ecoTRE® VALENTE
DIGITAL MANUFACTURING

34TH EDITION

Solidification Course 2027

International Training in Metal Solidification and Casting.

MAY 23 - 28, 2027

CHAMPÉRY, SWITZERLAND

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About the Course

DURATION: 5 DAYS
LANGUAGE: ENGLISH
LOCATION: HOTEL SUISSE, CHAMPÉRY (SWITZERLAND)

Overview and key information

The Solidification Course is a unique international training program that connects **scientific knowledge with industrial practice** in metal solidification and advanced metallurgy. Held every year in Switzerland, it offers a rare opportunity to learn directly from **world-class professors and experts** who have shaped modern solidification science.

Now in its **34th edition**, the course combines **lectures, exercises, and open discussions** to provide a solid, applied understanding of:

- solidification fundamentals,
- microstructure and defect formation and control,
- process optimization in casting, continuous casting, and additive manufacturing,
- Artificial Intelligence
- Additive Manufacturing

Participants will strengthen their ability to interpret and predict solidification phenomena, link theory to industrial reality, and and apply simulation and optimization tools to improve product quality and process performance.

Since 2026, the course has been organized by **ECOTRE Valente**, continuing its scientific legacy while integrating cutting-edge expertise in digital metallurgy and simulation.

Course highlights

Key figures & global reach

For more than **30 years**, the Solidification Course has been a reference point for professionals and researchers in metallurgy and materials science.

33
editions

39
countries

35
hours of training in a single week

+1,100
participants

+380
companies

8
world-class lecturers per edition

From **research laboratories** to **industry and university**, the course connects people shaping the future of metallic materials.
Its international network includes professionals from **Europe, North and South America, Asia, and the Middle East**, creating a unique bridge between academia and industry.

A global community of metallurgists, engineers, and innovators — united by one shared goal: mastering the science of solidification.

Course highlights

Companies and institutions that have already taken part

AEROSPACE & AVIATION	AETC, Airbus, Boeing, Dassault Aviation, GKN Aerospace, MTU Aero Engines, PCC Structurals, Pratt & Whitney, Rolls-Royce, Safran
AUTOMOTIVE & TRANSPORT	Brembo, Caterpillar, CMS, FILL Gesellschaft, FNSS Defense System, Linamar, Maxion Wheels, Renault, Stellantis, Volkswagen, Volvo
ENERGY	ABB, EDF, Fives Cryo, Framatome, General Electric, Honeywell, Siemens, Vallourec
ENGINEERING	Asulab, Danieli, DLR, Ecotre, ESI Group, Keysight, Safran Tech, Sandvik, SMS Group
FOUNDRY	Aperam Alloys Imphy, Constellium, Deloro, Elkem, GF Casting, Hydro, Novelis, Rio Tinto Alcan, Signicast, Talum, Tital
JEWELLERY & FASHION	Argor-Heraeus, Cendres et Metaux, Nivarox-FAR, Rolex, Swatch Group, Varinor
STEEL INDUSTRY	ABS, Aubert et Duval, Arcelor Mittal, Bohler, Buderus, Doncaster, Fomas, Nippon Steel, Outokumpu, Sheffield Forgemasters, Swiss Steel Group, ThyssenKrupp, voestalpine Stahl
UNIVERSITIES & RESEARCH INSTITUTES	EPFL Switzerland, Birmingham University, Brescia University Italy, IMDEA Materials Spain, KTH Sweden, Lorraine University France, McMaster University Canada, Montanuniversitat Leoben Austria, NTNU Norway, Purdue University USA, TU Delft Netherlands

The list of companies and institutions refers to past editions of the Solidification Course and is provided for informational purposes only.

Who should attend

If your work involves metals, processes, or microstructures — this course will expand how you understand and control them.

Target participants

The Solidification Course is designed for professionals and researchers who want to deepen their understanding of **metal solidification, process simulation, and metallurgical innovation**.
It's an advanced-level program that blends theory and practice, ideal for those aiming to strengthen both **technical expertise and industrial insight**.

This course is for you if you are:

- an **engineer or metallurgist** involved in casting, forging, or heat treatment;
- a **process or R&D manager** responsible for product quality and innovation;
- a **simulation or design engineer** using digital tools to optimize manufacturing;
- a **technical consultant or educator** seeking an updated, international perspective on solidification phenomena.

The program is particularly relevant for professionals working in **foundry and metal processing industries, steelmaking (and aluminum/copper production), automotive, aerospace, energy, watch industry, and additive manufacturing.**

A basic knowledge of metallurgy or materials science is recommended.
The course ensures direct interaction with lecturers and personalized discussion on specific challenges and case studies.

