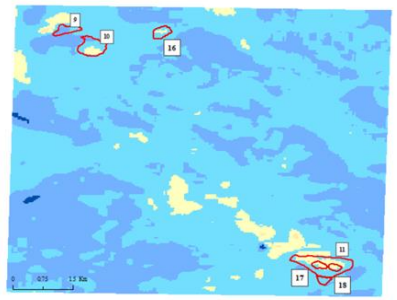
- environmental condition assessment and monitoring of changes in mining and post-mining sites,
- studies on the environmental condition and its changes in urban and industrial areas,
- spatial statistics and predictive modeling using machine learning in GIS.

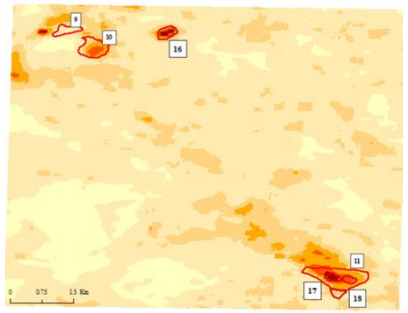


Buczyńska i Blachowski, 2023
https://doi.org/10.1016/j.catena.2023.107463

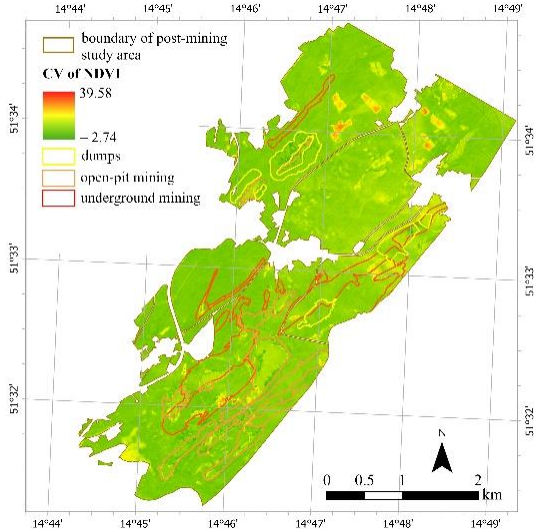
Exam



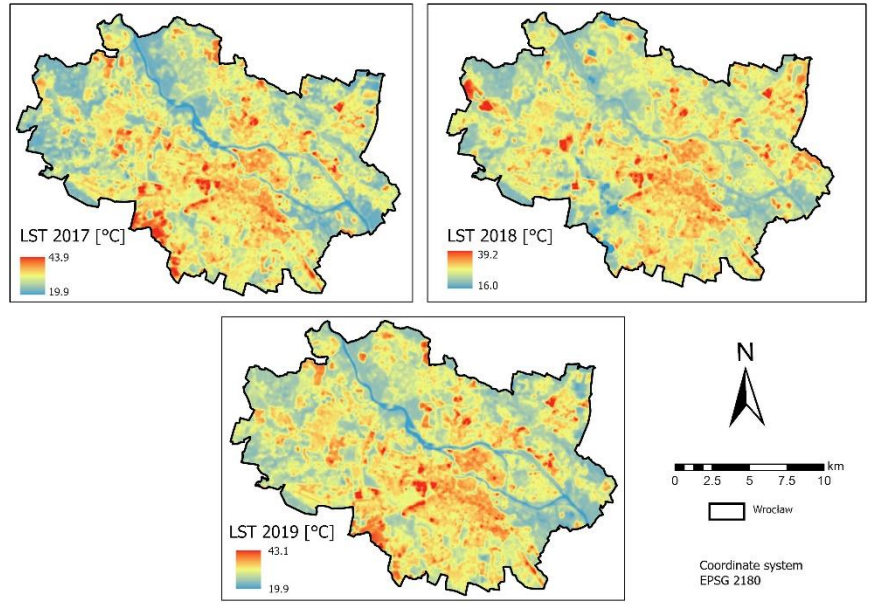




Worsa-Kozak et al., 2024
https://doi.org/10.3389/fenvs.2024.1305149



Blachowski et al., 2023
https://doi.org/10.3390/rs15123067



Blachowski i Hajnrych, 2021
https://doi.org/10.3390/f12081136

Wrocław University of Science and Technology

Department of Geodesy and Geoinformatics

