

EIT RawMaterials PhD training: Enabling new approaches

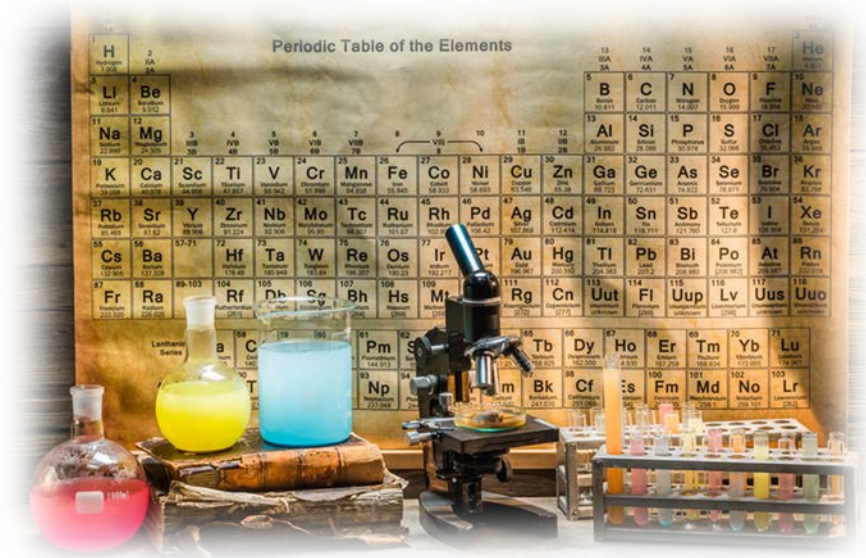
Olli Salmi | LUT | 9 Oct 2018



EIT RawMaterials is supported by the EIT,
a body of the European Union

EIT RawMaterials PhD training: How?

- Exposure to the largest consortium around metallic and mineral raw materials in the world: candidates will meet potential future employees, customers, and colleagues
- International and intersectoral mobility: each PhD candidate works in two different countries and will gain experience in both academic and private sectors
- Training in entrepreneurship and innovation skills: apart from frequent contacts with the industry partner of their project, the entrepreneurial mindset of PhD candidates will be stimulated by specific training
- Training in market and technology intelligence: understanding the boundary conditions of the minerals and metals markets, both technologically and economically



Focus areas of current EIT RawMaterials PhD courses/programmes

- Functional Materials
 - New materials for aerospace sector and nanotechnology applications
- Circular Economy
 - Material design for circularity
 - Production management for circularity
 - Entrepreneurship in circular industries
- Big data, simulation and automation
 - Realtime measurements in drilling together with use of scientific databases
 - Data analytics to optimise mineral processing
- Industry/RTO placement
 - PhD candidates' placement especially in SME's to understand the business logic of smaller niche companies

Functional Materials

IDS-FunMat. Functional Materials & Innovation

- Motivation

- Designing materials, instead of just selecting what's out there, ought to be able to enable radically new approaches to designing products so that they better solve challenges
- Getting functional materials into use requires innovation skills

- Educational solution – 2 year programme, including

- Entrepreneurship, technology intelligence, project and risk management, and other innovation skills
- Eco-design and life-cycle assessments
- Industry interaction

- Further information

<https://idsfunmat.u-bordeaux.fr>



Circular Economy

CEESIMP. Circular Economy Entrepreneurship in System Integrated Metals Processing

- Motivation

- In their future careers, students need to be able to access the economic impact of their research; and, industry needs to develop more circular economy solutions

- Educational solution (online course + summer school)

- Online: Gain insights into innovation; and, how materials and material processing can be designed to eliminate waste and maximise future recycling
- Summer school: Solve an industry challenge; and get coaching on pitching

- Further information

<https://eitrawmaterials.eu/course/suscritmat/>



SusCritMat. Sustainable Management of Critical Raw Materials

- Motivation

- Certain raw materials e.g magnetic materials play a vital function in many types of products
- Supplies of such raw materials, particularly within Europe, are limited: critical raw materials

- Educational solution (short courses)

- Enhance awareness of critical raw materials
- Develop life cycle and design skills in order to recover critical raw materials from products

