Name and surname:	**Andrzej Białowiec**
Academic Degree:	prof. dr hab. inż. (Prof.)
Institute/Department:	Department of Applied Bioeconomy
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ORCID:	0000-0002-5871-2129
UPWr Base of Knowledge - link:	https://bazawiedzy.upwr.edu.pl/info/author/UPWr903a39c81e8e493eb3646a16ed2782f5/Person%2Bprofile%2B%25E2%2580%2593%2BAndrzej%2BBia%25C5%2582owiec%2B%25E2%2580%2593%2BWroc%25C5%2582aw%2BUniversity%2Bof%2BEnvironmental%2Band%2BLife%2BSciences?r=author&tab=&lang=en
Researchgate:	https://www.researchgate.net/profile/Andrzej-Bialowiec
Personal website / Working group website:	
Participation in projects in last 5 years (chronological; with distinction into PI (kierownik) and RF (wykonawca)):	1. The research on the microbial mechanism of enhancing the biomethane production from biowaste by typical carbon materials. NCN. Opus 22. 2022-2025. PI 2. Studies on the release of volatile organic compounds from carbonised solid fuel produced from municipal waste. NCN. Preludium Bis2. 2021-2025. PI 3. Study of the influence of pyrolysis technological parameters and substrate properties on the release of volatile organic compounds from biocarbon. NCN. Preludium Bis. 2020-2024. PI.
Do you plan to engage support of second supervisor or auxiliary supervisor?	YES
	Auxiliary supervisor
Name and surname:	Chinenye Adaobi Igwegbe
Academic Degree:	dr inż. (Dr. Eng.)
Faculty, Institute/Department:	Department of Chemical Engineering, Nnamdi Azikiwe University, P.M.B. 5025, Awka, Nigeria
e-mail address:	ca.igwegbe@unizik.edu.ng
ORCID:	0000-0002-5766-7047
UPWr Base of Knowledge - link or most important publications from last 3 year (JCR) / patents from last 3 years (maximum 5):	https://doi.org/10.1007/s40899-022-00780-4 ; https://doi.org/10.1515/cppm-2021-0056 ; https://doi.org/10.1016/j.molliq.2021.118257 ; https://doi.org/10.1016/j.clce.2022.100042 ; https://doi.org/10.1016/j.cherd.2022.06.028
Researchgate:	https://www.researchgate.net/profile/Chinenye_Igwegbe5
Personal website / Working group website:	
Projects in last 5 years (chronological; with distinction into PI (kierownik) and RF (wykonawca)):	The food waste upcycling to phospholipids due to hydrothermal treatment combined with the application of Yarrowia lipolytica yast. NAWA Ulam. 2023-2025.
PhD topic:	Research on the functionalization of biochar and hydrochar derived from biowaste for the adsorption of antibiotics from wastewater
Research discipline in Doctoral School:	Environmental Engineering, Mining and Energy
Short description of the research problem to be solved in the PhD (minimum 1000 characters):	The development of adsorbents from wastes for use in wastewater is ongoing in order to tackle problems of environmental contamination – land pollution (conversion of biomass to a valuable adsorbent material) and water pollution (elimination of pollutants from water before discharge) while also lowering the cost of using more expensive materials. The European Center for Disease Prevention and Control (ECDC) stated that Poland is one of six European nations with the highest levels of antibiotic usage per capita and their presence in wastewater, soil, and surface waters has been documented which is the leading cause of antibiotic resistance. Antibiotics enter the environment through improperly discarded unused medications, agricultural, hospital waste, and industrial effluent. Studies have shown that the processing technologies used by wastewater treatment plants (WWTPs) are not so effective in removing antibiotics from wastewater. Adsorption is favored and cheap, and the adsorbents used can be easily regenerated. The use of adsorption is economical due to its usage of various low-cost adsorbents, especially biomass. Carbon-based adsorbents derived from biowastes are promising materials for effective water purification and will continue to be used in the future due to their low cost, availability, and renewability, and are well-known for their high surface area and porosity. As a result, this topic aims to convert widely available and non-lethal biowastes via pyrolysis and hydrothermal carbonization into valuable materials (biochar and hydrochar) that may be used as adsorbents for antibiotic removal from wastewater with the ultimate goal of environmental protection. The porosity of the adsorbents will be enhanced by chemical activation after carbonization. The surface and pore properties, morphology, and physicochemical nature of the carbon-based adsorbents, including the spent adsorbents, will be studied via standard methods. The adsorbents will be examined for their efficiency in wastewater treatment with their performance optimized by considering process factors such as contact time, adsorbent dose, initial antibiotic concentration, pH, and temperature. The data from the adsorption processes will be modeled, predicted, and optimized using ASPEN adsorption, response surface methodology (RSM), artificial neural network (ANN), adaptive neuro-fuzzy inference system (ANFIS), and genetic algorithm (GA) optimizers. The process's kinetics, isotherms, and thermodynamics will be investigated. Fixed bed adsorption and adsorbent regeneration studies will also be incorporated to evaluate the feasibility of applying these adsorbents for engineering, and economic/feasibility purposes.
Professional skills for PhD candidate (e.g. master program, specializations, softwares, language, analytical techniques, minimum 500 characters):	The candidate should be familiar with environmental engineering, and chemical engineering, especially the methods of adsorption research. The candidate will be responsible for the carbon materials generation, adsorption tests executing, carbon materials properties determination, data validation, and statistical analysis, data collection. Mathematical modeling. The candidate should have an interest in BET analysis of carbon materials, and adsorption for wastewater purification. Interests in the characterization of physical and chemical properties of biochar, statistical analyses, data collection, data analysis, and mathematical modeling including ANN.
a) Project title:	
b) Agreement number:	
c) Number of months in the project to support PhD (in months; starting from 1st of October 2022):	
Project website:	