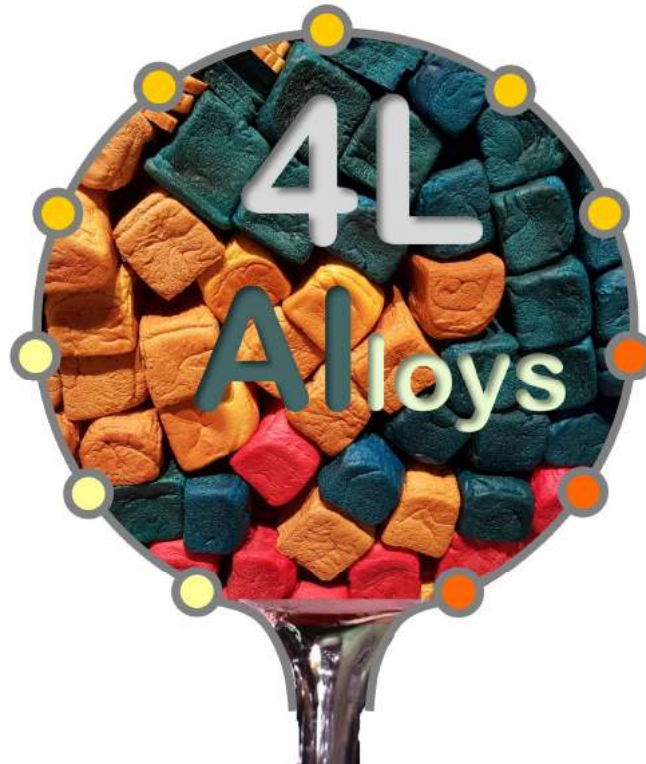


## Summer School



# Life Long Learning on Light Alloys: from Raw Materials to Sustainable Products

*Vicenza – July 24<sup>th</sup>-28<sup>th</sup>, 2017*

*Department of Engineering and Management*

*in cooperation with*

 <p><b>SINFONET</b> SMART &amp; INNOVATIVE FOUNDRY NETWORK</p>	 <p>FONDAZIONE <b>CPV</b> Centro Produttività Veneto Formazione &amp; Innovazione</p>	 <p>CONFINDUSTRIA Veneto SIAV S.P.A.</p>	
 <p><b>A&amp;L</b> Aluminium Alloys Pressure Diecasting Foundry Techniques</p>		 <p>CONSORZIO <b>SPRING</b> STRATEGIC PARTNERSHIP FOR RESEARCH-BASED INNOVATIVE AND NETWORKED GROWTH</p>	 <p><b>AMAFOND</b> ASSOCIAZIONE ITALIANA FORNITORI FONDERIE</p>
 <p>ASSOCIAZIONE ITALIANA DI METALLURGIA</p>		 <p>Consorzio Imballaggi Alluminio <b>CIAI</b></p>	 <p><b>ASSOFOND</b> Federazione Nazionale Fonderie</p>