Faculty of Geoengineering, Mining and Geology

Wrocław University of Science and Technology

Department of Geodesy and Geoinformatics

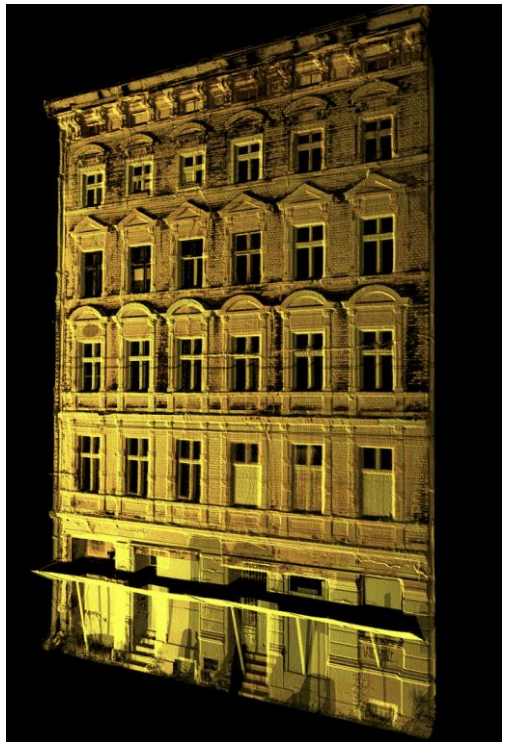
Faculty of Geoengineering, Mining and Geology

Research. Main areas of expertise

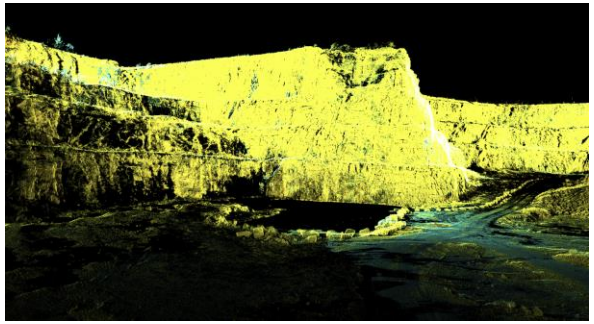
Area 3. Photogrammetry, Terrestrial and UAV Laser Scanning, Mobile Mapping Systems

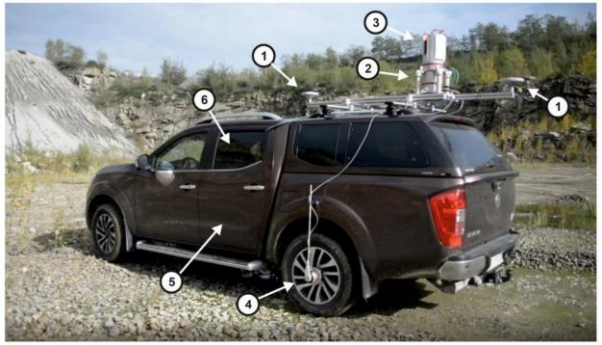
- inventorying of urban spaces,
- inventorying and monitoring of green (vegetated) spaces,
- inventorying and monitoring of material cultural heritage sites,
- testing algorithms for numerical 3D modelling

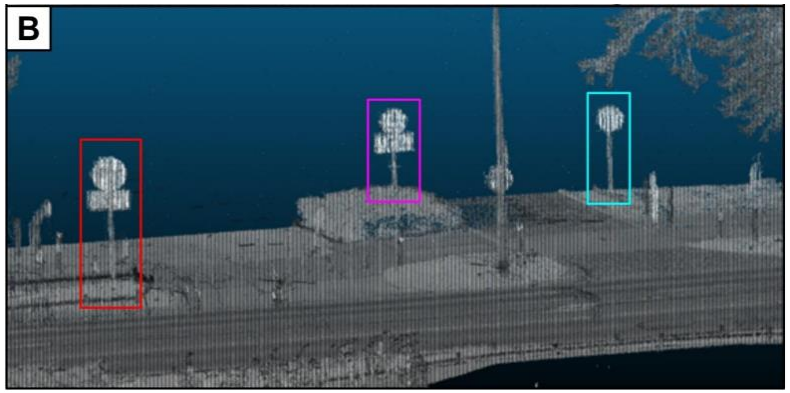
Examples



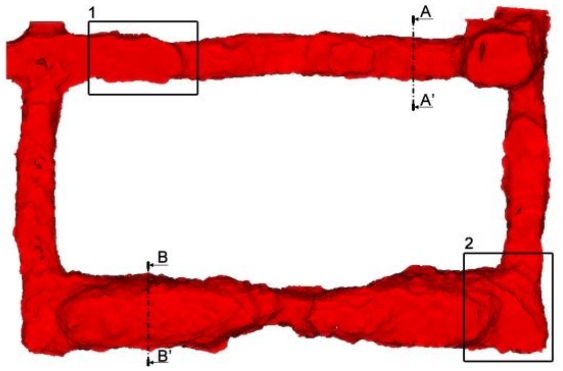
Wajs et al., 2021
https://doi.org/10.3390/en14206853

