| **Name and surname** | **Andrzej Białowiec** |
|---|---|
| Academic Degree | prof. dr hab. inż. (Prof.) |
| Institute/Department | Department of Applied Bioeconomy |
| e-mail address | andrzej.bialowiec@upwr.edu.pl |
| ORCID | 0000-0002-5871-2129 |
| UPWr Base of Knowledge - link | https://bazawiedzy.upwr.edu.pl/info.seam?id=UPWr903a39c81e8e493eb3646a16ed2782f5&affil=&lang=en |
| Researchgate | https://www.researchgate.net/profile/Andrzej-Bialowiec |
| Personal website / Working group website | https://bazawiedzy.upwr.edu.pl/info/team/UPWr3f2491470e0340d6971ba3a144db1ad6/Waste+and+Biomass+Valorization+Group?affil=&ps=20&tab=&lang=en&pn=1&cid=2074216 |
| Participation in projects in last 5 years (chronological; with distinction into PI (kierownik) and RF (wykonawca)) | 2021 – present – Research grant entitled “Research on the release of volatile organic compounds from carbonized solid fuel produced from municipal solid waste” NCN funding, Preludium BIS 2 program, decision number DEC-2020/39/O/ST8/02750, $136K - PI<br>2020 - present – Research grant entitled "Investigation of the influence of technological parameters of pyrolysis and substrate properties on the release of volatile organic compounds from biochar". NCN funding, Preludium BIS program, decision number DEC-2019/35/O/ST8/03353, $136K - PI<br>2020-present - Academic Exchange Grant "The effect and microbial mechanisms of hydrochar on the enhancement of methane production from organic waste", the bilateral, scientific exchange between Poland and China, Polish National Agency for Academic Exchange, PPN/BCN/2019/1/00050, $8K - PI<br>2019 The development of an innovative, effective method of biomass biological treatment under an anaerobic condition - the project implemented under the Bon for Innovations program. Project number: POIR.02.03.02-10-0024/18. $100K - PI<br>2015-2019 An innovative technological line for the conversion of organic waste into innovative, high-quality solid fuels - the project from program 1/1.1.1/2015 action 1.1.1. PO IR POIR (NCBiR). $4865K - PI<br>2017 Selection of the composition of substrates based on the best-terra compost and composting technology at the factory composting plant at the Boguszowice sewage treatment plant - the project implemented under the Bon for Innovations program. Project number: POIR.02.03.02-24-0019/17. $108K - PI |
| Do you plan to engage support of second supervisor or auxiliary supervisor? | NO |
| **PhD topic** | **Hydrogen generation from biowaste with application of waste sulfur** |
| 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 increase in research and development projects related to the production of hydrogen from waste created a new approach to waste management - WasteToHydrogen. Biowaste consisting of highly biodegradable organic matter and water may be a valuable source of hydrogen, however, the direct production of hydrogen due to dark fermentation remains still ineffective. Therefore new approach has been proposed. A two-stage process consisting of anaerobic digestion of biowaste with the application of waste sulfur to increase the hydrogen sulfide (H2S) content in the biogas combined with the extraction of H2S and further splitting by thermal decomposition or photocatalysis will be developed. The project aims to optimize the anaerobic digestion to increase the H2S yield and to find the most effective technology of H2S extraction and splitting into H2 and elemental sulfur. The possibilities of sulfur application into an anaerobic digester have been already examined. It increased the biogas yield and H2S content. A promising aspect of the application of waste sulfur into anaerobic digester is that the energy demand for H2S splitting is 10 fold lower than in the case of water in the electrolysis systems. The project represents the synergistic effect of the recycling of the type of waste biowaste from households and sulfur from the petrochemical industry. |
| Professional skills for PhD candidate (e.g. master program, specializations, softwares, language, analytical techniques, minimum 500 characters) | The candidate should have experience in environmental engineering, environmental biotechnology, or process engineering. The candidate should have knowledge of biowaste conversion via biological and thermochemical processes. The candidate should willingly participate in the international internship, write the research proposals, and should be active in increasing scientific skills during the specialized workshops. High English language skills, especially in the journal manuscripts and scientific proposals writing, and communication are required. |
| **Details of the project to support PhD research** | |
| a) Project title | none |
| b) Agreement number | none |
| c) Number of months in the project to support PhD (in months; starting from 1st of October 2022) | 0 |
| d) Project website | |