



POLISH NATIONAL AGENCY  
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PROGRAMME

<p>name of the unit:</p> <p><b>DIVISION OF SPACIAL ECONOMY AND GEOMATICS</b></p> <p>Institute of Environmental Engineering and Building Services, Lodz University of Technology</p>		<p>symbol:</p> <p><b>I-62</b></p> <p><a href="http://http://bais.p.lodz.pl/index.php/kontakt-i62">http://http://bais.p.lodz.pl/index.php/kontakt-i62</a></p>
<p>head of the unit:</p> <p><b>Katarzyna Klemm, PhD, DSc, TUL Prof.</b></p>	<p>potential promoters:</p> <p><b>Katarzyna Klemm, PhD, DSc., TUL Prof.</b></p>	<p>contact person:</p> <p>Katarzyna Klemm PhD, DSc, TUL Prof. phone: 48-42-631-35-21 <a href="mailto:katarzyna.klemm@p.lodz.pl">katarzyna.klemm@p.lodz.pl</a></p>
<p>scope of activities:</p> <p>The main areas of interest and research directions in the field of Urban Physics are:</p> <ul style="list-style-type: none"> <li>aerodynamics of built-up areas,</li> <li>energy balance in built-up areas,</li> <li>human thermal comfort in the external environment,</li> <li>experimental studies and numerical simulations of microclimate conditions in various urban structures,</li> <li>simulation studies of the impact of greenery on the heat balance in various urban structures.</li> </ul>		
<p>present activities:</p> <p>The investigations carried out in the Division are focused on the assessment of influence of selected building structures on aerodynamic and thermal conditions, establishment of relationship between the type of building development, its physical properties and microclimate conditions and human thermal comfort. Analyses are conducted on a natural scale and with the use of numerical simulations. The practical goal is to develop GIS-based cartographic methods in the form of urban climate maps for selected areas of Łódź.</p> <p>The second research trend focuses on urban ventilation problems and determination of ventilation corridors, based on detailed analyses of roughness of elements with the use of GIS.</p> <p>The current research focuses on assessing the effectiveness of adaptation strategies to climate change, such as green roofs, green walls, water surfaces and trees within the metropolitan area of Łódź, the area characterized by the highest intensity of the urban heat island.</p>		
<p>Future activities:</p> <ul style="list-style-type: none"> <li>The use of multi-criteria optimization to determine optimal strategies for adaptation to climate change for specific building structures,</li> <li>Designation of local climatic zones in the city based on the physical characteristics of buildings, material characteristics, substrate properties, etc.</li> </ul>		
<p>Publications/patents, awards, projects:</p> <ul style="list-style-type: none"> <li>Bochenek A., Klemm K. Effectiveness of Tree Pattern in Street Canyons on Thermal Conditions and Human Comfort. Assessment of an Urban Renewal Project in Historical District in Lodz (Poland). Atmosphere 2021, 12(751), [1-19].ISSN 2073-4433</li> <li>Bochenek A., Klemm K. The Impact of Passive Green Technologies on the Microclimate of Historic Urban Structures: The Case Study of Lodz. Atmosphere 2020, 11(974), [1-18]. ISSN 2073-4433.</li> </ul>		



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- Bochenek A., Klemm K. Influence of canyon aspect ratio on microclimatic conditions: case of Lodz, Poland. MATEC Web of Conferences 2019, 282, 02045. eISSN 2261-236X
- Bochenek A., Klemm K. Evaluation of thermal comfort of the city's public spaces covered by the revitalization program using the cfd simulator. Journal of Civil Engineering, Environment and Architecture. Rzeszów 2018. eISSN 2300-8903.
- Bochenek A., Klemm K. Assessment of the impact of spatial development changes on thermal comfort experienced by man in the external environment. IOP Conference Series Materials Science and Engineering 2018, 415 (1). eISSN 1757-899X.

**Keywords:**

thermal comfort, aerodynamics, CFD, GIS, urban climate, in-situ measurement, urban heat island, adaptation to climate change

**List of internship proposal in this research team:**

Numerical simulation and in-situ measurement of the influence of physical parameters of buildings and greenery on thermal conditions.