

**Supervisors of the University of Lodz Doctoral School of Exact and Natural Sciences**  
**for the academic year 2024/2025**

No	Academic staff member	Contact	Field of science and research interests	Proposed dissertation subject
		✉ e-mail ☎ phone 🆔 ORCID		
<b>Biological sciences</b>				
1.	dr hab. Aneta Balcerczyk, prof. UŁ  Faculty of Biology and Environmental Protection, University of Lodz	✉ aneta.balcerczyk@biol.uni.lodz.pl ☎ 42 635 44 76 🆔 0000-0001-8544-5778	Epigenetic mechanisms in regulation of metabolism, biology of endothelium, tumor growth and development also in relation to diet.	Histone code/Histone posttranslational modifications cross-talk, epigenetic background of metabolic disorders.
2.	dr hab. Dominika Drzewiecka  Faculty of Biology and Environmental Protection, University of Lodz	✉ dominika.drzewiecka@biol.uni.lodz.pl ☎ 42 635 44 69 🆔 0000-0002-2753-7700	Biodiversity and features of halophilic microorganisms, including halophilic fungi, occurring in salty environments in Poland, their mechanisms of adaptation to extreme life condition, metabolic potential and antimicrobial activity.	Biodiversity of halophilic fungi occurring in the Bochnia Salt Mine and their physiological features, including antimicrobial and health-promoting properties
3.	dr hab. Joanna Grabowska, prof. UŁ  Faculty of Biology and Environmental Protection University of Lodz	✉ joanna.grabowska@biol.uni.lodz.pl ☎ +48 42 635 45 13 🆔 0000-0001-9924-0650	Fish communities in rivers, invasive species, "life-history" of fish, interactions between species, anthropogenic transformations of river ecosystems	Biology and phylogeography of stream lampreys in Poland

4.	<p>prof. dr hab. Michał Grabowski</p> <p>Faculty of Biology and Nature Protection University of Lodz</p>	<p>✉ michal.grabowski@biol.uni.lodz.pl</p> <p>☎ +42 635 44 40</p> <p>📞 0000-0002-4551-3454</p>	<p>Zoology, biogeography, evolutionary biology, molecular phylogeography, biodiversity evolution, speciation, DNA (meta)barcoding</p>	<p>1) Cryptic diversity and molecular basis of speciation of freshwater amphipod crustaceans (Crustacea Amphipoda) in European mountain areas.</p> <p>2) Chironomid flies (Diptera Chironomidae) in the alpine floor of the Polish mountains - endemics or glacial relicts?</p>
5.	<p>dr hab. Tomasz Jurczak, prof. Uł</p> <p>Faculty of Biology and Environmental Protection, University of Lodz</p>	<p>✉ tomasz.jurczak@biol.uni.lodz.pl</p> <p>☎ 42 635 44 38</p> <p>📞 0000-0002-1576-6741</p>	<p>Ecohydrology, blue-green infrastructure, adaptation of cities to climate change.</p>	<p>Assessment of the impact of climate change and catchment use on water quality in the upper section of the Bzura River and recreational reservoirs in Arturówek.</p>
6.	<p>dr hab. Marcin Kiedrzyński</p> <p>Faculty of Biology and Environmental Protection, University of Lodz</p>	<p>✉ marcin.kiedzynski@biol.uni.lodz.pl</p> <p>☎ 42 635 45 18</p> <p>📞 0000-0002-1751-9357</p>	<p>Plant biogeography, climate change refugia, population genetics, local adaptations, polyploidy, epigenetics, ecological niche modelling</p>	<p>Modelling of the future refugia for forest plants: an example of specialists for Scots pine woods</p>
7.	<p>dr hab. Joanna Kołodziejczyk-Czepas, prof. Uł</p> <p>Faculty of Biology and Environmental Protection, University of Lodz</p>	<p>✉ joanna.kolodziejczyk@biol.uni.lodz.pl</p> <p>☎ +48 42 635 44 83</p> <p>📞 0000-0001-8849-1067</p>	<p>Biochemistry of the circulatory system and hemostasis, disorders of the hemostatic system, the influence of substances of natural and synthetic origin on plasma and cellular components of the hemostatic system, biological activity of substances of plant origin, oxidative stress</p>	<p>The effects of polyethylene and poly(ethylene terephthalate) nanoparticles on the functions of selected components of the haemostatic system in vitro</p>