Scientific program

A full week of intensive training designed to connect scientific depth with industrial know-how.

Main topics and structure

The Solidification Course offers a complete overview of the **solidification of metallic materials**. Each lecture is designed to provide a clear scientific foundation while showing how these principles apply to **casting, ingot, continuous casting, additive manufacturing, and defect control**. Participants will gain a deep understanding of:

- Thermodynamics and phase diagrams
- Heat and mass transfer
- Nucleation and grain refinement
- Micro- and macrosegregation
- Dendritic and eutectic solidification
- Columnar and equiaxed structures
- Porosity and hot tearing
- Mushy zone dynamics
- Solidification in multicomponent alloys
- Additive Manufacturing and rapid solidification
- Artificial Intelligence and optimization techniques (reverse engineering, artificial neural networks, genetic algorithms, …) applied to foundry processes and image analysis

The program combines **lectures, hands-on exercises, and films showing in-situ solidification**, encouraging active participation and discussion with the lecturers. Group work and Q&A sessions help translate theory into practical problem-solving.

Agenda

Five days of learning, discussion, and collaboration — guided by the leading minds in solidification science.

Weekly schedule at a glance

Sunday, 23 May
From 6:30 PM - Welcome, registration, and opening dinner

Monday, 24 May
Introduction / Overview of solidification phenomena M. Gremaud
Phase diagrams A. Jacot
Discussion/Exercises (Phase diagrams) A. Ludwig / A. Jacot
Heat and Mass transfer M. Krane
Discussion/Exercises (Heat-Mass transfer) H. Combeau / M. Krane
Nucleation and grain refinement in alloys A. Ludwig
In-situ visualization of solidification (films) M. Rappaz / D. Tourret

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Tuesday, 25 May
Microsegregation D. Tourret
Discussion/Exercises (Microsegregation) D. Tourret / H. Combeau
Mushy zone dynamics H. Combeau
Dendritic solidification A. Phillion
Discussion/Exercises (Dendrites) A. Phillion / A. Ludwig
Eutectic solidification A. Ludwig
Discussion/Exercises (Eutectic) A. Ludwig / A. Phillion
"Swiss Evening" dinner

Wednesday, 26 May
Porosity M. Rappaz
Discussion/Exercises (Porosity) H. Combeau / M. Rappaz
Columnar and equiaxed structures H. Combeau
ECOTRE VALENTE Awards
Private discussions can take place to address more specific problems with professors.

Thursday, 27 May
Hot tearing A. Phillion
Discussion/Exercises (Hot tearing) M. Krane / A. Phillion
Additive manufacturing / Rapid solidification D. Tourret
Macrosegregation M. Krane
Discussion/Exercises (Macrosegregation) A. Ludwig / M. Krane
Session on AI usage in foundry processes M. Rappaz / A. Jacot

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Friday, 28 May
Solidification path in multi-component systems M. Rappaz
Discussion/Exercises (Multi-comp) A. Jacot / M. Rappaz
Synthesis – Linking solidification phenomena A. Jacot
Concluding remarks M. Gremaud
Until 12:15 PM - Course ends (lunch included)

Faculty

LEARN DIRECTLY FROM THE SCIENTISTS AND ENGINEERS WHO DEFINED TODAY'S UNDERSTANDING OF SOLIDIFICATION.

Lecturers and experts

NAME	INSTITUTION / ROLE	COUNTRY	KEY TOPICS
Prof. Hervé Combeau	Professor, Lorraine University – Institut Jean Lamour	France	Microsegregation, mushy zone dynamics, grain structures
Dr Marco Gremaud	Solidification Course Co-founder — Former ESI Manufacturing Director / Innosuisse Expert	Switzerland	Introduction, coordination, industrial applications
Dr Alain Jacot	R&D Manager, Physics & Materials, Keysight Technologies	Switzerland	Phase diagrams, in-situ visualization of solidification, AI & optimisation techniques
Prof. Matthew J. M. Krane	Professor, Purdue University	USA	Heat and mass transfer, macrosegregation
Prof. Andreas Ludwig	Professor Emeritus, Montanuniversität Leoben	Austria	Nucleation, eutectic solidification, structure formation
Prof. André Phillion	Professor, McMaster University	Canada	Dendritic growth, hot tearing, synthesis
Prof. Michel Rappaz	Solidification Course Co-founder — Professor Emeritus, EPFL Lausanne	Switzerland	Porosity, additive manufacturing, multicomponent alloys, AI & optimisation techniques
Prof. Damien Tourret	IMDEA Materials Institute	Spain	Microsegregation, Additive Manufacturing

Fees and Registration

SEATS ARE LIMITED!
EARLY REGISTRATION IS STRONGLY RECOMMENDED TO SECURE YOUR PARTICIPATION AND BENEFIT FROM THE EARLY-BIRD OFFER.