## Presentation

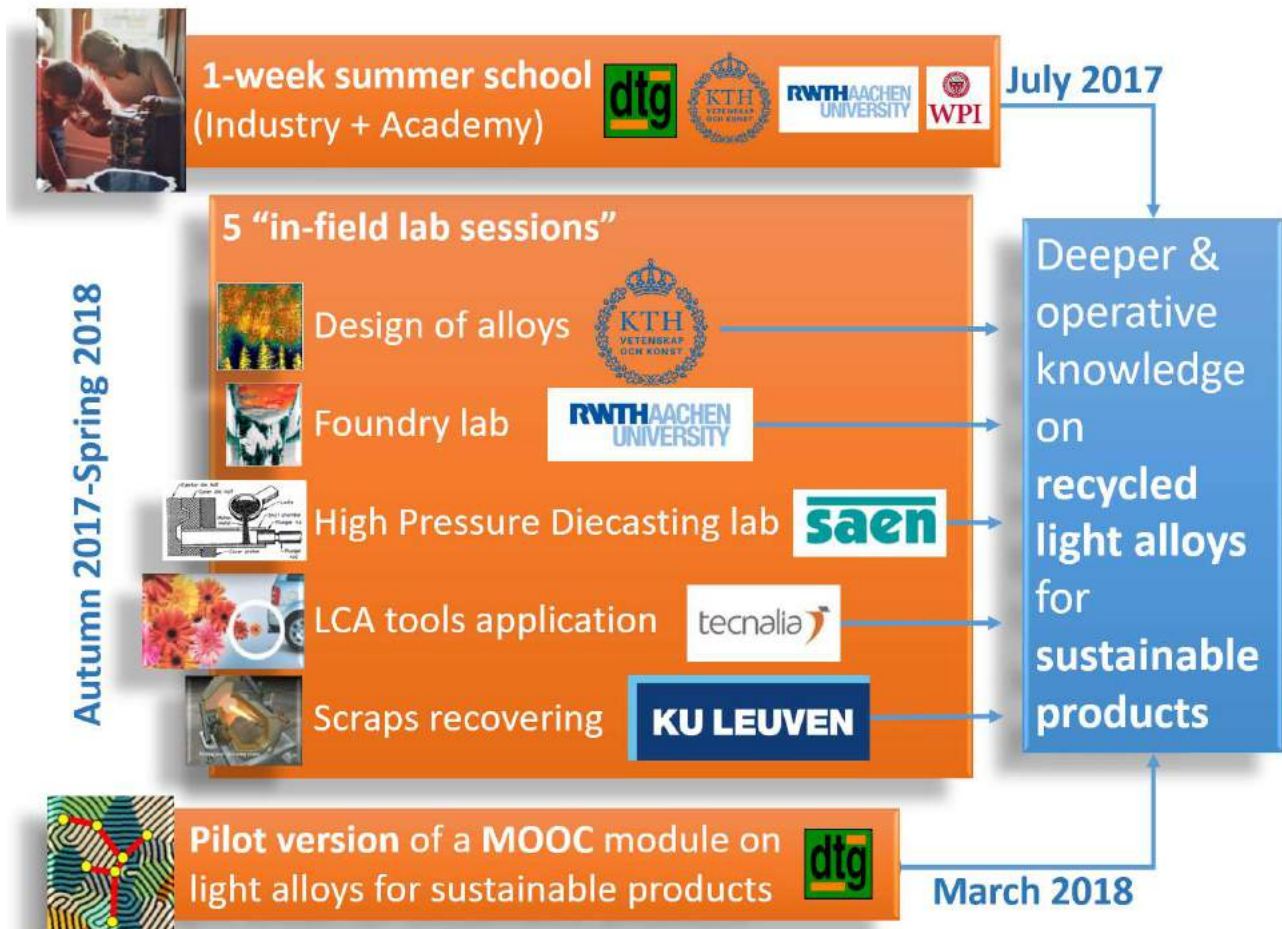
The use of light metal castings, particularly in the transport sector offers environmental advantages through savings of weight and ease of recycling. European light metal foundries are typically small or medium size enterprises, with a strong need of innovation for being competitive.

The **4L-Alloys** School is addressed to professionals coming from European producers and users of cast, rolled and extruded Al-based components, as well as from the whole supply chain.

