



PAVOL JOZEF ŠAFÁRIK
UNIVERSITY
IN KOŠICE



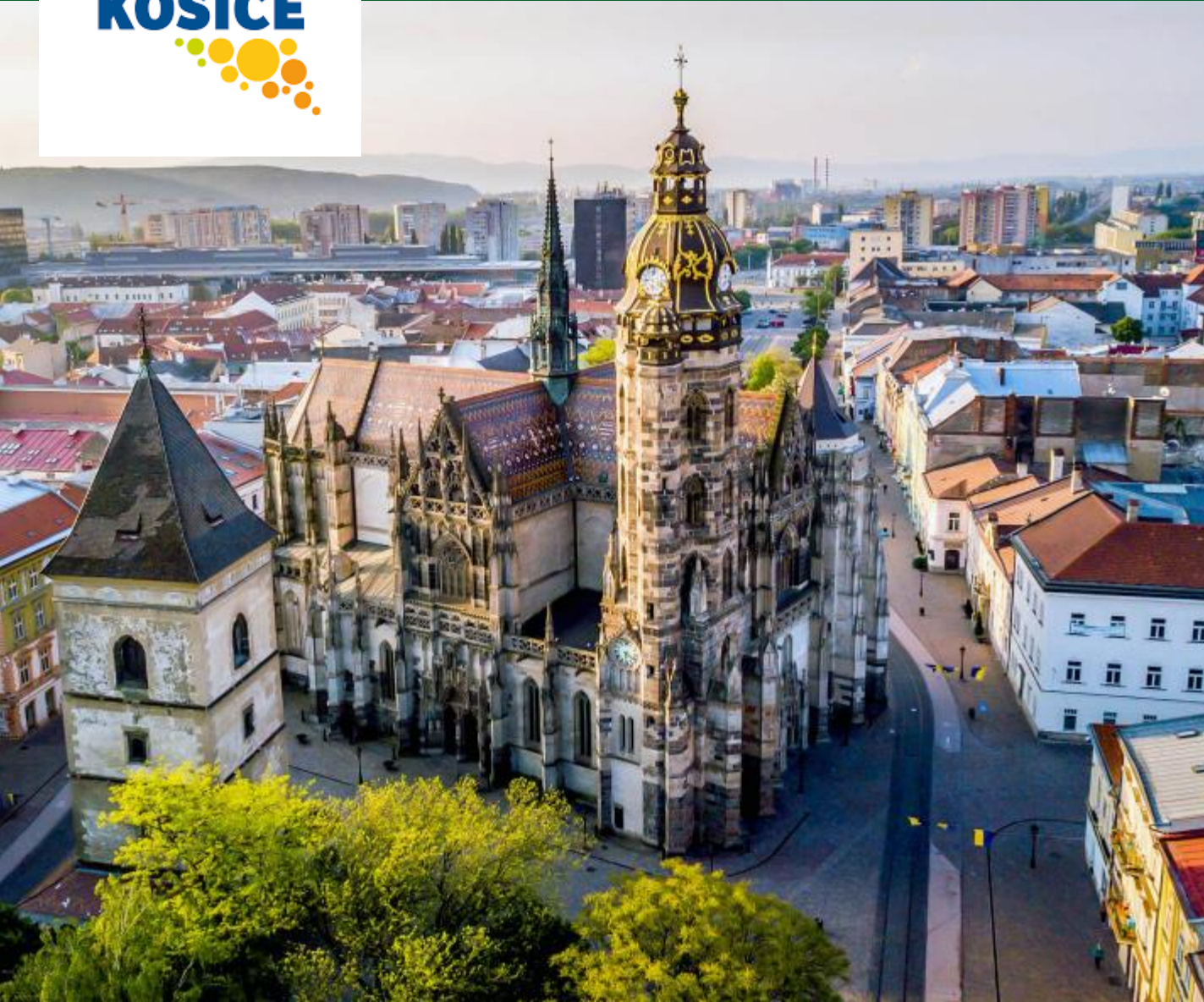
INSTITUTE OF GEOGRAPHY

Faculty of Science

Pavol Jozef Šafárik University in Košice



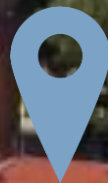
KOŠICE: 220 000 people, 20 000 students, 3 universities





