

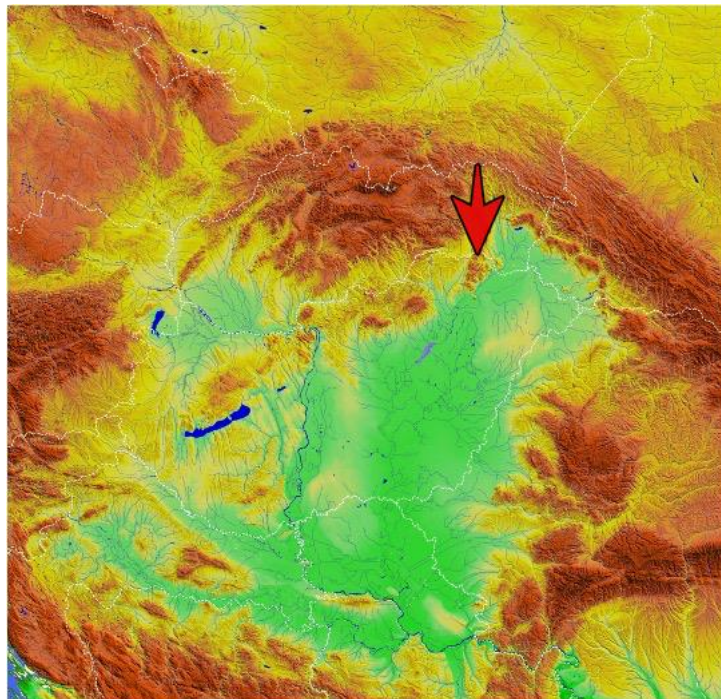
**TIMREX summer field school**  
**on innovative mineral exploration**  
**7-11 June 2022, Telkibánya, Hungary**



The objective of the school is to introduce innovative mineral exploration methods and techniques with special focus on exploration of hydrothermal ore deposits. Keynote lectures about magmatic-hydrothermal ore forming processes will be given by prof. Laurence Robb. The program is designed for earth science master students, primarily from the East-South-Eastern European (ESEE) region. Master students from field of mining engineering are also welcome.

Telkibánya is a well-known historical mining site of the Carpathian region, and the locality provides a good environment for field practice complementing the theoretical parts of the summer school.

**The students who cannot attend the Summer School physically will have the opportunity to follow the lectures online! Click [HERE](#) to register, the link for access will be sent to the registered students on 6 June 2022.**



## Detailed program of the school

Lectures
Practical classes, demos
Field programs
Social programs

### 7 June 2022

time	Topic	Leaders
9-10	Exploration challenges in the ESEE region, scope of the short course	Ferenc Mádai
10-11	Telkibánya geological setting and mining history	János Földessy
11-12	Careers in economic geology for young geoscientists	Laurence Robb
12-13	Lunch	
13-14	Mining museum visit	
14-15	Magmatic-hydrothermal ore-forming processes (porphyry Cu-Mo and epithermal Au-Ag deposits)	Laurence Robb
15-16		
16-17	Hydrothermal processes (1, 2) - physical & chemical properties of aqueous solutions, fluid inclusions, ore-fluid compositions, solubility of metals in aqueous solutions, hydrothermal alteration	Laurence Robb
17-18		
18-	Barbecue, open fire	

### 8 June

time	Topic	Leaders		
9-10	Hydrothermal processes (3) – precipitation mechanisms with examples	Laurence Robb		
10-11				
11-12	Sensors and field-based solutions for obtaining spectral chemistry information	Boglárka Topa		
12-13	Lunch			
13-14	Advanced geophysical methods in mineral exploration	Geogold Kárpátia		
14-15	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Fieldwork 1: Educational path: Teréz-adit, Jó-hill gold mine pits, Koncfalva ruins of Medieval processing plant, soil sampling</td> <td style="width: 50%;">Fieldwork 2: Mária-adit: hydrothermal alteration measurement, XRF, LIBS, spectral gamma radiation</td> </tr> </table>	Fieldwork 1: Educational path: Teréz-adit, Jó-hill gold mine pits, Koncfalva ruins of Medieval processing plant, soil sampling	Fieldwork 2: Mária-adit: hydrothermal alteration measurement, XRF, LIBS, spectral gamma radiation	Mádai F, Móricz F Topa B, Zajzon N
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15-16				
16-17				
17-18				
18-	Barbecue, open fire / local pub			