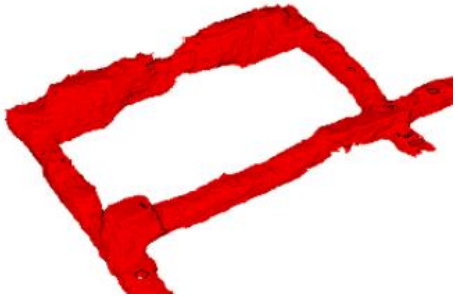






Siejek, Wajs and Kasza, 2024
DOI: 10.59440/ceer/185736





Trybała i in. 2023
https://doi.org/10.5194/isprs-archives-XLVIII-1-W1-2023-517-2023

Wrocław University of Science and Technology

Department of Geodesy and Geoinformatics

Faculty of Geoengineering, Mining and Geology

Research. Main areas of expertise

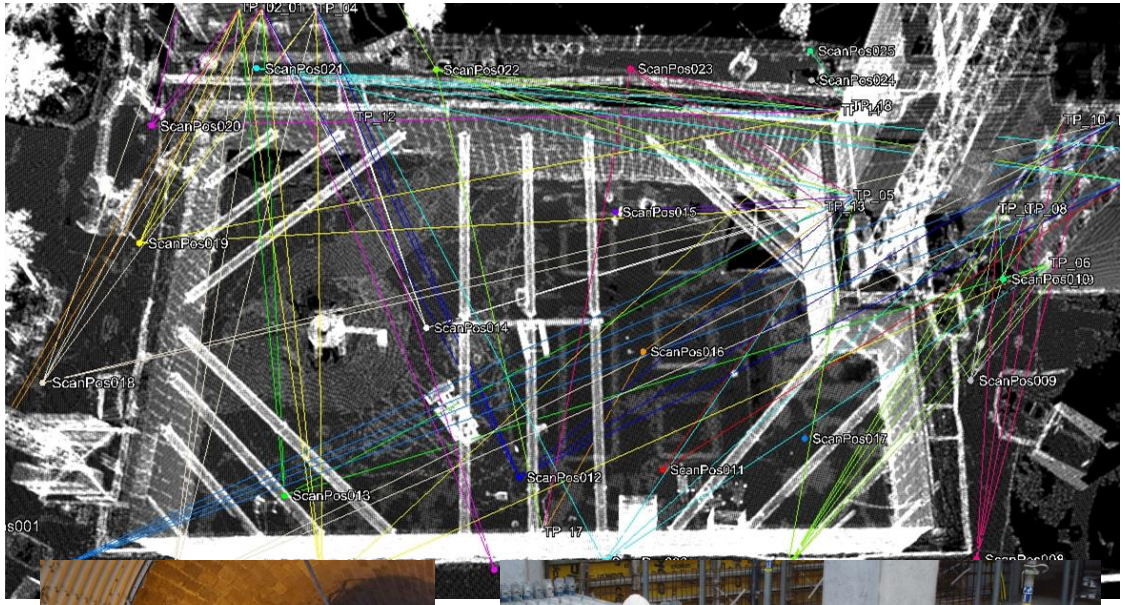
Area 4. Spatio-Temporal Monitoring and Analysis of the Condition of Engineering and Natural Structures

- integration of geodetic measurement techniques and their applications in geotechnics,
- monitoring of displacements and deformations, and diagnostic measurements.