**PAVOL JOZEF ŠAFÁRIK
UNIVERSITY**
IN KOŠICE

- MEDICINE
- SCIENCE
- ARTS
- LAW
- PUBLIC ADMINISTRATION



5 Faculties

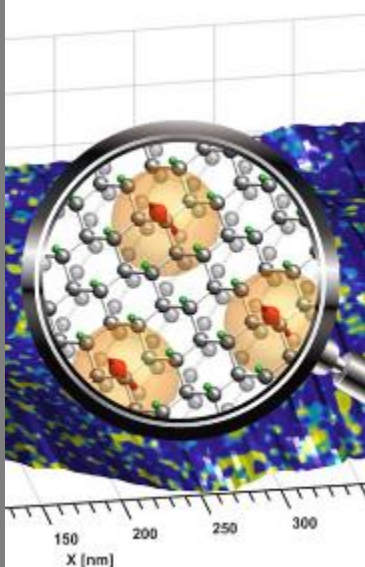


FACULTY OF SCIENCE – Research & Education units



INSTITUTE
OF BIOLOGY
AND ECOLOGY

52 acad.staff



INSTITUTE
OF PHYSICS

55 acad.staff



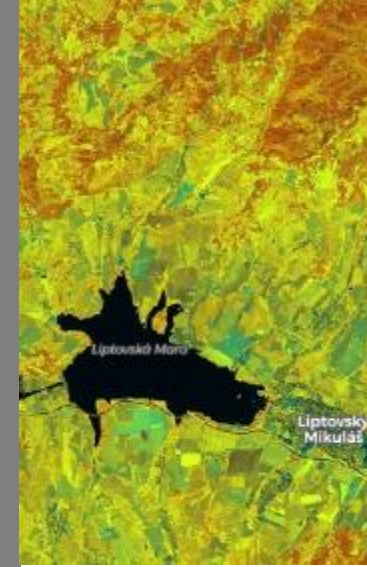
INSTITUTE
OF CHEMISTRY

46 acad.staff



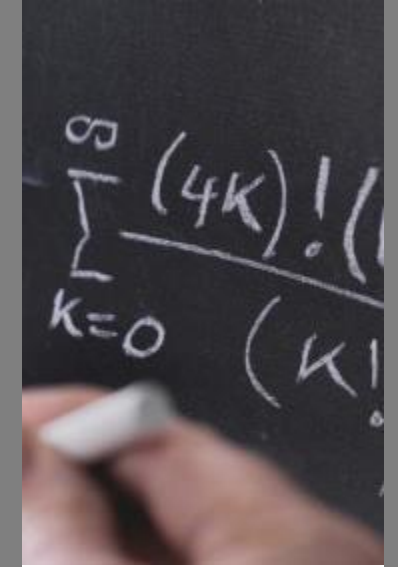
INSTITUTE
OF INFORMATICS

21 acad.staff



INSTITUTE
OF GEOGRAPHY

17 acad.staff



INSTITUTE
OF MATHEMATICS

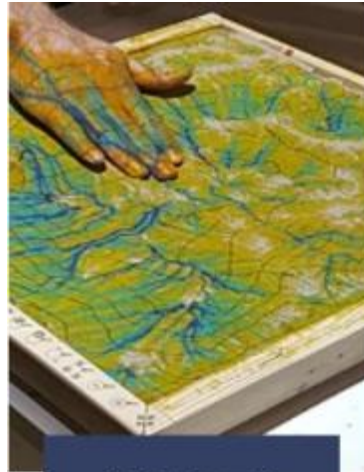
26 acad.staff



Institute of Geography

- 17 academic staff (1 prof., 6 assoc.prof., 3 assist. prof., 7 researchers) + 2 admin. support staff
- 3 departments
 - Department of Geoinformatics
 - Department of Physical Geography
 - Department of Human Geography
- 4 laboratories

Research & Education Facilities



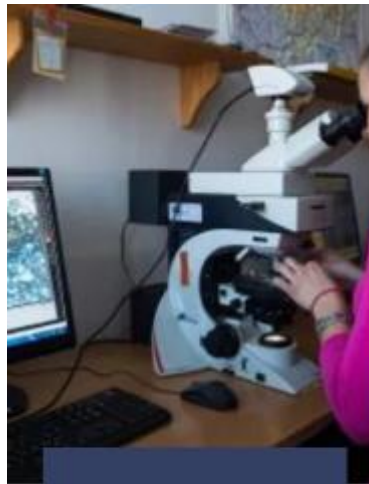
Laboratory of
Geographic
Information Systems



Laboratory of
Remote Sensing



Laboratory of
Granulometry and
Hydrologic Methods



Laboratory of Optical
Methods



Library and Map Archive

Research profile

- **Geoinformatics and Remote Sensing:** UAV lidar and hyperspectral mapping, geospatial modeling of solar radiation, surface temperature in urban areas (UHI), water flow and flash floods, geomorphometry, terrestrial laser scanning applications in caves and geomorphology. Contributions to the development of open-source GIS tools (GRASS GIS).
- **Physical Geography:** Karst landscapes, Flysch zones, fluvial geomorphology, cave mapping and speleology, studies of palaeogeography based on heavy minerals analysis and sedimentological research.
- **Human and Regional Geography:** Population studies, migration research, and the economic transformation of post-socialist regions.
- **Didactics of Geography:** Innovative teaching methods for geography at primary and secondary levels, incorporating interactive GIS, remote sensing, and 3D printing.