- Further information

<https://eitrawmaterials.eu/course/suscritmat/>



CE-COSP. Circular Economy and Raw Material Competence for Sustainable Production

- Motivation
 - A key solution to climate change is to minimise waste and maximise reuse, remanufacturing and recycling, (circular economy) - which requires an overview
 - Products however tend to be produced in 'isolated' manufacturing stages
- Educational solution (course)
 - PhD students working on the topic of product and manufacturing design gain an overview of car manufacturing via a journey along the value chain
 - At each stage of the journey, students need to reflect on how to include circular economy aspects in their research
- Further information: <https://eitrawmaterials.eu/course/ce-cosp/>



Field: Management of Technology

DOCSUMCube. Entrepreneurship in the Circular Economy

- Motivation

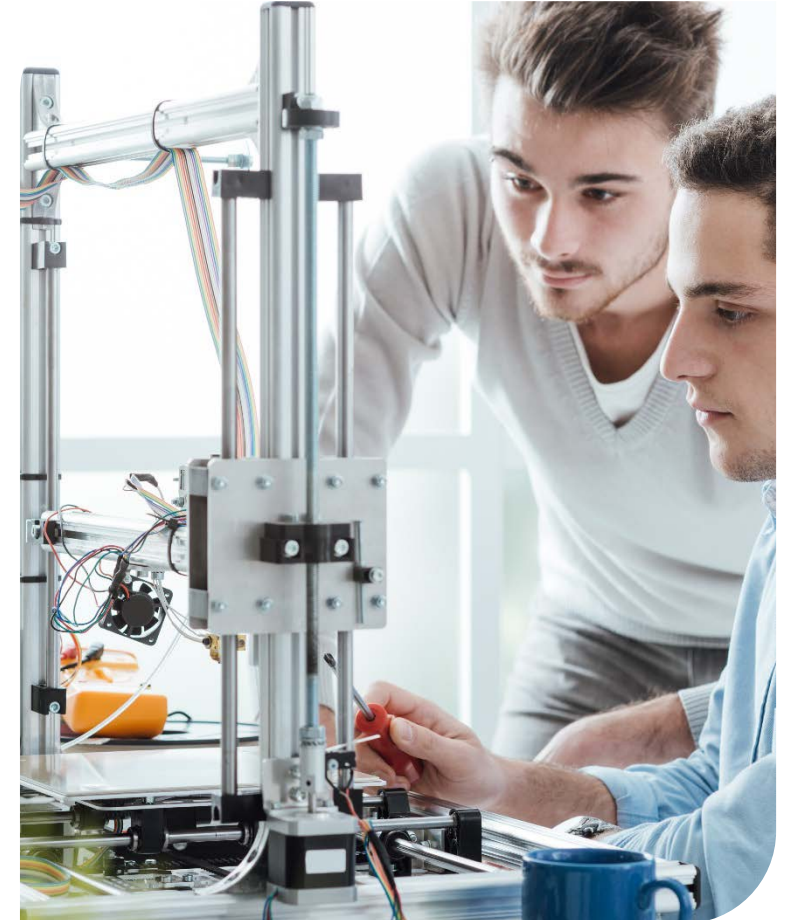
- In their future careers, students need to be able to access the economic impact of their research; and, industry needs to develop more circular economy solutions

- Educational solution (summer school)

- Students join a summer school where they:
 - Work together on industry challenges
 - Receive coaching on how to assess the economic and organisational impacts of technologies
 - Gain experience of pitching solutions to industry

- Further information

<http://www.circulareconomy.education>



TOP STARS. Innovation challenge for PhD Students

- Motivation

- In their future careers, students need to be able to access the economic impact of their research; and, industry needs to develop more circular economy solutions

- Educational solution (summer school)

- Students join a summer school where they:
 - work together on industry challenges
 - Receive coaching on how to assess the economic and organisational impacts of technologies
 - Gain experience of pitching solutions to industry