EARLY BIRD offer: **EURO 7.200**

Valid until 31/10/2026 with full payment.

Course Full Price:
EURO 7.900

How to register

1. CLICK ON **www.solidificationcourse.com**
2. FILLING FORM
3. PAY with:
   - **BANK TRANSFER**
   - **CREDIT CARD**

What's included?

- 5 days of advanced lectures, exercises, and discussions
- A printed copy of the reference book "Solidification" by Dantzig & Rappaz
- Full course materials and exercise handouts
- Hotel accommodation (full board) at Hotel Suisse, Champéry
- Lunches, dinners, coffee breaks, and social events
- Access to the Solidification Course alumni network and digital resources

ECOTRE Valente

KNOWLEDGE, INNOVATION, AND SOLUTION FOR CASTING
— this is the foundation on which ECOTRE builds the future of manufacturing.

Ing. Lorenzo Valente,
CEO of ECOTRE Valente

Organizer and mission

ECOTRE Valente is an Italian engineering company specialized in **digital manufacturing and metallurgy**.
Its mission is to help manufacturing companies accelerate their **digital transformation**, reduce defects, lower costs, and improve performance by replacing traditional physical trials with **digital testing and process optimization**.

Operating across **six digital lines** – foundry, metal forming, additive manufacturing, heat treatment, welding, and machining – ECOTRE provides advanced **software, training, and technical services** that drive industrial innovation.

The company has three competences centers: one **Software distribution Center**, one **Training Center**, and one **Consultancy Center**.

Since the 2026 edition, ECOTRE Valente has taken the lead of the world's most prestigious training in metal solidification — the Solidification Course — reaffirming its leadership in knowledge, innovation, and the digital transformation of metallurgy.

ECOTRE Valente Award 2027

WHERE KNOWLEDGE BECOMES RECOGNITION.
Recognizing excellence in Casting, Solidification and Metallurgical Innovation.


In memory of **Dr. TIZIANO VALENTE**, founder of ECOTRE Valente

Show your work. Be recognized.

Ecotre Valente is proud to launch the **Ecotre Valente Award**, a special recognition dedicated to one participant of the **Solidification Course 2027**. The contest is open to participants who wish to share a technical work related to the **solidification of metals**. Participants are invited to submit a short video presenting a project, study or application in areas such as:

- Metal solidification
- Casting process improvement
- Simulation and digital tools for metallurgical industry
- Artificial intelligence
- Defect prediction and reduction

The Award

A premier recognition of excellence: the winner will receive the Ecotre Valente Award in front of all participants, professors, and experts during the Solidification Course 2027.
AWARD CEREMONY:
Wednesday, 26th May 2027 – 12:00 a.m.

How to partecipate

SEND US A VIDEO PRESENTATION OF YOUR WORK.

Video length: 3 to 5 minutes
Language: English
Submission deadline: April 30th 2027
Official launch: the 1st of July 2026

Please, note that the submitted work may be published on Ecotre Valente's social media channels.

Therefore, ***all content must be free from any NDA, confidentiality restriction or third-party limitation.***

FAQ

Useful answers before you apply

In what language is the course held?
All lectures and discussions are in English.
A good working knowledge of English is sufficient; fluency is not required.

Do I need an advanced background in metallurgy?
The course is designed for professionals and researchers with a basic understanding of metallurgy or materials science.
It's an advanced-level program, but concepts are clearly explained and reinforced through examples and discussions.

Where does the course take place?
At Hotel Suisse, in Champéry (Switzerland), a mountain resort 100 km from Geneva: www.hotelsuissechampery.ch

How to get there?
It takes approximately 2.5 hours by train from Geneva Airport and about 4.5 hours from Zurich Airport (both airports have train stations). Timetables are available on www.sbb.ch/en or on Google.

What's the weather like there at that time?
Champéry is a Swiss mountain ski resort situated at an altitude of around 1100 meters. June is normally rather mild, but we can expect cold temperatures in the evening or in case of bad weather. We recommend bringing some warm clothing and sportswear if you plan to engage in outdoor activities during the free program.

Who should I contact to request assistance for registration?
For any questions related to payment or registration details, please contact our office at registrations@solidificationcourse.com

Contacts

If you still have questions, our team can help – from your first contact to the day you join us in Champéry.

WE LOOK FORWARD TO WELCOMING YOU TO THE SWISS ALPS FOR AN UNFORGETTABLE WEEK OF LEARNING, NETWORKING, AND INNOVATION.

Registration & Assistance

For questions about payments, confirmations, or registration details:
registrations@solidificationcourse.com

Our registration team will guide you through every step of the process.