Education profile

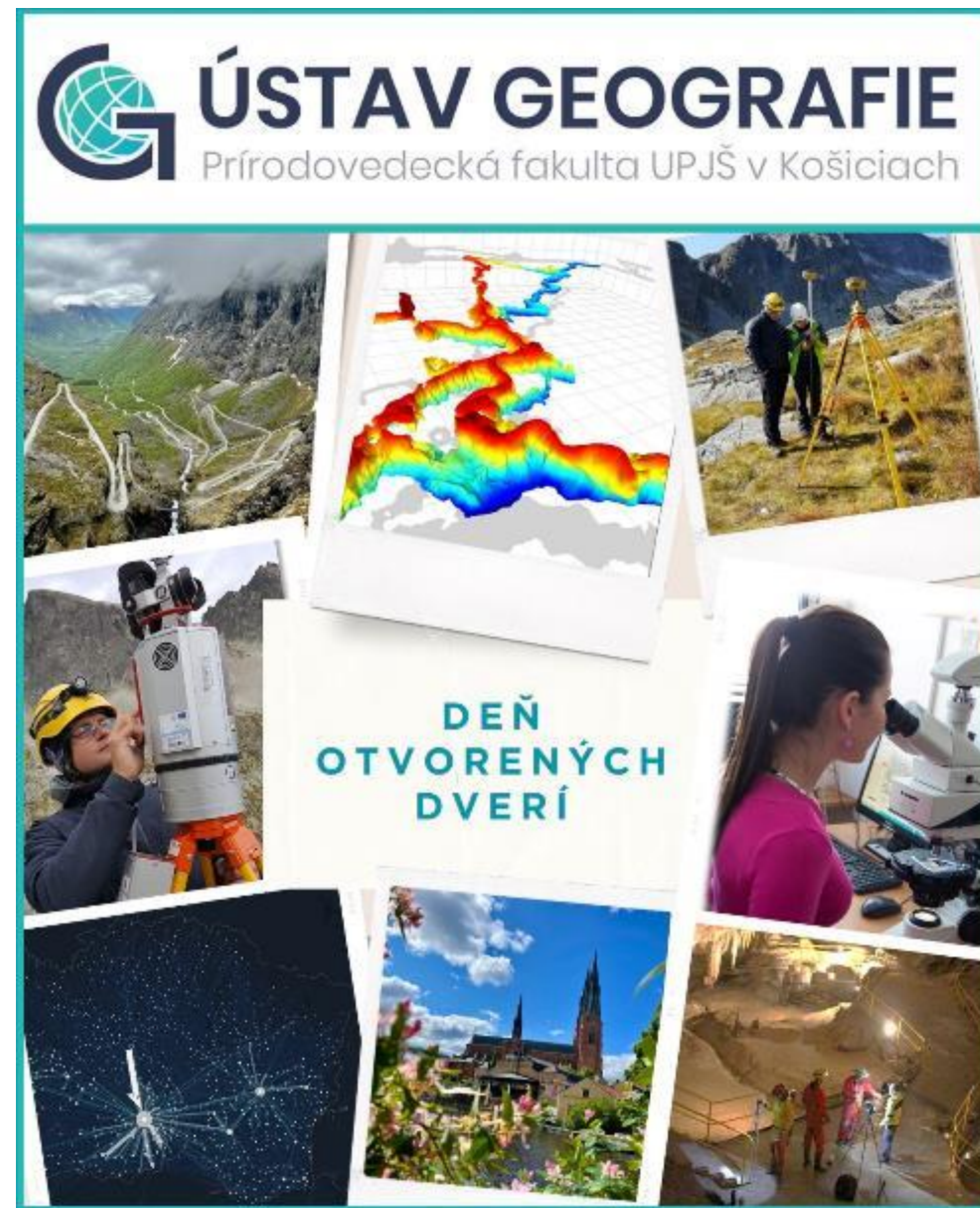
Single degree study

- BSc. Geography and Geoinformatics
- MSc. Geography and Geoinformatics
- PhD. Geoinformatics and Remote Sensing

Joint degree study

- BSc., Geography with other Science (e.g. Mathematics, Computer Science, Physics, Biology, Chemistry, Slovak, German, English language, History)
- Msc. Geography teaching

- <https://studijne-programy.upjs.sk/en/faculty/PF>



Recent publications

Cartography, visualisation, education

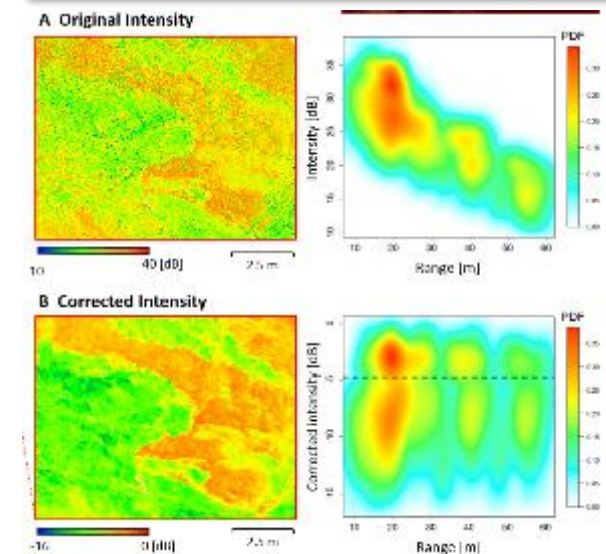
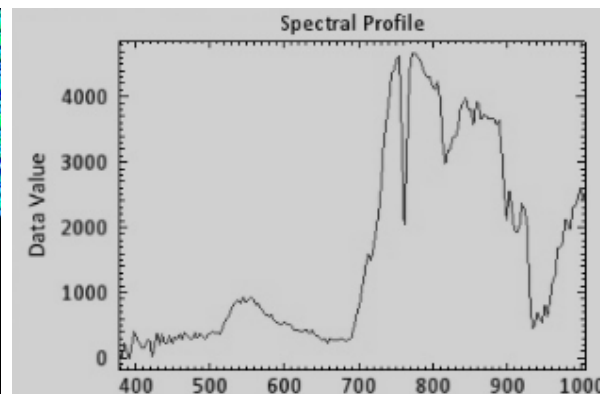
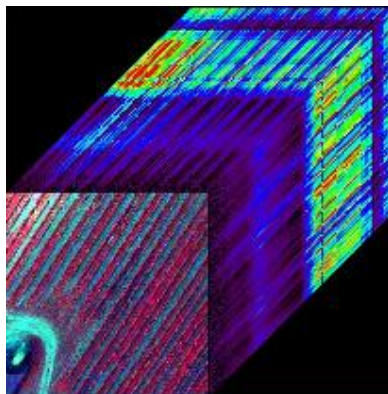
- **HOFIERKA, J., GALLAY, M., ŠUPINSKÝ, J., GALLAYOVÁ, G.** (2022). A tangible landscape modeling system for geography education. [*Education and Information Technologies*, 27, 4, 5417-5435.](#)
- **CSACHOVÁ, S., KIDONOVÁ, D.** (2022). Exploring Potential of Sketchnoting as a Tool for Constructing Learner's Knowledge in Geography. [*European Journal of Educational Research*, 11 \(2\), 1151-1159.](#)
- **ŠUPINSKÝ, J., KAŇUK, J., NOVÁKOVÁ, M., HOCHMUTH, Z.** (2022). LiDAR point clouds processing for large-scale cave mapping: a case study of the Majko dome in the Domica cave. [*Journal of Maps*, 18 \(2\), 268-275.](#)
- **DMYTRUK, Y., CHERLINKA, V.** (2022). Cartographic technique for determining areas of soil contamination by heavy metals. [*International Journal of Environmental Studies*, 8\(4\), pages 266-300](#)
- **NESTOROVÁ-DICKÁ, J., GESSERT, A., SNINČÁK, I.** (2019). Rural and non-rural municipalities in the Slovak Republic. [*Journal of Maps*, 15 \(1\), 84-93.](#)
- **GALLAY, M., HOCHMUTH, Z., KAŇUK, J., HOFIERKA, J.** (2016). Geomorphometric analysis of cave ceiling channels mapped with 3D terrestrial laser scanning, [*Hydrology and Earth System Sciences*, 20, 1827-1849.](#)