Examples

Muszyński and Rybak J.,. 2021
DOI: 10.3390/rs13163082

Muszyński, Rybak, and Kaczor, 2018
DOI: 10.3390/s18114067



Wyjadłowski et al., 2024
DOI:10.1016/j.conbuildmat.2024.136431

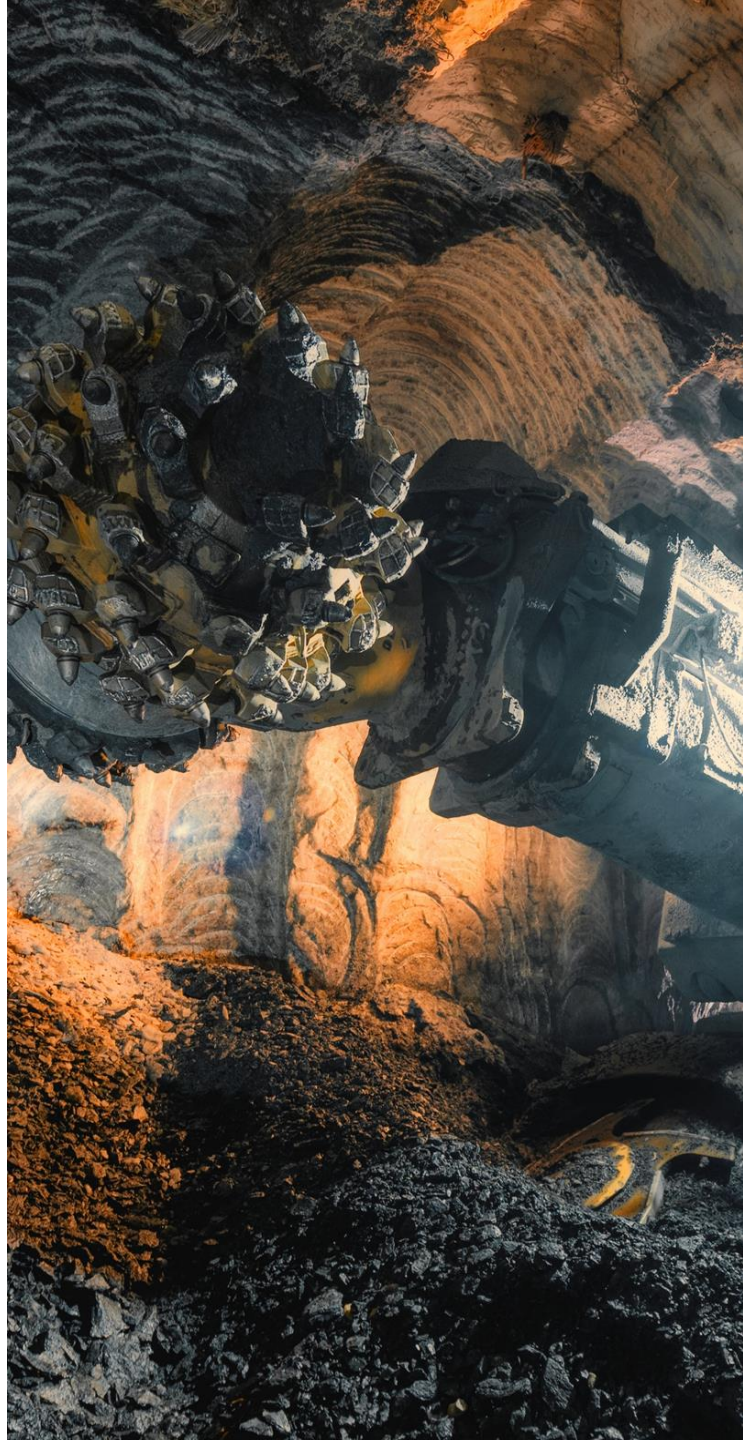
Muszyński and Wyjadłowski, 2019
DOI: 10.3390/s19051012

Wrocław University of Science and Technology

Department of Mining

Basic areas of the research activities:

- using data analytics and modeling to optimize mining processes, improving productivity and reducing costs,
- evaluating the environmental impact of mining operations and developing strategies to mitigate negative effects,
- researching and developing automated systems and robotic technologies to enhance mining operations,
- developing methods for diagnosing the condition of mining machinery to ensure optimal performance and prevent failures,
- implementing systems to predict and prevent machinery breakdowns, thereby increasing operational efficiency and safety.



kg.pwr.edu.pl/badania/oferta-badawcza
+48 71 320 48 76

Faculty of Geoengineering, Mining and Geology

Wroclaw University of Science and Technology

Research teams – Department of Mining

- **Digital Mining Center** (research in the field of the automation, digitalization and overall modernization of the mining industry).
- **Geology and Hydrogeology Team** (research in the field of geology, hydrogeology, geophysics, environment and natural hazards; Laboratory and field tests),
- **Mineral and Environmental Engineering Team** (research in the field of mineral engineering, environmental engineering in the raw materials industry),
- **Mining Technologies and Geoengineering Team** (research in the field of geotechnics, surface and underground mining, occupational health and safety; Laboratory and field tests)
- **Machine Systems Team** (research in the field of conveyor belts)
- **Industrial Economics and Natural Resources Team** (research in the field of raw materials and energy market analysis; corporate social responsibility and sustainable development; economic analysis of the functioning of enterprises - industrial economics; geological modelling, mine design and mining planning)