8.	dr hab. Tomasz Kowalczyk  Faculty of Biology and Environmental Protection, University of Lodz	✉ tomasz.kowalczyk@biol.uni.lodz.pl ☎ 42 625 44 28 📞 0000-0002-4559-5015	Plant tissue and cell cultures as a source of valuable biologically active compounds. Production of recombinant proteins in different expression systems.	Evaluation of the biological properties of plant extracts or recombinant proteins.
9.	dr hab. Tomasz Kowalczyk, prof. UŁ  Faculty of Biology and Environmental Protection, University of Lodz	✉ tomas.kowalczyk1@biol.uni.lodz.pl ☎ 42 66 55 681 📞 ORCID 0000-0003-1375-4250	Neuroscience – electrophysiology	Investigation of different types of oscillatory activity recorded in awake rats during different types of behavior
10.	dr hab. Tomasz Mamos, prof. UŁ  Faculty of Biology and Environmental Protection, University of Lodz	✉ tomasz.mamos@biol.uni.lodz.pl ☎ +48 42 635 4443 📞 0000-0002-0524-3015	Phylogenetics, phylogeography, molecular ecology and evolution of invertebrates	The influence of the environment on the evolution of cell size in crustaceans
11.	dr hab. Piotr Minias, prof. UŁ  Faculty of Biology and Environmental Protection, University of Lodz	✉ piotr.minias@biol.uni.lodz.pl ☎ 42 635 47 83 📞 0000-0002-7742-6750	Behavioural and molecular ecology, population genetics, immunogenetics, avian evolution.	Genetics and genomics of urbanization processes in birds.
12.	prof. dr hab. Beata Olas  Faculty of Biology and Environmental Protection, University of Lodz	✉ beata.olas@biol.uni.lodz.pl ☎ 42 635 44 84 📞 0000-0002-7048-2952	Oxidative stress and its biomarkers, antioxidants, hemostasis, dietary supplements.	Evaluation of the health-promoting properties of blue dyes present in the diet.

13.	<p>dr hab. Mateusz Płóciennik</p> <p>Faculty of Biology and Environmental Protection, University of Lodz</p>	<p>✉ mateusz.plociennik@biol.uni.lodz.pl</p> <p>☎ 696 933 703</p> <p>📞 0000-0003-1487-6698</p>	<p>I conduct research in the field of paleoclimatology, paleolimnology and environmental archeology using Chironomidae as bioindicators. I focus on the analysis of materials from Europe, mainly from the MIS2/1 and MIS6/5 periods. I also conduct ecological and faunistic research in entomology.</p>	<p>1) Climatic and hydrological reconstruction using subfossil Chironomidae. The research may concern sediment cores from MIS6/5 or MIS2/1 or surface sediment cores from the last century from Europe.</p> <p>2) Insect ecogeography in the Mediterranean region. The topic concerns the analysis of insect collections from S Europe or N Africa in order to link their biogeographic distribution to environmental conditions.</p>
14.	<p>dr hab. Michał Błażej Ponczek,</p> <p>Faculty of Biology and Environmental Protection, University of Lodz</p>	<p>✉ michal.ponczek@biol.uni.lodz.pl</p> <p>☎ +48 42 635 44 83</p> <p>📞 0000-0002-0839-8004</p>	<p>Biological sciences, biochemistry, bioinformatics and structural biology of blood coagulation proteins</p>	<p>Studies on the evolution and structure of vertebrate kininogens.</p> <p>Research on the evolution and the molecular structure of vertebrate kininogens includes biochemical, bioinformatic and structural methods including cryo-EM technique. Possible international cooperation (Department of Pathology, Microbiology and Immunology, Vanderbilt University Medical Center, Nashville, United States of America; Nottingham Biodiscovery Institute, School of Pharmacy, University of Nottingham, United Kingdom; Department of Biochemistry &amp; Molecular Biology, Saint Louis University, Saint Louis, United States of America; Doisy Research Center, Department of Biochemistry, Saint Louis University, United States of America).</p>