- Further information

<https://eitrawmaterials.eu/events/top-stars-2018/>



Big data, simulation and automation

MIDICON. Modern process data analytics in mineral production

- Motivation

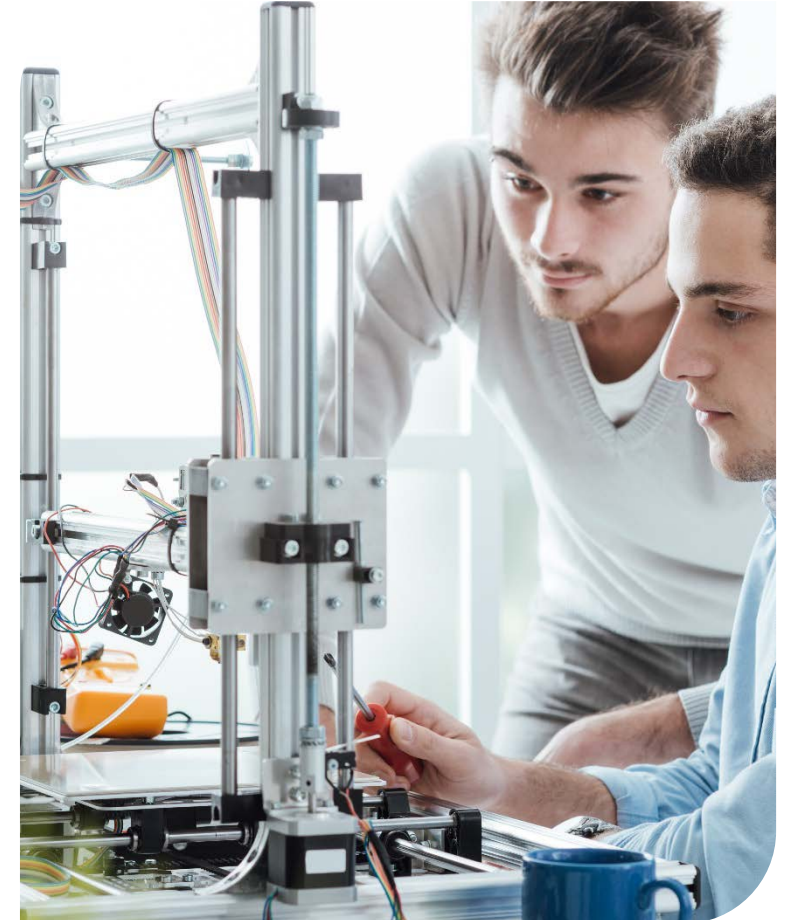
- Scientific modelling and the merging real time sensing technologies is now making it possible to use Industry 4.0 techniques to design and operate mineral production plants

- Educational solution (course)

- Introduction to key industry 4.0 topics
- Site visits and Industry challenge
- Groups work to research the challenge and devise a solution
- Coaching on business assessments and industry pitching

- Further information

<https://openlearning.aalto.fi/enrol/index.php?id=56>



I-EDDA-RS. Innovative Exploration Drilling and Data Acquisition Research School

- Motivation
 - A wide range of new measurement techniques are becoming available for use in exploration and drilling. People need to know that these techniques exist; and, how to make a scientific assessment of the incoming data - in order to optimise future exploration and drilling activities.
- Educational solution – a programme for PhD students about
 - How geoscientific methods can be used to discover new, deep mineral deposits
 - How to design and plan in-situ studies (exploration drilling) in order to make best use of incoming real time data
 - How to learn more by synthesising exploration results with the scientific knowledge
- And, enables students to practically apply their knowledge in a very deep drilling system
- Further information: <https://www.iedda.eu/>



Field: Raw materials processing and recycling

Industry / RTO Placement

ADMA. Gaining R&D work experiences in industry/RTOs

- Motivation
 - Industry and RTOs employ more PhD graduates than universities
 - Students don't get R&D experiences in industry/RTOs
- Educational solution
 - Match PhD students with relevant industry/RTO
 - Prepare students for a placement in industry/RTO
 - Enable PhD students to go on a placement
 - Facilitate learning from that experience
- Further information
 - <http://www oulu.fi/adma/>



Field: Raw materials processing and recycling

EIT RawMaterials PhD training: Why?

Glimpse the future potential of your scientific expertise

Gain industry experience and solve challenges

Apply research based concepts to exploration, mineral processing and design

 RawMaterialsAcademy

 EIT RawMaterials Academy

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THANK YOU!



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