### 9 June

time	Topic	Leaders
9-10	New and innovative analytical methodologies in exploration geochemistry	István Márton
10-11		
11-12		
12-13	Lunch	

13-17	Geochemical data evaluation practical part (groupworks: soil geochemistry dataset analysis, drillcore multispectral analysis)	Topa B, Zajzon N, Leskó M Mádai F, Márton I
17-	Kosice sightseeing and dinner	

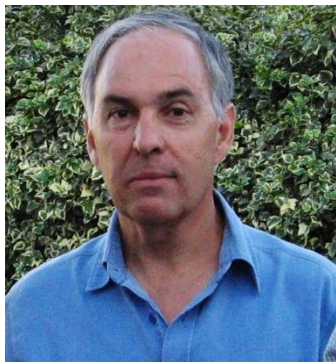
### 10 June

time	Topic	Leaders
9-10	UAV-based remote sensing data acquisition and integration in 3D models	Richárd Papp
10-12	Advanced statistical analysis of multivariate (big) datasets	Norbert Szabó
12-13	Lunch	
13-14	Pálháza perlite quarry site visit	
14-15		
15-16	Pálháza quarry drone demo and interpretation	Papp Richárd
16-18	Mád, Geoproduct company visit	
18-	Tállya vine tasting and dinner	

### 11 June

time	Topic	Leaders
9-10	Innovative solutions for and challenges in underwater spaces: sensor development, robotization	Zajzon N, Papp R
10-11		
11-12	Two fresh exploration thesis works from the Tokaj Mountains	Simon I, McCreery W (University of Oxford)
12-13	Next Generation Exploration Award group presentation	NGEA team members
13-14	lunch	

### Course leaders



#### Laurence Robb (FRSSAfr CGeol PrSciNat)

Before moving to the United Kingdom, Laurence Robb was Professor of Economic Geology in the School of Geosciences at the University of the Witwatersrand (Wits), South Africa, and between 2001-2005, also Director of its Economic Geology Research Institute (EGRI). He is currently Visiting Professor in the Department of Earth Sciences at the University of Oxford. He has worked for over 30 years on many the great mineral districts of the African continent and is currently involved in research on the metallogeny of Myanmar/Burma and also Western Sahara. His main field of expertise is in granite related mineral deposits - he is also the author of the text-book, 'Introduction to Ore-

Forming Processes' that is widely used all over the world. He served a term as President of the Geological Society of South Africa in 1999-2000 and was President of the Society of Economic Geologists, based in Denver, USA, in 2017.



**Prof. Dr. Norbert Péter Szabó** obtained his M.Sc. degree in geophysical engineering in 1999 from Faculty of Mining Engineering, University of Miskolc. He has been continuously working from graduating at the University of Miskolc. He obtained his Ph.D. in 2005. Since 2019, he has been a full professor at the Department of Geophysics. He is currently the head of Geophysical Department and vice-dean for scientific affairs at the Faculty of Earth Science and Engineering. He conducts research on geophysical inversion and exploratory (multivariate) statistical methods and their applications in earth sciences (mainly water and hydrocarbon prospecting). He delivers lectures on well logging, gravitational and magnetic exploration methods, engineering and environmental geophysics and geostatistics.



**Dr. Norbert Zajzon** completed his MSc and PhD studies about mineralogy, geochemistry and solid mineral resources at the Eötvös Loránd University, Budapest. His research subject was instrumental mineralogy and geochemistry related to global environmental crises, mass extinctions. Until now he is dedicated to numerous analytical techniques in the geoscience field. He is an associate professor at the Institute of Mineralogy and Geology, and head of the Mineralogy – Petrology Department, University of Miskolc (Miskolc, Hungary), teaching instrumental mineralogy, ore deposits and astronomy and planetology and head of the microprobe laboratory and co-leader of the 3D laboratory. He has experience in numerous H2020 projects, like Robominers, or UNEXMIN where he was the coordinator. UNEXMIN project. The UNEXMIN results led to its continuation the EIT Raw Materials financed UNEXUP project where he also is the coordinator. He is also the scientific advisor of the UNEXMIN Georobotics Ltd, which was founded by the UNEXMIN consortium.

