

## ABOUT THE PROJECT

HES-GEO project aims to enhance existing research capacity and stimulate scientific excellence in the [Institute of Geography and Spatial Management \(IGSM\)](#), Jagiellonian University, in studying **human-environmental systems (HES)** of the Anthropocene, along variety of urban-rural-marginal gradients, at various spatial and temporal scales and using **tools and data available through Earth observation (EO) and geospatial technologies.**



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## PARTNERS



[Institute of Geography and Spatial Management \(IGSM\)](#), which is a part of Faculty of Geography and Geology, Jagiellonian University, administrates the work of 10 research units which represent a broad spectrum of both **social sciences** and **Earth- and environmental sciences.**

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[The Department of Geoinformatics – Z\\_GIS](#) is a so-called 'interfaculty' (meaning interdisciplinary) department (90 scientific and technical staff) at the Paris Lodron University Salzburg (PLUS). Z\_GIS is dedicated to **fundamental and applied research, outreach activities and networking, and professional education and training.**

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[The Geography Department](#) belongs to the Humboldt University of Berlin Faculty of Mathematics and Natural Science. It is an integral part of the "Science and Technology Park Berlin-Adlershof". Hosting nine labs, the department covers the whole thematic range of geography, from **applied geography and urban planning, to cultural, social and economic geography, from geomatics to spatial modelling, and from the geography of soils to biogeography and landscape ecology.**

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The main mission of [the Department Earth and Environmental Sciences of KU Leuven](#) is to carry out state-of-the-art scientific research with respect to the **functioning of geo- and ecosystems at different spatial and temporal scales, including the interaction between humans and the environment and the sustainable management of natural resources.**

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## PROJECT PROGRESS - BRAINSTORMING EVENT



At the end of June 2021, 30 representatives of the HES-GEO project consortium from [Jagiellonian University \(Poland\)](#), [Paris Lodron Universität Salzburg \(Austria\)](#), [Humboldt-Universität zu Berlin \(Germany\)](#) and [Katholieke Universiteit Leuven \(Belgium\)](#) met together again. During several hours spent online and with the help of the digital whiteboard they worked to establish 6 Research Teams (RT) and to advance the development of their research proposals.

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## RESEARCH TEAMS - THEMES & LEADERS



**CULTURAL ECOSYSTEM SERVICES**  
team leader: [Agnieszka Nowak-Olejnik, PhD](#)

Nature provides a wide range of benefits for people, among which cultural ecosystem services (CES) are worth highlighting. CES are understood as the **nonmaterial benefits people obtain from ecosystems through spiritual enrichment, educational values, reflection, recreation, and aesthetic experiences** (MA, 2005). In contrast to other services, their significance increases with countries development (Guo et al., 2010). Nowadays, they are one of the main reasons for ecosystem conservation (Chan et al., 2011).

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**CARBON SEQUESTRATION IN SOILS OF MOUNTAIN ECOSYSTEMS**  
team leader: [Łukasz Musielok, PhD](#)

Soil carbon sequestration is considered to be the most crucial natural process enabling mitigation of climate change (Lal, 2004). This process is primarily mediated by plants through photosynthesis, with atmospheric CO<sub>2</sub> stored in the form of soil organic carbon (SOC). **Soil can quickly and in relatively permanent way fix (sequester) a very large amount of carbon.** However, the efficiency of the soil carbon sequestration depends significantly on the soil properties.

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**SOCIAL PROCESSES AND URBAN RESILIENCE**  
team leader: [Katarzyna Gorczyca, PhD](#)

Postsocialist countries suddenly turned from state regulation towards an extremely liberal economy, which resulted in changes in both power relations as well as city planning priorities (Kronenberg, et al., 2016). **In the XXI century many urban green and blue areas in postsocialist cities were lost due to aggressive build-up** often leading to social conflicts and public outrage (Dushkova et al., 2016; Hirt, 2012; Onose, Iojă, Niță, Badiu, & Hossu, 2020; Zupan & Budenbender, 2019).

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**FOOD WASTE**  
team leader: [Magdalena Kubal-Czerwińska, PhD](#)

**One of challenges of the Anthropocene for many regions is to create and maintain sustainable and resilient food systems** based on local resources and responsible involvement of food producers and consumers in the changing political, economic and cultural contexts that would ensure access to food for future generations. The food system is a complex web of activities that involve the production, processing, transportation and consumption of food (Eriksen 2008, Eriksen et al. 2009; Godfrey et al. 2020; Ingram 2011).

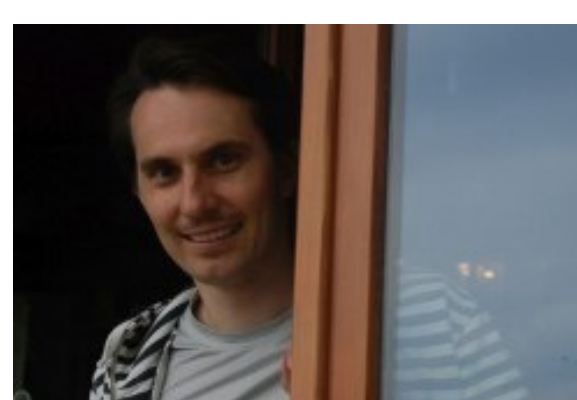
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**SOIL EROSION**  
team leader: [Anita Bernatek-Jakiel, PhD](#)

**Soil erosion has been identified as the gravest threat among all soil degradation processes** (Montanarella et al., 2016). It may cause direct and indirect environmental damage affecting land, freshwater, oceans, and thus people's life. Soil erosion impacts on nutrient and carbon cycle, leads to the property damage, loss of livelihoods and services as well as social and economic disruption (Borrelli et al., 2020; Poesen, 2018).

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**LAND USE AND BIODIVERSITY**  
team leader: [Dominik Kaim, PhD](#)

Central Europe is currently facing diverse and dynamic changes in land use. On the one hand, we observe settlement development, while on the other hand processes of agricultural land abandonment, leading to forest cover increase are widespread in the region. In many places, it results in the **development of the contact zones between wildland areas and settlement, called wildland-urban interface (WUI).**

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