Recent publications

Terrestrial lidar, UAV lidar, and UAV hyperspectral mapping

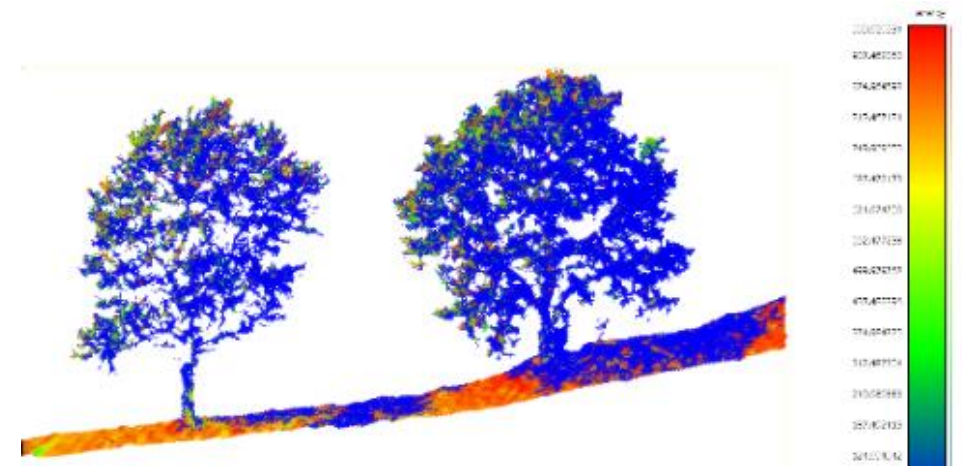
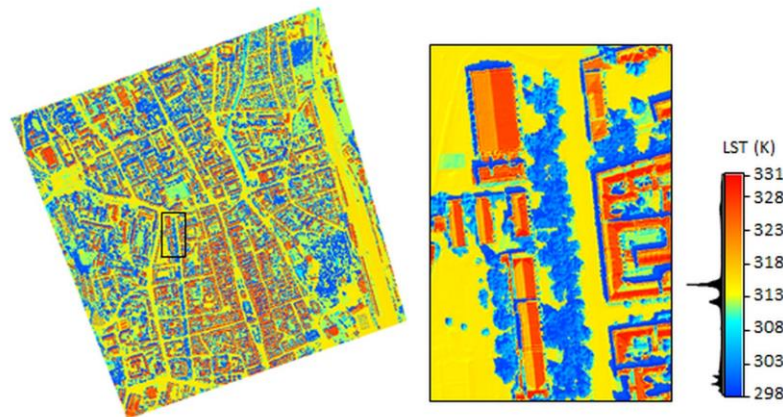
- **NOVÁKOVÁ, M., GALLAY, M., ŠUPINSKÝ, J., FERRÉ, E., ASTI, R., DE SAINT BLANQUET, M., BAJOLET, F., SORRIAUX, P.** (2022). Correcting laser scanning intensity recorded in a cave environment for high-resolution lithological mapping: a case study of the Gouffre Georges, France. [Remote Sensing of Environment](#), 280, 113210.
- **GALLAY, M., KAŇUK, J., ZGRAGGEN, C., IMBACH, B., ŠAŠAK, J., ŠUPINSKÝ, J., HOLLAUS, M.** (2023). Unpiloted Airborne Laser Scanning of a Mixed Forest. A Case Study from the Alps, Austria. In: Meneely, J. (Ed.), [3D Imaging of the Environment: Mapping and Monitoring](#). 1-13.
- **ŠAŠAK, J., GALLAY, M., KAŇUK, J., HOFIERKA, J., MINÁR, J.** (2019). Combined use of terrestrial laser scanning and UAV photogrammetry in mapping alpine terrain. *Remote Sensing*, 11 (18), 2154.
- **KAŇUK, J., GALLAY, M., ECK, C., ZGRAGGEN, C., DVORNÝ, E.** (2018). Technical Report: Unmanned Helicopter Solution for Survey-Grade Lidar and Hyperspectral Mapping. *Pure and Applied Geophysics*. 175(9), 3357-3373.



