

EMERALDinho

Project title: EMERALDinho Stimulating Innovation and Entrepreneurship in Resources Engineering



Duration of the project: 1.1.2022. – 31.12.2024.

Project leader: Université de Liège (UL), Belgium

Consortium:

University of Zagreb – Faculty of Mining, Geology and Petroleum Engineering (UNIZG-RGNF), Croatia

Université de Lorraine (UL), France

Luleå University of Technology (LTU), Sweden

Helmholtz-Zentrum Dresden-Rossendorf e.V. (HZDR), Germany

Geological Survey of Finland (GTK), Finland

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Project description

EMeraldinho aims at developing the entrepreneurial mindset and stimulating innovation among the students enrolled in the EIT-labelled Master in Resources Engineering (EMerald). Through a series of extra activities (business school, field trips, job day, ESG seminars, innovation camps, etc.), the project will foster a cross-disciplinary collaborative environment. EMeraldinho actively involves a large RIS region (Adria) in teaching and coaching.

The EMerald Master in Resources Engineering is part of EIT Raw Materials Academy. It welcomes students from all continents and offers a unique cross-disciplinary education by blending geosciences with engineering and by addressing both primary and secondary resources. Students are exposed to the most recent innovation and to forefront research questions by participating into several innovation camps, field trips and business school that stimulate their creativity and entrepreneurial mindset. The participation of industry in redesigning the curriculum and providing internship experiences is a key component of the program. The **EMeraldinho project** contributes to involve RIS (South-Eastern Europe) partners, to develop hybrid and virtual teaching methods and to provide an annual business school and

innovation workshop for both students and teaching staff. It also supports active communication and networking actions to make sure EMerald graduates are recognized worldwide in the professional community.

By opening its partnership in education, the consortium is setting a stepstone for its future European strategy joining forces of both Erasmus Mundus, EIT and European Universities initiatives into a meaningful and long lasting educational offer.

Project objectives and scopes

The consortium reflects the three sides of the knowledge triangle with five universities, two large research centres and two leading industrial partners.

In order to support the entrepreneurial mindset of the students, the whole program provides opportunities for industrial partners to offer seminars and more specifically to raise awareness about the necessity of good Environmental Social and Governance (ESG) practices in the raw materials sector.

1. Lawyers, NGO's and public bodies such as the **European Bank for Reconstruction and Development (EBRD)** will also be solicited to provide students with a full understanding of the current landscape of the raw materials sector in Europe and abroad (WP6).
2. To further develop their entrepreneurial skills and capabilities in project management and use of business model canvases, students will be offered to participate in an intensive **Summer Business School** specializing on the very specific needs of the resources sector (WP1).
3. In order to extend its international outreach and make sure to overcome the risks of limited mobility, as experienced during the CoVid crisis, the EMeraldinho project also considers the development of a more intense offer of hybrid teaching materials referring to both primary (WP3) and secondary resources (WP4).
4. Most essential to stimulate innovational thinking is to expose students to real situations during field trips and innovation camps and to offer them the opportunity to creatively solve challenges. The EMeraldinho project involves a **RIS partner – UNIZG-RGNF**, acting as a hub for the whole region of the Dinarides, with the aim to give a series of lectures preparing students to experience a **two-week eye-opening field trip** to visit industrial operations and active or prospective mining sites (WP2).
5. Students will be invited to participate to a **one-week innovation Camp** in a **RIS cross-border region (DE-PL-CZ)** where the circular economy is progressively put in place (WP5).

To contribute to the high visibility and attractiveness of the EIT labelled program as well as to the reputation of the EMerald alumni, the project also includes a series of essential communication, lobbying and networking activities (job day, raw materials week, MITL online conference) (WP6). Industrial partners will be involved all across the program through different means to raise awareness on real socio-economic challenges. Seminars and workshops will be held to present interesting up-grading technics, case studies, innovative business model, new CSR practices in the raw materials sector in Europe.

The role of UNIZG-RGNF – ADRIA field trip

Central to the study track of EMerald are the ideas of multi-culturality and multi-disciplinarity. With EMeraldinho project, the program involves a RIS partner (Uni Zagreb) and exposes students to the innovation opportunities in the Dinaric Alps.

Within WP2, UNIZG-RGNF aims to prepare six case-specific introductory lectures and ADRIA fieldtrip guidebook – RIS focus, and to organise and conduct an **annual fieldtrip “ADRIA fieldtrip – from regional to ideal KTI”** in primary raw materials across the ADRIA region using both

- (1) a metallogenic and
- (2) a knowledge triangle integration (KTI) approach.

(1) Classical metallogenic approach follows subparallel NW-SE trending structure of the Dinaric orogen and incorporates typical ore deposits associated with all phases of the Wilson cycle:

- A. Incipient intracontinental rifting of the Dinarides (Early Permian Ljubija Fe deposit),
- B. Advanced intracontinental rifting of the Dinarides (Early Triassic Veovača/Rupice Fe-Pb-Zn-Cu-Sb barite deposits),
- C. Subduction in the Dinarides (Cretaceous Bor/Majdanpek Cu-Mo-Au open-pit),
- D. Passive continental margin – carbonate platform units, emersion related deposit (Cretaceous Jajce bauxite deposits),
- E. Post collisional magmatism in the Dinarides (Oligocene Rudnik Pb-Zn/Cu, Ag, Bi, W deposit), and
- F. Post-orogenic collapse of the Dinarides (Miocene Valjevo B-Li deposit).

(2) Knowledge triangle integration (KTI) approach is focused to the following raw material cycles in both traditional and new critical commodities in the ADRIA region:

(i) traditional commodities:

- A. Iron cycle in BiH and its collapse;
- B. Alumina cycle in BiH and future perspectives;
- C. Cu cycle in Serbia and future perspectives;

(ii) new and critical commodities:

- D. Sb mining potential in BiH and future perspective;
- E. Lithium and borates in Serbia and future perspective.

For each of the selected commodities, students will learn about ore types, reserves and production, industrial development, manufacturing, waste management opportunities. Students will review on site operation conditions, safety, energy consumption, improvement opportunities. During these activity students will be introduced with the specifics of the regional knowledge triangle for specific commodities and its misfits and deterioration in the last decades. Gained student knowledge in the circular economy from other Emerald courses will be utilized to simulate and present ideal KTI at selected ADRIA case-studies at the final days of the field-trip (group-work).