15.	dr hab. Iwona Wagner, prof UŁ  Faculty of Biology and Environmental Protection, University of Lodz	✉ iwona.wagner@biol.uni.lodz.pl ☎ +48 501 740 661, +48 42 365 44 38 +48 42 365 44 39 📞 0000-0002-7504-3027	Ecohydrology, urban ecohydrology, climate change adaptation, ecosystem services, nature-based solutions, blue-green infrastructure, management of stormwater, urban space revitalization.	Restoration of the components of the water cycle as the basis for the socio-ecological functionality of urban spaces and the development of indicators of their adaptive potential to climate change.
16.	dr hab. Radosław Włodarczyk  Faculty of Biology and Environmental Protection, University of Lodz	✉ radoslaw.wlodarczyk@biol.uni.lodz.pl ☎ 42 635 45 98 📞 0000-0001-5932-0226	Earth and environmental sciences (ornithology, breeding ecology, waterbirds, ecophysiology, population genetics).	How do immune genes and pollution interact to affect the microbiome and fitness components of common tern <i>Sterna hirundo</i> ?
<b>Chemical sciences</b>				
1.	dr hab. Lilianna Chęcińska, prof. UŁ  Faculty of Chemistry University of Lodz	✉ lilianna.checinska@chemia.uni.lodz.pl ☎ 42 635 57 32 📞 0000-0002-3546-920X	Crystallography: single-crystal X-ray analysis	Single-crystal structures of new forms of nitroimidazole antibiotics.
2.	dr hab. Dariusz Guziejewski  Faculty of Chemistry University of Lodz	✉ dguziejewski@uni.lodz.pl ☎ 42 635-54-80 📞 0000-0002-0990-321X	Chemical electroanalysis of selected biologically active substances; modeling of selected electrode processes using the SWV technique; study of the kinetics of electrode reactions; design novel electrocatalytic materials; development and characterization of new electrochemical measurement techniques	Synthesis and characterization of materials with electrocatalytic properties Characterization of new electrochemical measurement techniques

3.	prof. dr hab. inż. Piotr Kaszyński  Faculty of Chemistry, University of Lodz	✉ piotr.kaszynski@chemia.uni.lodz.pl ☎ 695 296 760 📞 0000-0002-2325-8560	Organic chemistry: synthesis, physical-organic, organic materials, stable radicals, liquid crystals	Heterocyclic chemistry, stable radicals, self-organizing paramagnetic systems
4.	dr hab. Zdzisław Kinart  Faculty of Chemistry University of Lodz	✉ zdzislaw.kinart@chemia.uni.lodz.pl ☎ 42-635-57-41 📞 0000-0003-0263-7120	Physicochemical measurements, conductometric, densitometric, and viscometric measurements of ionic liquids, organic acids, and inorganic compounds in various organic solvents.	Investigation of physicochemical properties of selected ionic liquids in diverse organic solvents over a wide temperature range.
5.	dr hab. Magdalena Małecka, prof. Uł  Faculty of Chemistry University of Lodz	✉ magdalena.malecka@chemia.uni.lodz.pl ☎ 602 372 707 📞 0000-0003-3384-9855	Crystallography, complexes of N-containing ligands, inclusion complexes.	Synthesis and crystal structure of complexes.
6.	dr hab. Damian Plażuk, prof. Uł  Faculty of Chemistry, University of Lodz	✉ damian.plazuk@chemia.uni.lodz.pl ☎ 42 665 53 29 📞 0000-0002-2898-6604	The research topics we carried out are related to organometallic and organic chemistry. My research team is working on developing new compounds with high application potential. In particular, we focus on synthesizing and studying sandwich complexes, such as ferrocene and ruthenocene derivatives, and semi-sandwich complexes, where our research mainly involves iridium, rhodium, ruthenium, and osmium compounds. The synthesized compounds are being studied regarding their application in anticancer therapy.	The proposed research topic includes synthesizing new organometallic compounds with potential applications as innovative anticancer substances. The research we carried out will emphasize the development of selectively acting and/or selectively delivered inhibitors of selected proteins, which may contribute to developing more effective cancer treatments.