Recent publications

Land surface temperature and urban heat island modelling

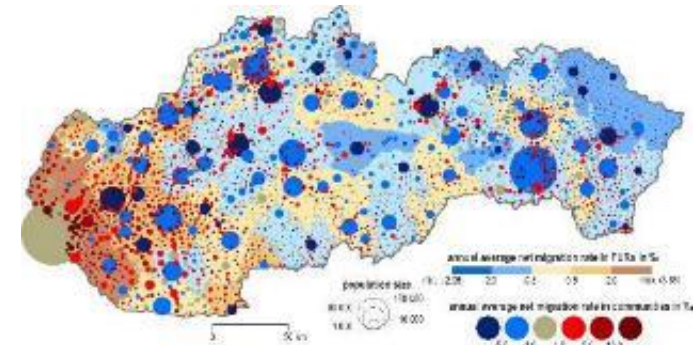
- **FEDOR, T., HOFIERKA, J.** (2022). Comparison of urban heat island diurnal cycles under various atmospheric conditions using WRF-UCM. [Atmosphere 13 \(12\), 2057.](#)
- **ONAČILLOVÁ, K., GALLAY, M., PALUBA, D., PÉLIOVÁ, A., TOKARČÍK, O., LAUBERTOVÁ, D.** (2022). Combining Landsat 8 and Sentinel 2 data in Google Earth Engine to derive higher resolution land surface temperature maps in urban environment. [Remote Sensing 14 \(16\), 4076.](#)
- **HOFIERKA, J., ONAČILLOVÁ, K.** (2022). Estimating visible band albedo from aerial orthophotographs in urban areas. [Remote Sensing, 14, 164.](#)
- **HOFIERKA, J., GALLAY, M., ONAČILLOVÁ, K., HOFIERKA, J. Jr.** (2020). Physically-based land surface temperature modeling in urban areas using a 3-D city model and multispectral satellite data. [Urban Climate](#), 31, 100566.
- **HOFIERKA, J., BOGLARSKÝ, J., KOLEČANSKÝ, Š., ENDEROVA, A.** (2020). Modeling Diurnal Changes in Land Surface Temperature in Urban Areas under Cloudy Conditions. [ISPRS Int. J. Geo-Inf.](#), 9, 534.



Recent publications

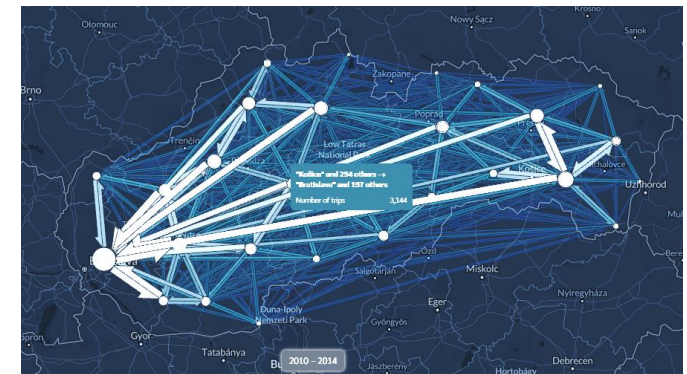
Urban studies and migration

- **NOVOTNÝ, L., PREGI, L., NOVOTNÁ, J.** (2023). East-west or up the urban hierarchy? Internal migration patterns in Slovakia since post-socialist transformation to COVID-19 pandemic. [Eurasian Geography and Economics](#). *Accepted*.
- **NESTOROVÁ-DICKÁ, J., GUROVÁ, P.** (2022). Sustainability of social care in Slovakia: Modelling of Possible Load the Existing Network of Residential Social Facilities by the future Senior Population. [Moravian Geographical Reports 30 \(2\), 66-85](#).
- **PREGI, L., NOVOTNÝ, L.** (2022). Impact of migration and natural reproduction on the development of the Slovak–Hungarian ethnic boundary in eastern Slovakia, 1991–2018. [Regional Statistics](#), 12, 1, 77-103.
- **NOVOTNÝ, L., KULLA, M., NESTOROVÁ-DICKÁ, J., PREGI, L., CSACHOVÁ, S.** (2021). Performance of Small Towns in an Economically Lagging Regions: A Case Study of the Spiš Region, Slovakia. In: Baňski, J. ed. *The Routledge Handbook of Small Towns*. New York (Routledge), pp. 159-172.



Impact of using renewable energies on economics and society

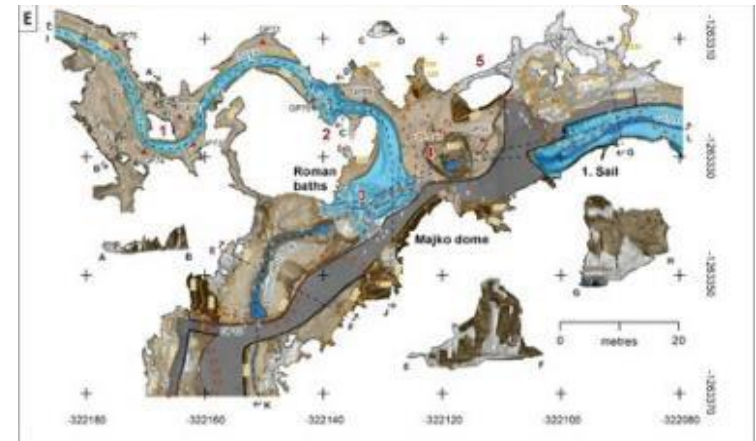
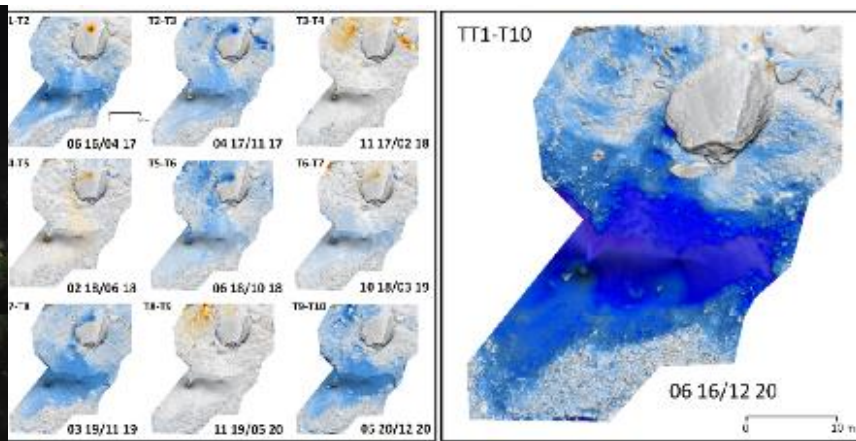
- **CHODKOWSKA-MISZCZUK, J., MARTINAT, S., KULLA, M., NOVOTNÝ, L.** (2020). Renewables projects in peripheries: determinants, challenges and perspectives of biogas plants - insights from Central European countries. [Regional Studies, Regional Science](#), 7, 362-381.
- **MARTINÁT, S., CHODKOWSKA-MISZCZUK, J., KULLA, M., NAVRÁTIL, J., KLUSÁČEK, P., DVOŘÁK, P., NOVOTNÝ, L., KREJČÍ, T., PREGI, L., TROJAN, J., FRANTÁL, B.** (2022). Best Practice Forever? Dynamics behind the Perception of Farm-Fed Anaerobic Digestion Plants in Rural Peripheries. [Energies](#), 15 (7), 2533.



