Webinar

"Sozological Aspects of Post-Mining Area Development: Challenges and New Strategies"

November 13, 2025, 1-2:30 PM

Lists of Abstracts and Speaker Biographies

Thermal Activity of Coal-Waste Dumps: An Environmental and Reclamation Challenge in the Upper Silesian Coal Basin

Anna Abramowicz, Oimahmad Rahmonov, Justyna Ciesielczuk
University of Silesia in Katowice

Abstract: Coal-waste dumps in the Upper Silesian Coal Basin remain a significant component of the post-industrial landscape and a source of complex environmental problems. One of the most serious among them is the phenomenon of self-heating within the waste material, leading to the formation of subsurface fires. These processes affect not only the safety and stability of the dumps but also influence soil and water chemistry, as well as the rate and pattern of plant succession. Field observations and thermal analyses indicate that even relatively small dumps exhibit recurrent patterns of thermal activity - from zones of complete vegetation degradation, through loosely distributed ecological systems, to areas of diverse biological regeneration. The relationship between substrate temperature and vegetation condition may serve as a valuable indicator of thermal activity and the degree of dump stabilisation. Understanding these processes is crucial for developing effective monitoring and reclamation strategies for post-mining areas, particularly where comprehensive historical documentation is lacking. This issue gains particular importance in the context of minimising long-term environmental impacts and protecting ecosystems within the highly urbanised areas of the region.

Short Bio: Anna Abramowicz - Assistant Professor at the University of Silesia in Katowice. She specialises in environmental geology and the transformation of post-mining areas. She gained her research experience during her studies and scientific work at the Faculty of Natural Sciences of the University of Silesia, as well as through research stays at universities in the Czech Republic and Slovakia. Her research interests focus on environmental monitoring, reclamation processes, and the sustainable management of post-industrial landscapes.

The webinar was organized as part of the ongoing project of the National Agency for Academic Exchange NAWA and the Slovak Research and Development Agency under the Contract no. SK-BG-23-0015 and SK-PL-23-0060.

Natural History Museum in London – input in green mining research and remediation of post-mining areas

Piotr Cuber, Ana Santos
Natural History Museum | Contributor to CIGMiS

Abstract: The Natural History Museum (NHM) in London is a unique place combining natural sciences in fields of biology, geology, paleontology, and space exploration under one roof of a cathedral building. Few people realize, however, that this museum is more than just galleries, education, and entertainment. Behind the scenes, genuine scientific research is conducted across all these fields, as well as interdisciplinary studies.

Biological projects focus on taxonomic, phylogenetic, evolutionary, biodiversity, and nature conservation studies. Geological projects investigate volcanoes, rare earth elements, resource management, and mineral composition analysis. Research projects focus on the rich collection of specimens, estimated at 80 million, and on new samples actively collected during various projects and scientific expeditions within and outside the UK. There are also projects that bring together scientists from different disciplines, such as those focused on remediation of post-mining areas.

The example of such project is Bio+Mine: Biodiversity Positive Mining for the Net Zero Challenge, which focuses on the remediation of a defunct copper mine in the Philippines. This approach utilizes approaches from various fields of knowledge, traditional remediation technologies, and innovations such as drones and microorganisms. A crucial aspect of this research is the active involvement of local communities and the dissemination of information on activities aimed at improving the natural environment. Another project is Elemental, which focuses on the use of bioprocesses in metal mining and the remediation of ore mining sites.

Short Bio: Dr Piotr Cuber is a molecular biologist passionate about decoding the hidden language of DNA to better understand life on Earth. With a PhD in Biomedical Sciences and a career spanning tick-borne pathogens, mosquito gene drives, and biodiversity research, Piotr brings deep expertise and innovation to every project. At the Natural History Museum, he leads R&D in molecular biology automation and sequencing, focusing on low biomass and fragmented DNA samples. His work at the Centre for Innovation in Genomics and Microbiome Sciences (CIGMiS) pushes the boundaries of genomic science — from studying soil biodiversity influenced by European bison to detecting airborne human pathogens.

Piotr's interdisciplinary approach blends genomics, robotics, and environmental science to reveal the molecular foundations of evolution, ecology, and the tree of life.