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Department of Mining - research topics

- Natural resources sector
- Geothermal and renewable energy sector
- Water management sector
- Sustainable development, resources, and environmental protection
- Mining sector: rock resource mines, drilling and blasting companies, mining operations utilizing conveyor transport in their processes, and producers of idlers
- Non-mining sector: enterprises utilizing conveyor transport (e.g., power plants, smelters, waste sorting facilities) with a particular emphasis on those located in close proximity to residential area
- Monitoring and diagnostics of spatially distributed technical infrastructure

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Department of Mining - research topics

- Identification and monitoring of changes in the natural and anthropogenic environment (including post-mining areas and ongoing extraction activities) to facilitate sustainable development and enhance the quality of life for local residents
- Reduction of energy consumption and extension of the operational lifespan of components in conveyor systems, as well as minimizing energy usage in mineral processing
- Environmental assessments of material quality, including natural stone and aggregates
- Health and safety management for the mining industry

Wrocław University of Science and Technology

World's TOP 2% Scientists (2023)

Prof. Radosław Zimroz,
PhD, DSc, Eng.

Prof. Jan Drzymała,
PhD, DSc, Eng.

Govind Vashishtha,
PhD, Academic Teacher
and Visiting Researcher

Faculty of Geoengineering, Mining and Geology

Wrocław University of Science and Technology

Patents/know-how

- **Method for belt damage detection in belt conveyors.** Authors: Ryszard Błażej, Monika Hardygóra, Leszek Jurdziak, Radosław Zimroz, Maciej Szupieńko. Patent. Poland, No 227740.

- **Method for continual monitoring of length and elongation of conveyor belt being in motion.** Authors: Agata Kirjanów, Ryszard Błażej, Leszek Jurdziak, Tomasz Kozłowski: Patent. Poland, No 227912.

- **Conveyor belt with increased resistance to puncture and cutting.** Authors: Agata Kirjanów, Ryszard Błażej, Leszek Jurdziak, Tomasz Kozłowski: Patent. Poland, No 426299.

- **Device for testing rotation resistance of rollers under load,** Authors: Robert Król, Damian Kaszuba, Waldemar Kisielewski, Patent. Poland, No 236292.

List of patents: wggg.pwr.edu.pl/badania/patenty

Faculty of Geoengineering, Mining and Geology

Cooperation with Academia and Industry

Key Areas

- **Joint Teaching and Learning**
  Joint teaching programs
  Career path collaboration
- **Joint Research and Innovation**
  Research team matchmaking
- **Student Mobility**
  Hybrid and on-site courses at partner universities
  International internships
  Joint master's programs
  Diversity, integration, and team building

unite!

Aalto University

POLITECNICO DI TORINO

Université Grenoble Alpes

Wroclaw University of Science and Technology

Cooperation with Academia and Industry

Department of Mining

- KGHM, KGHM Cuprum sp. z o.o
- PGE GiEK S.A.
- Agencia Estatal Consejo Superior de Investigaciones Cientificas M.P.
- Atlantic Copper S.L.U.
- Geologian Tutkimuskeskus
- Lappeenranta University of Technology
- Metso Minerals Oy
- Outotec Oy
- Suomen Malmijalostus Oy
- Universidad Politecnica de Madrid
- The Institute of Construction and Architecture from the Slovak Academy of Sciences
- Institute for Chemical Processing of Coal (ITPE)
- VSB – Technical University of Ostrava
- KOMAG Institute of Mining Technology
- Haldex (HDX)
- Leuven.Inc vzw
- Tetra Pak Packaging Solutions S.p.a.
- Technische Universität Darmstadt
- University of the Basque Country and others