## Physical sciences

1.	<p>prof. dr hab. Tadeusz Balcerzak</p> <p>Faculty of Physics and Applied Informatics University of Lodz</p>	<p>✉ tadeusz.balcerzak@uni.lodz.pl</p> <p>☎ +48 42 635 5687</p> <p>📞 0000-0001-7267-992X</p>	<p>Physics of nanomaterials, two-dimensional materials and their hybrids. Their electronic and morphological structure. Studies using close interaction microscopy (STM, STS, AFM) and global characterization techniques (XPS, AES, UPS, ARPES). Growth of materials in ultra-high vacuum conditions.</p>	<p>Investigations of oxidation of transition metal dechalcogenides.</p>
2.	<p>dr hab. Stanisław Bednarek, prof. UŁ</p> <p>Faculty of Physics and Applied Informatics University of Lodz</p>	<p>✉ stanislaw.bednarek@uni.lodz.pl</p> <p>☎ 48 42 635 56 83</p> <p>📞 0000-0001-5072-2595</p>	<p>High magnetic fields physics, applied physics</p>	<p>Non-destructive system to production of the high magnetic fields</p>
3.	<p>dr hab. Paweł Kowalczyk, prof. UŁ</p> <p>Faculty of Physics and Applied Informatics University of Lodz</p>	<p>✉ pawel.kowalczyk@uni.lodz.pl</p> <p>☎ +48 42 635 56 10</p> <p>📞 0000-0001-6310-4366</p>	<p>Physics of nanomaterials, two-dimensional materials and their hybrids. Their electronic and morphological structure. Studies using close interaction microscopy (STM, STS, AFM) and global characterization techniques (XPS, AES, UPS, ARPES). Growth of materials in ultra-high vacuum conditions.</p>	<p>Dedicated two-dimensional substrates for applications in modern electronics.</p>
4.	<p>dr hab. Witold Kozłowski</p> <p>Faculty of Physics and Applied Informatics University of Lodz</p>	<p>✉ witold.kozlowski@uni.lodz.pl,</p> <p>☎ +48 42 635 5687</p> <p>📞 0000-0003-0341-1481</p>	<p>Physics of nanomaterials, two-dimensional materials and their hybrids. Their electronic and morphological structure. Studies using close interaction microscopy (STM, STS, AFM) and global characterization techniques (XPS, AES, UPS, ARPES). Growth of materials in ultra-high vacuum conditions.</p>	<p>Influence of substrate and layers' twist on electronic properties of hybrid based on two dimensional materials.</p>

5.	prof. dr hab. Andrzej Maciołek-Niedźwiecki  Faculty of Physics and Applied Informatics University of Lodz	✉ andrzej.niedzwiecki@uni.lodz.pl ☎ 42 6355658 📞 0000-0002-8541-8849	Astrophysics of compact objects – computational models for analysis of observational data from accreting black holes	1. Investigation of radiative processes occurring in the vicinity of event horizon  2. Application of neural networks for modeling of accretion processes
5.	dr hab. Jarosław Perkowski, prof. UŁ  Faculty of Physics and Applied Informatics University of Lodz	✉ jaroslaw.perkowski@uni.lodz.pl ☎ 42 635 56 41 📞 0000-0002-9142-329X	Experimental nuclear physics	Study of neutron-induced reactions important in astrophysics or nuclear energy. The research will be carried out with using a neutron spallation source at CERN in the framework of the n_TOF international collaboration.
6.	dr hab. Julian Sitarek, prof. UŁ  Faculty of Physics and Applied Informatics University of Lodz	✉ jsitarek@uni.lodz.pl ☎ 42 635 56 47 📞 0000-0002-1659-5374	Cherenkov telescopes (in particular data analysis methods), active galaxies, high-energy processes in cosmic sources	Development of analysis methods for Cherenkov telescopes. Observations of active galaxies with LST telescopes.
7.	dr hab. Krzysztof Warda, prof. UŁ  Faculty of Physics and Applied Informatics University of Lodz	✉ krzysztof.warda@uni.lodz.pl ☎ +48 42 635 5687 📞 0000-0003-2271-6360	Physics of nanomaterials, two-dimensional materials and their hybrids. Their electronic and morphological structure.	Investigation of the electronic properties of 2D materials heterostructures at the nanometer scale.
			Physics of nanomaterials, two-dimensional materials and their hybrids. Their electronic and morphological structure. Calculations using machine learning algorithms and density functionals theory.	Application of machine learning algorithms and theoretical modeling to optimize fabrication and characterization of hybrid 2D material systems.