Revitalization of Slaná River Region after Mining Activities

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Abstract: Regeneration of Slané River flows after and during mining activities involves a combination of environmental restoration practices aimed at restoring the hydrology, water quality, and ecological integrity of river systems that have been degraded by environmental disaster caused by discharge of mine water. The Slaná watercourse is a significant landscape forming factor determining the overall development of the natural environment, which has become susceptible to the presence of heavy metals, which are a potential risk factor for aquatic organisms and humans, and therefore it needs to be restored and protected. By restoration of Slaná watercourse we mean: 1) restoration of the natural flow regime, 2) improvement of water quality, 3) rehabilitation of aquatic and riparian habitats and 4) stabilization of river banks and sediment control. We consider the protection of the watercourse to include the control of discharged mining waters, as well as regular monitoring of the quality of the watercourse and its sediments. The article presents potential polluters along the Slaná River, which can have a significant impact on correct regeneration of Slaná River. The environmental situation after the 2022 ecological disaster on the Slaná River is alarming even now, and the need for regeneration of the river is increasing more and more.

Short Bio: Prof Ing. Martina Zeleňáková, PhD. is professor at the Department of Environmental Engineering, Faculty of Civil Engineering at the Technical University of Košice, Slovakia. In the framework of her scientific-research activities she has focused on the solution of water management problems, and separately on the assessment of environmental risks in river basins in relation to flood events, droughts, erosion and water pollution. In the framework of her professional activity she addresses the processing of project documentation of water streams regulation, especially for the needs of flood protection, and she is involved in processing reports of the EIA of these activities/structures. She is professionally qualified person for environmental impact assessment under Ministry of the Environment of the Slovak Republic establishing details of competency and authorised civil engineer for water structures design.

Evaluating Policy Effectiveness and Local Strategies for Sustainable Small-Scale Mined Land Reclamation in Ghana

Scholastica Akalibey[1], Jiri Schneider[1], Jitka Fialova[1], Slávka Gałaś[2], Albert Ahenkan[3], Dastan Bamwesigye[1], Obed Asamoah[4]

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Abstract: Gold mining is a key component of economic development and serves as a significant source of employment in mineral-rich African countries, especially in Ghana. Considering the crucial role of gold mining in economic growth, it cannot be stopped but must be done responsibly to ensure sustainable landscape management. Hence, the imperative for responsible mining practices necessitates comprehensive post-mining land rehabilitation protocols accompanied by local methodologies. These protocols require fundamental prerequisites such as robust regulatory frameworks and policy instruments that mandate land reclamation.

Using the mixed method research approach, the study investigates spatiotemporal dynamics of Land Use/Land Cover transformation, utilizing Landsat multispectral imagery from the United States Geological Survey in 2005, 2015, and 2025, in the Bosome Freho District. The spatial analysis reveals a substantial proliferation of mining activities within the Bosome Freho District. This expansion generated extensive abandoned mining sites attributable to both licensed small-scale operations and illegal mining activities. Also, the study evaluates the efficacy of existing policy instruments and regulatory mechanisms while examining indigenous reclamation methodologies. Data was obtained through surveys, interviews, and Focus Group Discussions.

Mine land expansion increased from 0.2835 km² in 2005 to 6.3927 km² in 2015, and subsequently escalated to 19.4371 km² by 2025, a 68-fold increase over the two-decade period. 428 respondents (93%) demonstrate awareness of existing reclamation policy frameworks with critical implementation gaps: 43.5% of the respondents said land reclamation frameworks are ineffective, while 33.0% affirm policy effectiveness, and 23.5% remain uncertain. Notably, 72.6% of the respondents indicated that policy ineffectiveness is as a result weak enforcement. Agroforestry systems are the predominant indigenous reclamation methodology identified. The study recommends participatory governance mechanisms throughout the policy cycle, community-centered interventions aligned with the SES Theory, and the intensification of public education. This is because the empirical respondents acknowledge the existence of policies but do not understand specific provisions.

Short Bio: Scholastica Akalibey is a PhD candidate at Mendel University in Brno, Czech Republic, and is currently undertaking an exchange program at AGH University of Krakow, Poland. Her research examines the spatiotemporal changes of the landscape, post-mining land reclamation policies, and indigenous

restoration methods in Ghana's gold mining communities through the lens of the socio-ecological systems theory and mixed-methods design. She has published in high-impact peer-reviewed journals, including Elsevier and Wiley, on topics such as the green economy, circular economy, sustainable forestry, and climate change, contributing to sustainable environmental governance and sustainable mining in mineral-rich African regions.