LIUBOMYR GAVRYLIV

Faculty of Natural Sciences
Comenius University

Project number
3007/01/01

Project duration
10/2021 - 9/2025

BIOGRAPHY

I am a PhD in Geology from Kyiv, received my degree in 2019 at Taras Shevchenko National University of Kyiv, Ukraine. I have applied for a SASPRO2 fellowship in 2021 in order to focus on my research idea only, deepen my programming skills and collaborate with pioneer researchers in mineralogy and geochemistry area worldwide. My idea is to develop a platform that would help geo-oriented researchers to obtain seamless and easy access to mineralogical data, especially compositional ones.

"I am proud to be a part of Comenius University and have a "Marie-Skłodowska Curie fellow" title, because after 4 months of my fellowship I already have so many results that it would be impossible to reach those without such working environment and help from the scientists of the Department as well as management team of SASPRO2. I already have agreements of collaboration from University of Oulu, Finland and the US-ukrainian IT company, oriented on implementing AI and ML techniques. After the post-doc, I expect to work on developing new ideas associated with current project and improve the platform using modern ML techniques and Big Data technologies. I will be looking for a collaboration with companies from IT sector and Technology Institutes worldwide. "

PROJECT SUMMARY

The heterogeneous multidimensional relational model for mineralogical data analysis

More than 100 new minerals are discovered every year, with the total number of over 5,600 minerals that have been approved by The Commission on New Minerals, Nomenclature and Classification (CNMNC) of the International Mineralogical Association (IMA) as of December, 2020. This number may exceed 15,000 if mineral synonyms, varieties and polytypes are taken into account. While the amount of this data is increasing enormously every year it still remains unprocessed, unclassified, non-structured and therefore inaccessible to the geoscientific community.

Accordingly, an average geoscientist is progressively involved in data intensive science and data analysis issues including the full data lifecycle – from data gathering to processing and archiving, which typically requires advance skills in programming. The project focuses on developing a freely available interoperable platform that would allow to explore multiple dimensions of mineralogical data, shed light on the relations between mineral species and unravel the hidden patterns within this big data. The model is intended to put the mineralogy knowledge into practice and allow the earth scientists stay focused on their research while delegating complex data computing and transformation tasks to a composite model itself.

The latter has the following characteristics: simple – to be understood by geoscientists; customizable – to be responsive to the needs of the researcher; relational and nested – the data is organized into separate domains with intra- and cross-domain relations; FAIR – meet principles of findability, accessibility, interoperability, and reusability. By applying the data and network analysis algorithms on the model which encodes inverse mineral relations will provide principally new information on mineral diversity, distribution, rarity and reveal previously unrecognized phenomena in relationships between groups of minerals.

PUBLICATIONS

1.   **Liubomyr Gavryliv,** Gogolev Konstantin and Aleksieienko Anton "Geochemical Modelling of Magma Evolution Process in Bodie Hills Volcanic Field, Nevada, USA". 2018. Earth Science India eISSN: 0974 – 8350. Vol. 11 (II), April, 2018, pp. 99 – 121.
https://www.researchgate.netpublication/324965386_Geochemical_Modelling_of_Magma_Evolution_Process_in_Bodi e_Hills_Volcanic_Field_Nevada_USA

2.   V. P. Ponomar, **L. I. Gavryliv** "Mineral magnetic properties of granodiorite, metagabbro and microgabbro of Petermann Island, West Antarctica". 2018. Czech Polar Reports. Volume 8, No. 1 (2018), pp. 94-106. DOI: 10.5817/CPR2018-1-7
https://www.sci.muni.cz/CPR/15cislo/Ponomar_Gavryliv-web.pdf

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S A S P R O 2

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