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Academic Degree	dr hab. inż. (DSc.)
Institute/Department	Department of Civil Engineering
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ORCID	0000-0002-6017-6919
UPWr Base of Knowledge - link	https://bazawiedzy.upwr.edu.pl/info_seam?id=UPWr8ff22f3e65cb495299f046bfe7bc394&affil=&lang=pl
Researchgate	https://www.researchgate.net/profile/Jolanta-Dabrowska
Personal website / Working group website	https://publons.com/researcher/1327043/jolanta-dabrowska/
Participation in projects in last 5 years (chronological; with distinction into PI (kierownik) and RF (wykonawca))	<p>1. Title: Hydrobox2.0 – innovative technology supporting water saving and plant growth Financing: Smart Growth Operational Programme 2014-2020. Measure 4.1 Research and development, Sub-measure 4.1.4, Application projects. Value of the project: PLN 2 657 500.73, including the maximum amount of funding assigned to the Wrocław University of Environmental and Life Sciences: PLN 2 374 487.76; Function: Member of the research team - RF Involvement time: 2017-2019</p> <p>2. Title: GOOD START. Creating the foundations for future professional, social and personal competences and developing educational activity of primary school students from grades V-VIII. Financing: The project is co-financed by the European Union within the framework of the Operational Programme Knowledge Education Development. The project budget amounts to PLN 637,705.00, including co-financing from the European Union PLN 537,457.77. Function: Member of the team - RF Involvement time: since 2019</p> <p>3. Title: Water retention and nutrient recycling in soils and streams for improved agricultural production (WATERAGRI) Financing: This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 858375 (6 999 986 EUR). Function: Member of the research team - RF Involvement time: since 2020</p>
Do you plan to engage support of second supervisor or auxiliary supervisor?	YES
	Second supervisor (from other discipline, polish or international research unit)
Name and surname	Krzysztof Schabowicz
Academic Degree	Prof.
Faculty, Institute/Department	Department of General Building Engineering/Faculty of Civil Engineering of the Wrocław University of Science and Technology
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UPWr Base of Knowledge - link or most important publications from last 3 year (JCR) / patents from last 3 years (maximum 5)	https://dona.pwr.edu.pl/szukaj/default.aspx?nrewid=352450
Researchgate	https://www.researchgate.net/profile/Krzysztof-Schabowicz
Personal website / Working group website:	https://wbliv.pwr.edu.pl/pracownicy/krzysztof-schabowicz_schabowicz
Participation projects in last 5 years (chronological; with distinction into PI (kierownik) and RF (wykonawca))	<p>1. NCBiR – Smart Growth Operational Programme POIR.01.01.01-00-0474/17 „Przeprowadzenie badań przemysłowych i prac rozwojowych w firmie SZPEC Piotr Szwałkowski, umożliwiających opracowanie unikalnej receptury związanej z jakością lekkich kruszyw sztucznych, otrzymanych z wykorzystaniem drobnoziarnistego odpadu granitowego i utylizacji komunalnego osadu ściekowego.” Involvement time: 2012-2018, Project Coordinator (PI).</p> <p>2. COST ACTION TU1404 Towards the next generation of standards for service life of cement-based materials and structures. COST is supported by the EU Framework Programme Horizon 2020. Involvement time: 2014-2018. RF.</p> <p>3. International research project carried out in cooperation with the Institute of Fundamental Technological Research Polish Academy of Sciences and Slovak Academy of Sciences "Investigation of concrete matrix composites, shape memory foams and selected aggregates with application of X-ray microtomography (2016-2018)". RF.</p> <p>4. Interdisciplinary research project 01/02/2017 „Nieniszcząca diagnostyka obiektów budowlanych i technicznych w aspekcie zapewnienia bezpieczeństwa i niezawodności ich eksploatacji” – kierownik projektu ze strony PWr. Project carried out at University of Bielsko-Biala in cooperation with the Silesian University of Technology, Wrocław University of Science and Technology, Doosan Babcock Energy Polska S.A. and BOSMAL Automotive Research and Development Institute. Involvement time: since 2017. Project coordinator at Wrocław University of Science and Technology.</p> <p>5. NCBiR – Smart Growth Operational Programme POIR.01.01.01-00-0274/21 „Opracowanie innowacyjnej technologii budowy domów z zespolonych warstwowych ścian drewnianych.” Involvement time: since 2021, Project Coordinator (PI).</p>
PhD topic	Analysing the interplay between urban land surface temperature and the grey infrastructure
Research discipline in Doctoral School	Civil Engineering and Transport

<p>Short description of the research problem to be solved in the PhD (minimum 1000 characters)</p>	<p>The global climate has been significantly affected by the urbanization process in recent years; on the other hand, climate change and current demographic trends, as well as urban development, will lead to increased heat-related issues in built-up areas. Heat extremes are one of the greatest challenges of climate change, adversely affecting economies, ecosystems, energy, environments, and human well-being, causing damage to infrastructure, increasing energy consumption, human illness and death, among other things. For years, cities have been observing the rise in local urban temperature due to the development of built-up and impervious areas. Urban overheating effect and associated Urban Heat Island are major challenges for large cities in adapting to climate change, it is estimated that these phenomena can double the economic losses expected from climate change. Unfortunately, current climate models show further warming trends.</p> <p>It is common to use blue and green infrastructure to mitigate the heat load in urban areas. Its cooling potential cannot be widely exploited though in densely built-up city centres and arid regions. Therefore, a growing number of studies prioritize grey infrastructure (GI) for UHI mitigation. However, to fully understand mutual relations of GI and urban overheating, further interdisciplinary studies are needed, as well as filling a number of knowledge gaps suggested by scientists (Qi et al. 2019, Su et al. 2021, Kim et al. 2021, Wang et al. 2022).</p> <p>The main research problem will be to investigate what impact the existing grey infrastructure (buildings, roads, and surfaces) has on urban overheating and how it can be used for heat mitigation.</p> <p>The PhD candidate's task will be to:</p> <ol style="list-style-type: none"> 1. Analyse multi-year data on mean and maximum air temperatures for a selected European city. For each year, calculate the number of extremely hot days and investigate the occurrence of heat waves. Identify ranges of change and multi-annual trends. 2. Produce Land Surface Temperature (LST) patterns from satellite data for the multi-year period under study. Investigate the extent and intensity of urban overheating. Relate the results to changes in urban land use. Determine areas with a tendency to significant overheating and possibly new "hot spots" associated with the emergence and expansion of residential areas. 3. Analyse the impact of temperature changes in urban development on the energy balance of different buildings using calculation and/or simulation methods. Assess the impact of climate change and the age structure of buildings on their energy performance and environmental impact. 4. Propose methods of urban heat mitigation using the potential of grey infrastructure.
<p>Professional skills for PhD candidate (e.g. master program, specializations, softwares, language, analytical techniques, minimum 500 characters)</p>	<ol style="list-style-type: none"> 1. MSc in civil engineering. 2. Research experience in the field of civil engineering and climate change. Demonstrate scientific achievements i.e. publications in JCR journals, participation in courses, projects and scholarships. Understanding the issues and challenges related to the adaptation of cities to climate change and to strengthening their resilience. In particular, being aware of the interlinkages between built-up areas and climate change. 3. Willing to undertake long-term internships abroad. 4. English language skills of at least B2 level.
<p>Details of the project to support PhD research</p>	
<p>a) Project title</p>	<p>none</p>
<p>b) Agreement number</p>	<p>none</p>
<p>c) Number of months in the project to support PhD (in months; starting from 1st of October 2022)</p>	<p>0</p>
<p>d) Project website</p>	<p></p>