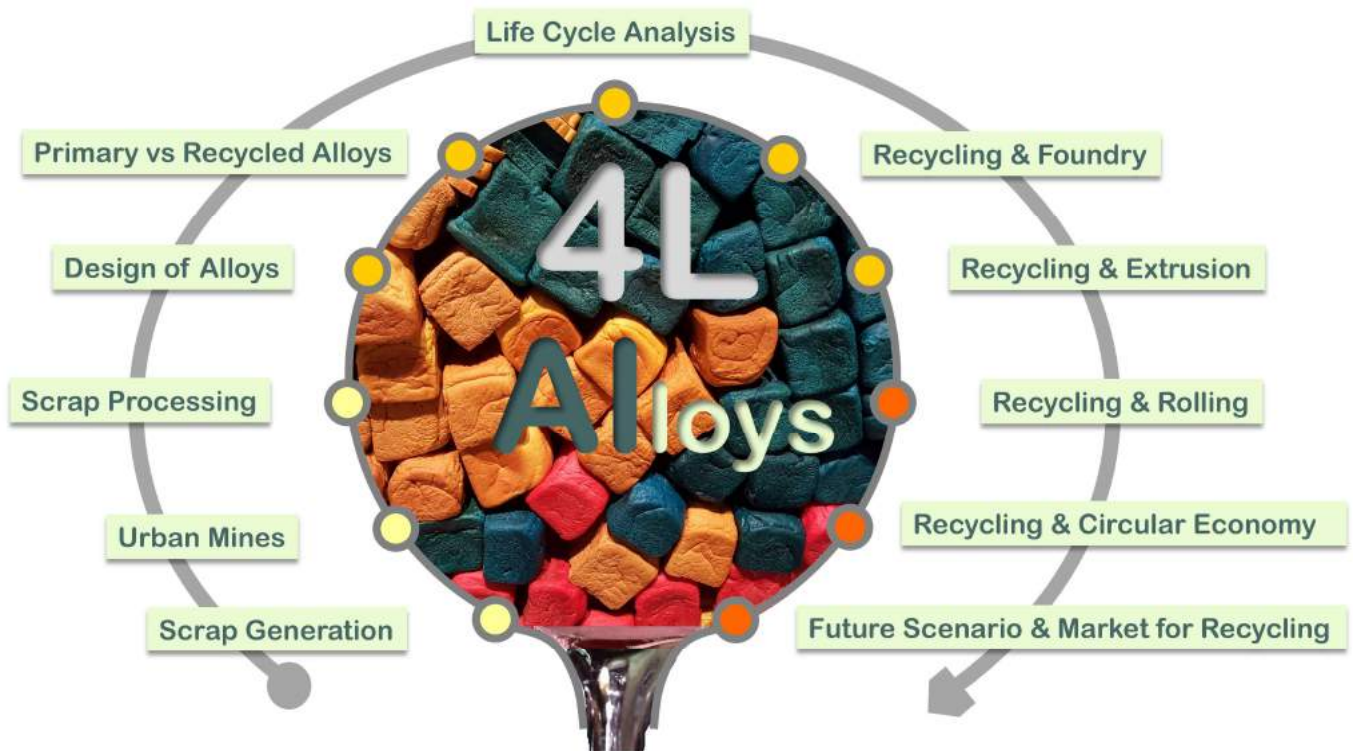
The **4L-Alloys** School will train these professionals at improving the sustainability of high quality manufacturing of Al-based products, taking advantage from the potential of recycling and recycled alloys.

The **4L-Alloys** School, thanks to trainers from industrial companies, Academy, Technology Transfer Institutions, will offer an overview of this potential, merging topics which are important both for industrial engineers (knowledge of innovative solutions and approaches) and for researchers (knowledge of the industrial requirements to be targeted by innovation).

The **4L-Alloys** School will be held in Vicenza (24<sup>th</sup>-28<sup>th</sup> July 2017), and will be linked to 5 in-field lab sessions (scheduled from September 2017 to march 2018), allowing the opportunity of visiting plants and laboratories with special competence in areas such as alloys design, recycling, processing of recycled alloys, life cycle analyses.



## 4L-Alloys Roadmap



### Topics Covered

Aluminium Alloys  
Casting  
Extrusion plants  
Foundry processes  
Life Cycle Analysis  
Recycling  
Rolling plants  
Scrap collection  
Scrap re-melting  
Scrap sorting  
Solidification  
Surface Finishing  
Urban mines

### Target Audience

If your business is Aluminium alloys processing (from scraps treatment to melting, from foundry to rolling and extrusion, from design to application), this School will be valuable for you.  
The School is also addressed to PhD students, in the area of Engineering & Materials Processing.