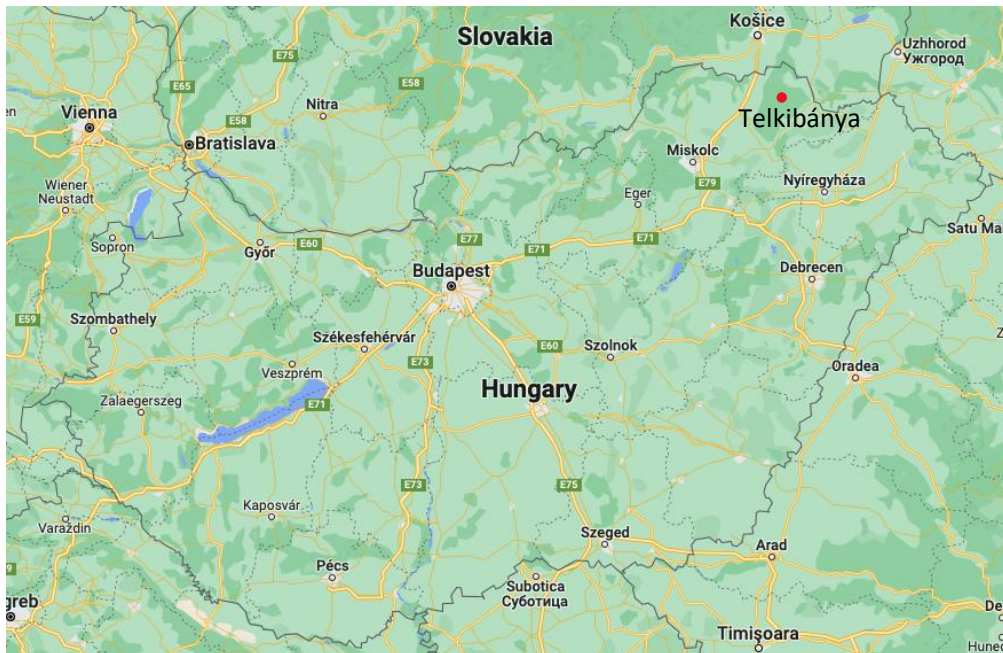


**István Márton PhD** has obtained BSc and Msc in Romania at the Babeş–Bolyai University, Cluj and University of Bucharest, respectively. Following a 3 years period working as Exploration Geologist in Apuseni Mts (Romania) he continued studies at the University of Geneva (Switzerland), where he obtained PhD in 2008. After a short academic post-doc research period he has joined the exploration industry and since then, he has been working in the exploration and mining industry as an Exploration Geologist and Geochemist. The lecturer has been involved in target generation, greenfield- and brownfield- exploration and geometallurgical works in 8 countries being focused on Cretaceous–Miocene epithermal Au-Ag, polymetallic carbonate replacement Pb-Zn-Cu-Au, porphyry Cu-Au-Mo, sedimentary rock-hosted gold and Archean orogenic gold deposits. Since 2009 he is working also as visiting lecturer at the University of Babeş–Bolyai University teaching Introduction to Ore Deposits and Economic Geology courses and supervises bachelor/master student projects. More recently the Lecturer is acting as principal geoscientist consultant at Dundee Precious Metals with focus on exploration geochemistry, 3D modelling and drill target generation efforts of the company in greenfield and near-mine projects in Bulgaria, Serbia, Armenia and Canada.



**Richárd Zoltán Papp** is the Managing Director at UNEXMIN GeoRobotics Ltd. He graduated from the Environmental sciences BSc at the Eötvös Loránd University and then from the Earth science engineering MSc at the University of Miskolc. He completed his PhD studies in mineralogy at the University of Miskolc and participated in the UNEXMIN (H2020) and UNEXUP (EIT RawMaterials) projects as a research fellow. Recently he is the head of the UNEXMIN Georobotics Ltd., the successor enterprise of the UNEXMIN project aiming to commercially exploit the multi-robot platform. The company positions itself as a R&D and commercial technology service provider capable of significantly extending the framework for mineral exploration and data acquisition methods, with robotic solutions (initially with underwater surveying) and integration of available geoscientific data acquired for greenfield or brownfield deep deposits exploration /development.

## Site information





*Yard of the field camp in Telkibánya*



*Gulash party 1*



*Field laboratory work 1.*



*Field laboratory work 2.*



*Site visit at the Pálháza perlite quarry*