Recent publications

Karst and Cave research and mapping

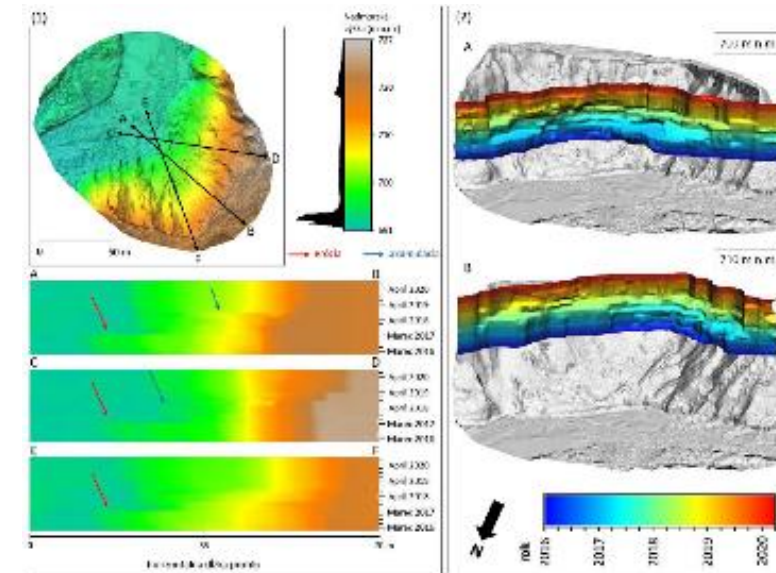
- ŠUPINSKÝ, J., KAŇUK, J., HOCHMUTH, Z., GALLAY, M. (2019). Detecting dynamics of cave floor ice with selective cloud-to-cloud approach. The [Cryosphere](#), 13, 2835-2851.
- ŠUPINSKÝ, J., KAŇUK, J., NOVÁKOVÁ, M., HOCHMUTH, Z. (2022). LiDAR point clouds processing for large-scale cave mapping: a case study of the Majko dome in the Domica cave. [Journal of Maps](#), 18 (2), 268-275.
- KAŇUK, J., ŠUPINSKÝ, J., MENEELY, J., HOCHMUTH, Z., ŠAŠAK, J., GALLAY, M., CALLIERI, M. (2023). Laser Scanning of a Complex Cave System during Multiple Campaigns. A Case Study of the Domica Cave, Slovakia. In: Meneely, J. (Ed.), [3D Imaging of the Environment: Mapping and Monitoring](#). 1-26.
- GESSERT, A., HOCHMUTH, Z. (2023). Seasonal dynamics of karst dissolution based on a limestone tablets experiment in the Slovak Karst region. [International Journal of Speleology](#), 52 (2), 139-147.
- PALCSU, L., GESSERT, A., TÚRI, M., KOVÁCS, I., FUTÓ, I., ORSOVSZKI, I., PUSKÁS PRESZNER, A., TEMOVSKI, M., KOLTAI, G. (2021). Long-term time series of environmental tracers reveal recharge and discharge conditions in shallow karst aquifers in Hungary and Slovakia. [Journal of Hydrology - Regional Studies](#), 36, 100858.



Recent publications

Geomorphology, geology, palaeogeography, and biology

- **BÓNOVÁ, K., BÓNA, J., GALLAY, M., HÓK, J., BELLA, P., PAŃCZYK, M. et al.** (2024) Reconstruction of ancient drainage in the contact karst of the Harmanecká dolina Valley, Western Carpathians, based on mineralogical data from the allochthonous sediments and isobase geomorphometry. [Earth Surface Processes and Landforms](#), 1–23.
- **MINÁR, J., DRĀGUŤ, L., EVANS, I.S., FECISKANIN, R., GALLAY, M., JENČO, M., POPOV, A.** (2024). Physical geomorphometry for elementary land surface segmentation and digital geomorphological mapping. [Earth-Science Reviews](#), 104631.
- **RUSNÁK, M., KAŇUK, J., KIDOVÁ, A., ŠAŠAK, J., LEHOTSKÝ, J., PÖPPL, R., ŠUPINSKÝ, J.** (2020). Channel and cut-bluff failure connectivity in a river system: Case study of the braided-wandering Belá River, Western Carpathians, Slovakia. [Science of The Total Environment](#), 733, 139409.
- **MARCIN, M.; RASCHMANOVÁ, N.; MIKLISOVÁ, D.; ŠUPINSKÝ, J.; KAŇUK, J.; KOVÁČ, Ľ.** Karst Dolines Support Highly Diversified Soil Collembola Communities—Possible Refugia in a Warming Climate? *Diversity* **2022**, *14*, 1037.
- **BÓNOVÁ, K., BÓNA, J., PAŃCZYK, M., KOVÁČIK, M., MIKUŠ, T., LAURINC, D.** (2019). Origin of deep-sea clastics of the Magura Basin (Eocene Makovica sandstones in the Outer Western Carpathians) with constraints of framework petrography, heavy mineral analysis and zircon geochronology. [Palaeogeography, Palaeoclimatology, Palaeoecology](#), 514, 768-784.
- **HOFIERKA, J., GALLAY, M., ŠAŠAK, J., BANDURA, P.** (2018). Identification of karst sinkholes in a forested karst landscape using airborne laser scanning data and water flow analysis. [Geomorphology](#), 308, 265-277.