## Scientific Committee

Lars Arnberg	(KTH, Stockholm, Sweden)
Franco Bonollo	(DTG, Padova University, Italy)
Andreas Buhling Polaczek	(RWTH, Aachen, Germany)
Giulio Timelli	(DTG, Padova University, Italy)
Diran Apelian	(Worcester Polytechnic Institute, USA)

## Lecturers

Aritz Alonso Galdames	(Tecnalia, Bilbao, Spain)
Francesco Andreatta	(Udine University, Italy)
Diran Apelian	(Worcester Polytechnic Institute, USA)
Antonio Armigliato	(SLIM Fusina Rolling, Fusina – VE, Italy)
Lars Arnberg	(KTH, Stockholm, Sweden)
Ragnhild E. Aune	(NTNU, Trondheim, Norway)
Franco Bonollo	(DTG, Padova University, Italy)
Andreas Bührig-Polaczek	(RWTH, Aachen, Germany)
Francesco Dal Sasso	(Metalba, Bassano, Italy)
Sean Kelly	(Worcester Polytechnic Institute, USA)
Anne Kvithyld	(SINTEF, Trondheim, Norway)
Claudio Mus	(Endurance Overseas, Torino, Italy)
Roberta Niboli	(European Aluminium Association)
Piero Parona	(Raffmetal, Casto – BS, Italy)
Gino Schiona	(CIAL, Milano, Italy)
Giulio Timelli	(DTG, Padova University, Italy)
Ruggero Zambelli	(Raffmetal, Casto – BS, Italy)

## Organising Committee

Franco Bonollo	(DTG, Padova University, Italy)
Giulio Timelli	(DTG, Padova University, Italy)
Paolo Ferro	(DTG, Padova University, Italy)
Alberto Fabrizi	(DTG, Padova University, Italy)
Eleonora Battaglia	(DTG, Padova University, Italy)
Daniele Caliarì	(DTG, Padova University, Italy)
Jovid Rakhmonov	(DTG, Padova University, Italy)
Federica Bassani	(Associazione Italiana di Metallurgia, Milano, Italy)

## Programme

**July 24<sup>th</sup>, 2017**

**Registration & Informal Opening**

14.00-16.00 *Registration*

16.00-17.30 *Visit to Research Labs at DTG*

**July 25<sup>th</sup>, 2017**

**Scraps Generation  
and their Management  
in Urban Mines**



09.00-09.30 Welcome addresses

09.30-10.30 **Al-alloys components at end-of-life**

Short review of application, life-cycle, scraps generation  
*Franco Bonollo (Padova University, Italy)*

10.30-11.15 **The Aluminium urban mines**

Post-consume material flow analysis  
*Gino Schiona (CIAL, Milano, Italy)*

11.15-12.15 **Integrated Approach & Value Creation in Recycling Mixed Al-Scraps**

Enabling Technologies to Prepare and Up-cycle Aluminium Scraps  
*Diran Apelian, Sean Kelly (Worcester Polytechnic Institute, USA)*

12.15-13.45 *Lunch*

13.45-14.45 **Collection and sorting of scraps from urban waste**

Collection methods & strategies before scraps re-melting  
*Gino Schiona (CIAL, Milano, Italy)*

14.45-16.00 **Relevant processing solutions before re-melting of scraps**

Review of treatments on scraps to improve melting  
*Ragnhild E. Aune (NTNU, Trondheim, Norway)*

16.00-16.30 *Break*

16.30-17.45 **Techniques to optimise melting of scraps**

Furnaces, fluxes, treatments of re-melted Al alloys  
*Anne Kvithyld (SINTEF, Trondheim, Norway)*