Wrocław University of Science and Technology

Cooperation with Academia and Industry

Department of Geodesy and Geoinformatics

- Hochschule für Technik Stuttgart
- The Scientific and Technological Research Council of Türkiye (TÜBİTAK)
- The University Centre in Svalbard (UNIS)
- Delft University of Technology
- Technische Universität Bergakademie
- Freiberg - Institut für Markscheidewesen und Geodäsie
- EarthScope Consortium
- Deutscher Akademischer Austauschdienst
- The Wrocław Academic Centre (WCA)
- Polish Geological Institute National Research Institute
- Higher Mining Authority
- KGHM, KGHM Cuprum sp. z o.o
- Fondazione Bruno Kessler
- Deutsches GeoForschungsZentrum GFZ
- FPM GmbH
- Info-Solutions sp. z o.o

and others

Wrocław University of Science and Technology

Cooperation with Academia and Industry

Faculty of Geoengineering, Mining and Geology

Wrocław University of Science and Technology

Conferences organised and co-organized by the Faculty

- **VII Mineral Engineering Conference MEC 2024,** September 16-18, 2024, Wisła, Poland
- **4th Scientific and Technical Conference "Traditions and Innovations in Mining"** November 22-23, 2024, Wrocław, Poland
- **XXIV Conference of Phd Students and Young Scientists**
  Interdisciplinary Topics in Mining, Geology and Geomatics, October 23-25, 2024
- **Business breakfast with EIT Raw Materials 2024,** 6.12.2024 r.
- **XXIII Mineral Aggregates Conference**
  Raw Materials-Market-Technologies-Quality, April 19-21, 2023
- Scientific and technical conference - **Modern solutions in occupational health and safety**, May 28, 2024, Wrocław

Faculty of Geoengineering, Mining and Geology

Wroclaw University of Science and Technology

Studies at the faculty

BSc and MSc studies

- Geoinformatics
- Mining and Geology
- Geodesy and Cartography
- Geoenergy Engineering
- Raw Materials Engineering
- Applied Geology
- Occupational Health and Safety
- Urban mining

Postgraduate Studies

- Geographic Information Systems
- Occupational Health and Safety

Doctoral Studies

- Educational discipline – Environmental engineering, mining and energy

Wroclaw University of Science and Technology

Master Programs in English

Fields of study:	Specializations:
Mining and Geology	• Mining Engineering • Geotechnical and Environmental Engineering • Geomatics for Mineral Resource Management • Mineral Resource Exploration (TIMREX) *Partners: University of Miskolc, University of Zagreb, Lulea University of Technology* • Master in Entrepreneurship, Innovation and Technology Integration in Mining (MEITIM) *Partners: Technical University of Madrid, Lappeenranta-Lahti University of Technology*
Geodesy and Cartography	• Geodata Engineering
Urban mining	

Supported by eit RawMaterials ACADEMY

Faculty of Geoengineering, Mining and Geology

Wrocław University of Science and Technology

Studies in cooperation with foreign universities

- **Geotechnical and Environmental Engineering** - a joint MSc programme of Wrocław Tech and University of Miskolc (Hungary) (Second semester is a mobility period when the students will follow a structured exchange program at the University of Miskolc (Hungary)

- **Geomatics for Mineral Resource Management** double degree program offered by TU Bergakademie Freiberg (Germany) and Wrocław Tech

- **Geomatics for Mineral Resource Management** double degree program offered by Montanuniversität Leoben (Austria) and Wrocław Tech in geodesy and cartography.

Faculty of Geoengineering, Mining and Geology

Wroclaw University of Science and Technology

International educational projects

– currently ongoing

- T-shaped EIT-labelled Master Programme in Innovative Mineral Resource Exploration (TIMREX)
- Master in Entrepreneurship, Innovation and Technology Integration in Mining (MEITIM)
- RIS Internship programme - broadening University-Business Cooperation in the ESEE region
- Advanced LCA based on process and thermodynamics simulation (ALCASIM)

- EIT Labelled Master Pograms: Timrex MEITIM

Wroclaw University of Science and Technology

International projects

eit RawMaterials

European Institute of Innovation & Technology brings together leading institutions of higher education, research labs and companies to form dynamic cross-border partnerships – Knowledge and Innovation Communities, KICs - that develop innovative products and services, start new companies, and train a new generation of entrepreneurs.

Faculty of Geoengineering, Mining and Geology

Wroclaw University of Science and Technology

International research projects

– currently ongoing

- Electrical Computerised Hammering Operator (ECHO)
- Brines of RIS countries as a source of CRM and energy supply (BrineRis)
- Ventilation Optimizing Technology based on 3D-scanning (VOT3D)
- Closed-Loop Impact Monitoring for Environmentally and Socially Acceptable Energy Transition in Rural Regions (CLEAR)
- New technology for hydrogen and geopolymer composites production from post-mining waste (H2GEO)
- Smart Sustainable and Multifunctional Use and Management of Forests (SILVA NYMPHA)
- Advancing Post-Mining Waste Dump Safety and Sustainability (MidSafe)
- Miniaturized Robotic Systems for Autonomous In-Situ Exploration of Critical Raw Materials In Deep Land Deposits (MINOTAUR)
- Modelling of transverse vibration of belt and diagnostics of pipe conveyors

Brines of RIS countries as a source of CRM and energy supply

BrineRIS is an international RIS capacity-building project that deals with recovering valuable metals from geothermal brines using natural heat from inside the earth.