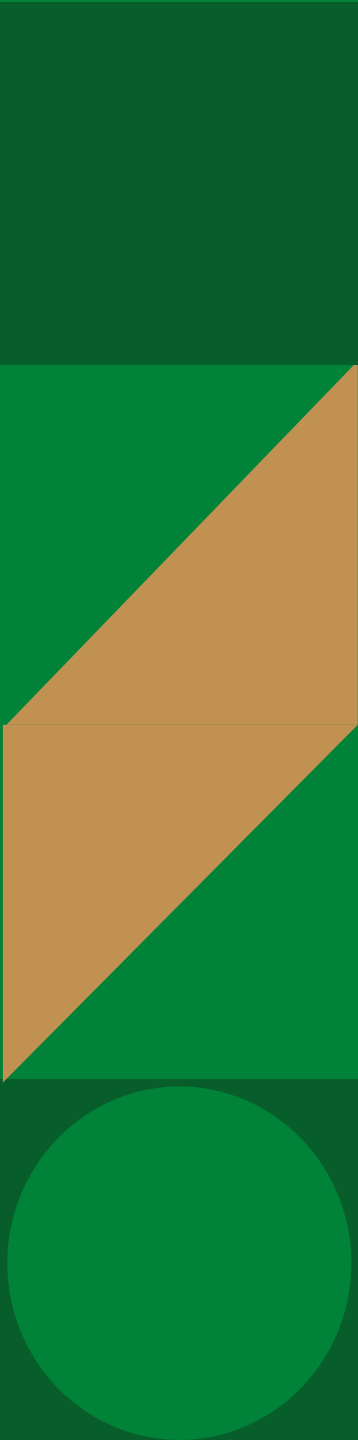
Recent publications

Urban studies and migration

- **NOVOTNÝ, L., PREGI, L., NOVOTNÁ, J.** (2023). East-west or up the urban hierarchy? Internal migration patterns in Slovakia since post-socialist transformation to COVID-19 pandemic. [Eurasian Geography and Economics](#). *Accepted*.
- **NESTOROVÁ-DICKÁ, J., GUROVÁ, P.** (2022). Sustainability of social care in Slovakia: Modelling of Possible Load the Existing Network of Residential Social Facilities by the future Senior Population. [Moravian Geographical Reports 30 \(2\), 66-85](#).
- **PREGI, L., NOVOTNÝ, L.** (2022). Impact of migration and natural reproduction on the development of the Slovak–Hungarian ethnic boundary in eastern Slovakia, 1991–2018. [Regional Statistics](#), 12, 1, 77-103.
- **NOVOTNÝ, L., KULLA, M., NESTOROVÁ-DICKÁ, J., PREGI, L., CSACHOVÁ, S.** (2021). Performance of Small Towns in an Economically Lagging Regions: A Case Study of the Spiš Region, Slovakia. In: Bański, J. ed. *The Routledge Handbook of Small Towns*. New York (Routledge), pp. 159-172.

Impact of using renewable energies on economics and society

- **CHODKOWSKA-MISZCZUK, J., MARTINAT, S., KULLA, M., NOVOTNÝ, L.** (2020). Renewables projects in peripheries: determinants, challenges and perspectives of biogas plants - insights from Central European countries. [Regional Studies, Regional Science](#), 7, 362-381.
- **MARTINÁT, S., CHODKOWSKA-MISZCZUK, J., KULLA, M., NAVRÁTIL, J., KLUSÁČEK, P., DVOŘÁK, P., NOVOTNÝ, L., KREJČÍ, T., PREGI, L., TROJAN, J., FRANTÁL, B.** (2022). Best Practice Forever? Dynamics behind the Perception of Farm-Fed Anaerobic Digestion Plants in Rural Peripheries. [Energies, 15 \(7\), 2533](#).