July 26<sup>th</sup>, 2017

## Aluminium Alloys: Primary and Recycled



09.00-10.30	<b>Solidification of Al-alloys</b> Key-features of solidification process & role of alloying elements <i>Lars Arnberg (KTH, Stockholm, Sweden)</i>
10.30-11.00	<i>Break</i>
11.00-12.30	<b>Casting of components in foundry processes for recycled Al alloys</b> Casting Processes, metallurgy, casting and shaping, as cast micro-structures <i>Andreas Bührig-Polaczek (RWTH, Aachen, Germany)</i>
12.30-14.00	<i>Lunch</i>
14.00-15.30	<b>Primary vs Recycled Al alloys</b> A critical comparison in terms of properties and potential <i>Giulio Timelli (Padova University, Italy)</i>
15.30-16.00	<i>Break</i>
16.00-17.30	<b>Surface Quality: competition among Al alloys</b> A critical comparison in terms of corrosion and surface finishing <i>Francesco Andreatta (Udine University, Italy)</i>

July 27<sup>th</sup>, 2017

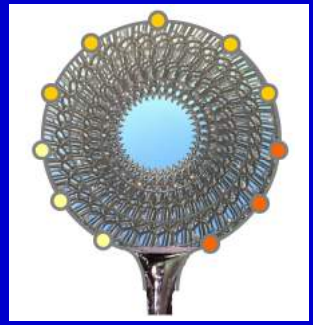
## Circular Economy and Scenarios for Recycled Alloys



09.00-10.30	<b>LCA as a tool to compare Primary vs Recycled Al alloys</b> Eco-sustainability of alloys quantified by means of LCA Aritz Alonso Galdames (Tecnalia, Bilbao, Spain)
10.30-11.00	<i>Break</i>
11.00-12.30	<b>Successful application of recycled alloys – case-history #1:</b> Recycled alloys in a modern HPDC foundry <i>Claudio Mus (Endurance Overseas, Torino, Italy)</i>
12.30-14.00	<i>Lunch</i>
14.00-15.00	<b>Circular Economy in an Increasingly Dynamic Aluminium Industry</b> Challenges & opportunities for Al-alloys in a circular economy context <i>Diran Apelian, Sean Kelly (Worcester Polytechnic Institute, USA)</i>
15.00-16.00	<b>The future scenario of recycling and recycled alloys</b> Overview of market trends and perspective <i>Roberta Niboli (Raffmetal and European Aluminium Association)</i>
16.00-16.30	<b>Overview of 4L-alloys in-field lab sessions</b> <i>Franco Bonollo (Padova University, Italy)</i>

July 28<sup>th</sup>, 2017

## Successful Applications of Recycled Alloys



- 09.00-10.00 **Successful application of recycled alloys – case-history #2:**  
Production of high performance recycled alloys  
*Piero Parona, Ruggero Zambelli (Raffmetal, Casto – BS, Italy)*
- 10.00-10.45 **Successful application of recycled alloys – case-history #3:**  
Re-generation of alloys in an extrusion plant  
*Francesco Dal Sasso (Metalba, Bassano, Italy)*
- 10.45-11.15 *Break*
- 11.15-12.00 **Successful application of recycled alloys – case-history #4:**  
Re-generation of alloys in a rolling plant  
*Antonio Armigliato (SLIM Fusina Rolling, Fusina – VE, Italy)*
- 12.00-12.30 **Concluding remarks**
- 14.00-17.00 *Visit to Industrial Plant  
(optional, to be confirmed)*



## Location of the Summer School

The School will be hosted within the Department of Engineering and Management of Industrial Systems (DTG, [www.gest.unipd.it](http://www.gest.unipd.it)), in Vicenza (str. S. Nicola, 3), a town in the North-East of Italy (30 min by train from Venice, less than 2 hours by train from Milan). Vicenza is both an ancient city, already important in the Roman times, and a modern city, fully open to tourism and commercial exchanges. Vicenza is well known for the good weather especially in summer, the friendly people, the excellent cuisine, and its artistic relevance.

Vicenza is a thriving and cosmopolitan city, with a rich history and culture, and many museums, art galleries, piazzas, villas, churches and elegant Renaissance palazzi. The considerable cultural interest of Vicenza is linked mainly to the name of the architect Andrea Palladio, responsible for numerous famous historical buildings in Vicenza, inspired by the classical art of the Greeks and Romans, revisited to suit the Veneto culture. Palladian architecture is considered a universal value that had an enormous influence all over the world and that is why Vicenza is included in UNESCO's World Heritage List. (<http://www.vicenzae.org/en/>).