Mathematics				
1.	dr hab. Marek Majewski, prof. UŁ  Faculty of Mathematics and Computer Science University of Lodz	✉ marek.majewski@wmii.uni.lodz.pl ☎ 605 672 229 📞 0000-0003-4542- 2592	Optimization, Control Theory, Ordinary differential equations and partial differential equations - variational methods	Optimization, Control Theory, Ordinary differential equations and partial differential equations - variational methods
2.	dr hab. Aleksandra Orpel, prof. UŁ  Faculty of Mathematics and Computer Science University of Lodz	✉ aleksandra.orpel@wmii.uni.lodz.pl ☎ 608 724 986 📞 0000-0001-8360-7083	Ordinary differential equations and partial differential equations - existence of solutions and qualitative theory	Ordinary differential equations and partial differential equations - existence of solutions and qualitative theory
			Artificial intelligence – machine learning, application to video games	Optimal control in machine learning  Differential game theory in video games
Informatics				
1.	dr hab. Tomasz Gwizdała, prof. UŁ  Faculty of Physics and Applied Informatics, University of Lodz	✉ tomasz.gwizdalla@uni.lodz.pl ☎ 42 635 57 09 📞 0000-0001-8360-7083	Informatics	<ul style="list-style-type: none"> <li>- data analysis (especially those burdened with high measurement uncertainty) -classification and clustering</li> <li>- global optimization methods</li> <li>- generative neural networks</li> <li>- neural networks applied to data obtained by different devices (like Lidar)</li> </ul>
2.	prof. dr hab. Andrzej Nowakowski  Faculty of Mathematics and Computer Sciences, University of Lodz	✉ andrzej.nowakowski@wmii.uni.lodz.pl ☎ 690 258 719 📞 0000-0003-1670-9770	Computer Sciences – Artificial intelligence	Machine Learning and its application

## Earth and environmental sciences

1.	<p>dr hab. Włodzimierz Pawlak, prof. UŁ</p> <p>Faculty of Geographical Sciences, University of Lodz</p>	<p>✉ wlodzimierz.pawlak@geo.uni.lodz.pl</p> <p>☎ 42 665 59 52</p> <p>🆔 ORCID: 0000-0002-9785-4787</p>	<p>Physical geography</p> <p>- Turbulent exchange of energy (sensible and latent heat fluxes) and mass (greenhouse gases) between the ground and atmosphere</p> <p>- urban climate</p> <p>- radiation balance of the active surface (urban, wetland, etc.)</p>	<p>Vertical turbulent exchange of greenhouse gases (H<sub>2</sub>O, CO<sub>2</sub>, CH<sub>4</sub>) between different surface types (city, wetland, farmland) and the factors determining it.</p> <p>Temporal variability of the surface radiation balance and its components</p>
2.	<p>dr hab. Joanna Petera-Zganiacz, prof. UŁ</p> <p>Faculty of Geographical Sciences, University of Lodz</p>	<p>✉ joanna.petera@geo.uni.lodz.pl</p> <p>☎ 42 665 59 72</p> <p>🆔 0000-0002-1045-5506</p>	<p>Physical geography, Geomorphology, Quaternary palaeogeography.</p>	<ul style="list-style-type: none"> <li>• Palaeogeography of the Vistulian</li> <li>• Periglacial processes</li> </ul>
3.	<p>dr hab. Edmund Tomaszewski</p> <p>Faculty of Geographical Sciences, University of Lodz</p>	<p>✉ edmund.tomaszewski@geo.uni.lodz.pl</p> <p>☎ 42 665 59 43</p> <p>🆔 0000-0003-4375-3638</p>	<p>Physical geography, hydrology, hydrometeorology, water management.</p>	<p>Hydrological extremes: river low-flows and hydrological droughts – spatial and temporal variability, natural determinants, importance for water management. Natural and anthropogenic determinants of flow variability in seasonal and multiannual scale.</p>