The project's main objectives are:

- to increase awareness of geothermal brines metallogenic potential in RIS countries,
- to build the capacity of RIS countries in lowcarbon metals mining technologies related to geothermal brines,
- to attract investors to RIS countries by an interactive platform of geothermal brines projects and investment case for European Raw Materials Alliance.

Contact:
Magdalena Worsa-Kozak PhD.
magdalena.worsa-kozak@pwr.edu.pl
brineris.pwr.edu.pl

Wrocław University of Science and Technology

International projects

OPMO – Operational Monitoring of Mineral Crushing Machinery – solution of a combined monitoring and diagnostic system will improve maintenance of mineral crushing machines.

A system like this is being developed through collaboration within an international consortium and with funding from EIT RawMaterials – under the Horizon Europe framework programme. It's being developed by researchers from Wrocław University of Science and Technology and specialists from KGHM Polska Miedź, Research and Development Centre KGHM CUPRUM, and the company AmePlus, as well as partners from Finland – Metso Oy, a supplier of machines and technologies, and the University of Tampere.

eitrawmaterials.eu/project/opmo

Faculty of Geoengineering, Mining and Geology

Wroclaw University of Science and Technology

International projects

New technology for hydrogen and geopolymer composites production from post-mining waste (H2GEO)

Development of a comprehensive technology for the management of mine waste dumps is planned within the project. The main idea of the project is to use the separated mineral fractions and fly ash to produce geopolymer composites.

Project Aim:

- a reduction of mine waste deposited in dumps,
- a development of the method of using the carbon-bearing fractions recovered from the mine waste, for production of hydrogen,
- research into feasibility on manufacturing geopolymers from mine waste,
- a development of comprehensive technology of mine waste dumps management.

Contact:
Anna Nowak-Szpak PhD. Eng.
anna.nowak-szpak@pwr.edu.pl
h2geo.komag.eu

Faculty of Geoengineering, Mining and Geology

Wrocław University of Science and Technology

European Commission

Co-funded by the European Union

Research Fund for Coal & Steel

Advancing Post-Mining Waste Dump Safety and Sustainability (MidSafe)

Grant Agreement No 101157379 — MidSafe

The MiDSafe project aims to enhance safety and sustainability in coal and lignite mine waste dumps. It focuses on identifying, analyzing, and mitigating geotechnical and associated risks to improve waste management practices.

Project Aim:

- new monitoring system for heterogeneous mine dumps, by developing novel approaches (UAV usage) and methodologies (3D modeling and Fuzzy Inference Systems) for dumps stability assessment.
- establishing a risk assessment methodology applicable to most mine waste dumps.
- development of innovative materials to minimize risks during or after the operation of mine waste dumps.

Coordinator:
Poltegor-Instytut Instytut Górnictwa Odkrywkowego– PL – Poland

WUST Contact:
Natalia Suchorab-Matuszewska PhD. Eng.
natalia.suchorab@pwr.edu.pl

Wrocław University of Science and Technology

International projects

MOIRA – The European Training Network on Monitoring Large-Scale Complex Systems

MOIRA is based around 12 Beneficiaries and 4 Partner Organizations made up of leading universities, top research institutions, and major industry, to assist in the dissemination and public engagement or MOIRA results, and in providing dedicated training to enhance the entrepreneurial mind set of 15 ESRs.

The objective of the MOIRA project is:

- to develop the next generation of knowledge discovery methodologies, algorithms and technologies.

The main tasks in which WUST is involved:

- the analysis of long-term, heterogeneous, historical big-data from time-varying systems operating under impulsive, non-Gaussian noise.