The city counts with a large and diverse offer for lodgement. The city is completely flat. Walking, cycling along the city is very comfortable. Moreover, the city has a good public transport network which will allow the delegates to come to the university from practically any point in the city.



## How to arrive in Vicenza

### By plane:

The airports nearest to Vicenza are Venice Marco Polo (60 km from Vicenza) and Verona Catullo (50 km from Vicenza); both airports are served by many frequent international flights. From both Venice Marco Polo and Verona airport, it's about an hour's transfer (by bus then train) to Vicenza. Information on [www.atvo.it](http://www.atvo.it) and [www.trenitalia.com](http://www.trenitalia.com).

### By train:

Vicenza station is on the main Milan-Venice railway link, served by numerous international trains. Trenitalia Le Frece and Eurostar trains stop at Vicenza. Information on [www.trenitalia.com](http://www.trenitalia.com).

### By car:

Vicenza is on the A4 (Milan-Venice) motorway, which is linked to the European motorway network.

## Accommodation

Vicenza has a wide range of accommodation, from luxury hotels to youth hostels. The estimated rates per night for single or double accommodation, breakfast included, are from 50 € to 150€. Some hotels are at walking distance from the Conference venue.

Some of the hotels are shown below:

### Four Stars Hotels

Glam Boutique Hotel (about 300 m) 17 rooms 120-150 € <http://www.gboutiquehotel.com>

Hotel Palladio (about 250 m far) 22 rooms 120-150 € <http://www.hotel-palladio.it>

Campo Marzio (about 1 km far) 35 rooms 100-120 € <http://www.hotelcampomarzio.com>

NH Jolly Tiepolo (about 3 km far) 113 rooms 80-100 € <http://www.vicenzatiepolohotel.it>

AC Hotel Vicenza, Marriott (about 4.5 km far) 125 rooms 80-100 € <http://www.marriott.com>

### Three Stars Hotels

Key Hotel (about 500 m far) 53 rooms 70-90 € <http://www.key-hotel.it/>

Hotel Cristina (1.2 km far) 33 rooms 70-90 € <http://www.hotelcristinavicenza.com>

Hotel Doge (about 2 km far) 30 rooms 70-90 € <http://www.hoteldoge-vi.it>

Hotel Verdi (about 3 km far) 51 rooms 60-80 € <http://www.hotelverdivicenza.it>

### Two Stars Hotels

Hotel Due Mori (450 m far) 30 rooms 60-80 € <http://www.hotelduemori.com>

Albergo San Raffaele (about 1 km far) 29 rooms 60-80 € <http://www.albergosanraffaele.it>

Hotel La Terrazza (about 1.5 km far) 18 rooms 60-80 € <http://www.laterrazahotelvicenza.com>

Albergo Acampora (about 2 km far) 10 rooms 50-70 € <http://www.albergoacampora.it>

## Language

The 4L-Alloys School will be held in English.

## Insurance

The Organising Secretariat cannot assume any responsibility for personal accident, loss or damage to the private property of participants and accompanying persons, which may either occur during or arise from the School. Participants should therefore take whatever steps they consider necessary as regards insurance.

## Website

The official website of the 4L-Alloys School is

[www.gest.unipd.it/4L-ALLOYS/](http://www.gest.unipd.it/4L-ALLOYS/)

## Registration & Fees

The Registration to the 4L-Alloys will be managed in cooperation with the Italian Association for Metallurgy (AIM). Registrations will be accepted until July 15<sup>th</sup>, 2017. After this date, only on-site registration will be allowed if places are still available; please note that the full conference kit cannot be guaranteed for on-site registrations.

Fees are in Euros. Invoice will be issued for every paid fee and mailed to your e-mail address. The registration includes:

- Conference kit (bag with electronic proceedings),
- Lunches and coffee breaks,
- 4L-Alloys School Official Dinner.