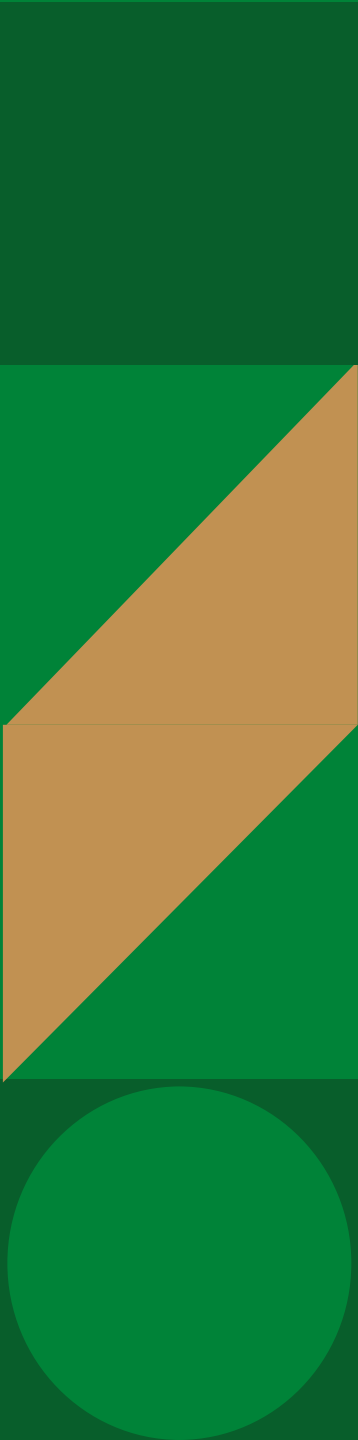


Recent research projects funded by international institutions

UrbanHist (Horizon 2020 Innovative Training Networks, MSCA-ITN, 2016-2020).

ESA - European Space Agency funded research contracts:

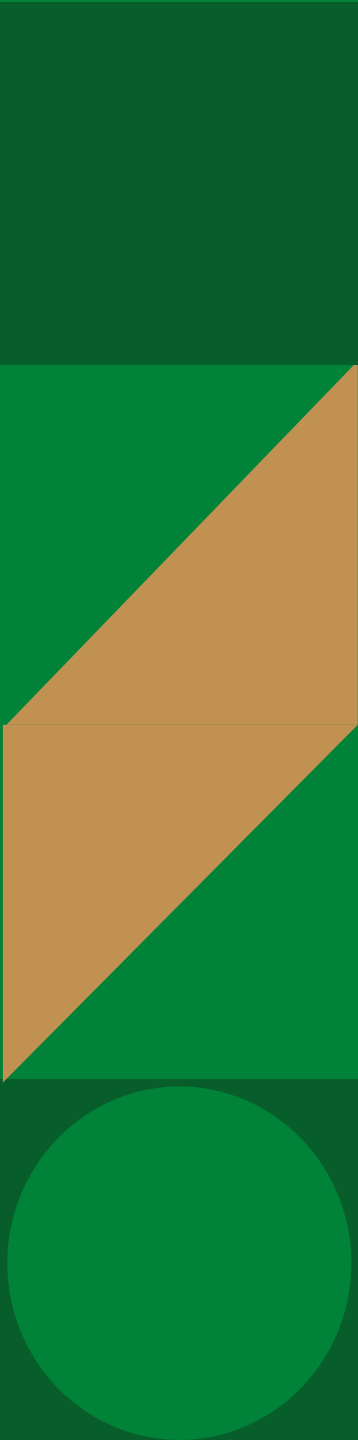
- **URBANA: Development and Verification of Urban Analytics** AO/1-11889/23/I-DT (15,000 EUR subcontract for Geomatics, Italy)
- [**ENEUM: Enhancing Earth Observation Curriculum with a Focus on ESA Sensors**](#) 4000140187/23/NL/SC/rp / Proposal ID: SK7_04 (50,000 EUR) (2023-2024)
- **SURGE: Simulating the cooling effect of urban greenery based on solar radiation modelling and a new generation of ESA sensors** (50, 000 EUR, 2016-2018)



Recent research projects funded by international institutions

INTERREG funded

- Space emergency protection system towards the monitoring of hazardous natural and anthropogenic geoprocesses in the transboundary region HU-SK-RO-UA (150,000 EUR, 2019-2022)
- HUSK Development of webGIS platform based on big-geodata for the Tokaj Wine Region foster cross-border collaboration" (TOKAJGIS, number SKHU/1601/4.1/052, 150,000 EUR, 2017-2020)



Recent research projects funded by domestic institutions

- VEGA 1/0780/24: Combining lidar and hyperspectral data for enhancing land cover classification using machine learning methods (ca. 40,000 EUR, 2024-2026)
- APVV-22-0024: Physical geomorphometry for physical geographic research (40,000 EUR, 2023-2027, in partnership with UK Bratislava)
- VEGA 1/0085/23: Modelling urban heat islands using geospatial tools (ca. 40,000 EUR, 2023-2025)
- VEGA 1/0168/22: Palaeogeographic and geodynamic interpretations of detrital minerals from selected areas of the Western Carpathians: a case study to identify the nature of transport conditions and source areas in karst and non-karst areas (ca. 30,000 EUR, 2023-2025)

Consultancy projects

- Simulating the flooding after water dam breaching for Košice city civil protection
- Carbon emission strategy for Košice city
- Training in GIS for Košice self-government region, Deutsche Telekom IT Solutions Slovakia



Public outreach

Summer schools

- Int. Rem. Sens. Summer School, Univ. Cagliari (07/2023)
- Workshop on Lidar mapping/Sentinel 3 Odra river, Univ. Wroclaw (10/2023)
- Exploring the landscape with dynamic visualization, tangible interaction, and UAV-lidar (07/2019)



Public outreach

Hands-on training for secondary school students



Geography teachers' club





OUR VISION: become more international



- Become partners/leaders for Horizon Europe proposals, Erasmus Mundus, INTERREG, ESA, bilateral collaboration
- Erasmus+ education and training activities for students and staff
- Increase intensity and diversity of international relations
- Attract international students and projects
- Generate useful research outcomes and successful graduates from international collaborations

Follow us

www.science.upjs.sk
www.uge.science.upjs.sk



FACEBOOK

pfupjs
ustavgeografie



YOUTUBE

Prírodovedecká
fakulta UPJŠ



INSTAGRAM

pfupjs
geography_kosice

Vielen Dank für Ihre Aufmerksamkeit

jaroslav.hofierka@upjs.sk
+421-55-234-2459