Contact:
Prof. Radosław Zimroz, PhD, DSc
radoslaw.zimroz@pwr.edu.pl
h2020-moira.eu

Faculty of Geoengineering, Mining and Geology

Wroclaw University of Science and Technology

Research and development projects

Project name	Project duration
Electrical Computerised Hammering Operator	2022.01.02-2024.12.31
Brines of RIS countries as a source of CRM and energy supply	2022.01.01-2024-12-31
Ventilation Optimizing Technology based on 3D-scanning	2022.07.01-2025.06.30
Closed-Loop Impact Monitoring for Environmentally and Socially Acceptable Energy Transition in Rural Regions (CLEAR)	2022.08.01-2025.07.31

dp.pwr.edu.pl/projekty-pwr/realizowane-projekty/projekty-realizowane-na-pwr

Faculty of Geoengineering, Mining and Geology

Wrocław University of Science and Technology

Partnership in European educational projects

Project name	Project duration
Master in Entrepreneurship, Innovation and Technology Integration in Mining (MEITIM)	2020.01.01-2023.12.31
Advanced LCA based on provess and thermodynamics simulation (ALCASIM)	2022.08.01-2025.07.31
T-shaped EIT-labelled Master Programme in Innovative Mineral Resource Exploration (TIMREX)	2022.01.01-2024.12.01
RIS Internship programme - broadening University-Business Cooperation in the ESEE region (RIS Internship)	2022.01.01-2024.12.01

dp.pwr.edu.pl/projekty-pwr/realizowane-projekty/projekty-realizowane-na-pwr

Wroclaw University of Science and Technology

Erasmus+ Programme

Erasmus+ offers the opportunity for higher education institutions to send students and staff abroad (in other Programme countries or other Partner countries) to study, teach, or train at participating institutions, as well as to participate in a traineeship.

28 agreements:

- Lulea Technical University (Sweden)
- University of Leoben (Austria)
- Universite de Liege (Belgium)
- Masaryk University (Czech Republic)
- Rwth Aachen (Deutschland)
- Hochschule für Technik und Wirtschaft Dresden (Deutschland)
- Tu Bergakademie Freiberg (Deutschland)
- Universite de Franche-comté (France)
- Universite de Technologie De Compiegne (France)
- Universite Grenoble Alpes (UGA) (France)
- Aalto University (Finland)
- Lappeenranta University of Technology (Finland)
- Sveučilište u Zagrebu (Croatia)
- University of Miskolc (Hungary)
- Università degli Studi di Cagliari (Italy)
- Politecnico di Torino (Italy)
- Polytechnio Kritis (Greece)
- Universidad Politecnica de Madrid (Spain)
- Universidad Politécnica de Cartagena (Spain)
- Universidad de Oviedo (Spain))
- Aksaray Universitesi (Turkey)
- Hacettepe Üniversitesi (Turkey)
- Balikesir Universitesi (Turkey)
- Istanbul University (Turkey)
- Istanbul Technical University (Turkey)
- Kocaeli Universitesi (Turkey)
- Tc.Dumlupinar Universitesi (Turkey)
- Bülent Ecevit University (Turkey)

Faculty of Geoengineering, Mining and Geology

Wroclaw University of Science and Technology

Students' activities

Student's research groups:

- The Miner
- Group of young geodesists
- GIS Research Group
- REVIMINING
- SAFETY TEAM
- GEOSCIENCE RESEARCH GROUP

Student's Self-Government

Faculty Alumni Association (SAWG)

Faculty of Geoengineering, Mining and Geology

Wrocław University of Science and Technology

Students' activities - projects (main)

- BatDron
- Urban Heat Island
- Campus of WUST
- Laser scanning of the Bastion in Żmigród
- Geophysics at Książ Castle, the Churches in Krzeszów, and Lądek-Zdrój
- Bucket-Wheel Excavator made from Lego Bricks
- Student Activity Fund (FAST) financed by the President of Wrocław
  - Attractiveness of post-mining areas in Lower Silesia
  - Groundwater level laboratory: piezometer near L2
- Scientific camp in Świebodzin and Muskau Arch

Students’ activities - conferences and training

- Organized by students
  - GISDay
  - OKSG (Polish Club of Geodesy Students)
  - ActiveGeoScience in Faculty
  - Surveyor's Day
- Students’ participation:
  - DAAD Scholarship program (Dresden, Freiberg, München, Berlin)
  - International Workshop LUT University, Lappeenranta, Finland
  - BrineRIS in Karlsruhe and Wrocław
  - Earth Science Days in Kraków and Warsaw
  - Visiting historic old Mine in Wałbrzych, Zacler, Nowa Ruda, Gliwice, Wieliczka
  - Geotop Day in Muskau Arch

Wrocław
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Faculty of Geoengineering,
Mining and Geology

Faculty of Geoengineering, Mining and Geology

15 Na Grobli st.

50-421 Wrocław

building L-1 (GEOCENTRUM)

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