Standard participant	600 Euro (22% VAT included)
ACRC Member	300 Euro (22% VAT included)
SINFONET Member	300 Euro (22% VAT included)
AIM Member	300 Euro (revenue stamp included)
Student*	300 Euro (22% VAT included)

\* *Please send proof of your student status by email (Student registration is available for undergraduate and PhD students ONLY).*

## Finalising Registration

If you plan to attend, please register online following the instructions and the link at the 4L-Alloys website [www.gest.unipd.it/4L-ALLOYS/](http://www.gest.unipd.it/4L-ALLOYS/)).

## Payment and remittance

- ⇒ by bank transfer, to the order of Associazione Italiana di Metallurgia AIM at “UBI Banca SpA”, Branch no. 2, Via Borgogna, 2/4 - 20122 Milano - Italy, account no. 000000022325 - cod. ABI 03111 - CAB 01604 - cin O, IBAN: IT4900311101604000000022325, swift code BLOPIT22. The transfer order must specify the name of the participant and the reference “4L-ALLOYS School”. A copy of the transfer order must be sent to AIM, together with the Registration Form.
- ⇒ by credit card online (please, follow the instructions and the link from the 4L-Alloys website [www.gest.unipd.it/4L-ALLOYS/](http://www.gest.unipd.it/4L-ALLOYS/)).

## Cancellation and refund policy

A refund, less 20% deduction for administrative costs, will be issued for written cancellations received by July 15<sup>th</sup>, 2017. For attendees who notify their cancellation after July 15<sup>th</sup>, 2017 or will not attend the School, a charge of 100% of the conference fee will be withheld and a copy of the proceedings will be sent after the event.



EIT RawMaterials, initiated by the EIT (European Institute of Innovation and Technology) and funded by the European Commission, is the largest and strongest consortium in the raw materials sector worldwide. Its vision is a European Union where raw materials are a major strength. Its mission is to boost competitiveness, growth and attractiveness of the European raw materials sector via radical innovation and guided entrepreneurship.

EIT RawMaterials unites more than 100 partners – academic and research institutions as well as businesses – from more than 20 EU countries. They collaborate on finding new, innovative solutions to secure the supplies and improve the raw materials sector all along its value chain – from extraction to processing, from recycling to reuse. There are six regional hubs in Belgium, Finland, France, Italy, Poland and Sweden, called Co-location centers that represent different regional ecosystems bridging between business, research and education.

EIT RawMaterials aims to significantly enhance innovation in the raw materials sector by sharing of knowledge, information and expertise. EIT RawMaterials will generate a significant impact on European competitiveness and employment by driving and fostering innovation and empowering students, entrepreneurs and education partners driving toward the circular economy. This will result in the introduction of innovative and sustainable products, processes and services, as well as talented people that will deliver increased economic, environmental and social sustainability to European society.

EIT RawMaterials strives to educate the raw materials game-changers of the future, ensuring Europe cultivates a society of learners contributing to a strong and resilient EU raw materials base.

Four domains of learning and education are addressed by EIT RawMaterials, namely

- PhD Education
- Master Education
- Lifelong Learning
- Wider Society Learning

Most EIT RawMaterials learning & education activities are carried out through innovative education projects launched via open Calls for Proposals with funded projects managed and implemented by the EIT RawMaterials partners.

Activities across the entire ecosystem of learners – PhD students, Master students, industrial partners, professionals within the raw materials sector – foster new pedagogical approaches to learning and teaching through the application of the Knowledge Triangle, linking critical knowledge and stakeholders in academia, industry and research. Resulting from this model is a de-siloing of raw materials disciplines and knowledge whereby learners obtain a holistic overview of the raw materials value chain complemented by robust innovation & entrepreneurial education.

**4L-ALLOYS School is a Lifelong Learning initiative supported by EIT RawMaterials.**

[www.eitrawmaterials.eu](http://www.eitrawmaterials.eu)