



**MULTHEM**

Multi Material Additive Manufacturing for  
Lightweight and Thermal Management

# MULTHEM Hackathon Guide for Participants



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## 1. Introduction

MULTHEM is an EU-funded project that brings together nine partners come from eight countries, including the Coordinator, Technology Centre of Metal-mechanical and Transport (Spain), alongside Solmatek Solutions SI (Spain), Fraunhofer Institute for Production Systems and Design Technology IPK (Germany), Luxembourg Institute of Science and Technology (Luxembourg), Brightlands Materials Centre - TNO (The Netherlands), Eirecomposites Teoranta (Ireland), Prima Additive (Italy), Thales (France), and Brunel University London (United Kingdom).

The MULTHEM project aims to develop a reliable and validated Additively Manufactured (AM) CFC process to satisfy light-weight manufacturing and improved heat transfer performance for efficient cooling, and product performance through different material combinations. This innovation enables the creation of dual-function components, such as EV battery housings, drone motor housings, and aircraft radioaltimeter housings offering weight reduction while maintaining the structural strength and enhances cooling enabled by advanced design optimisation improving the product life cycle. This approach will satisfy the requirements of sustainable manufacturing and improves cost effectiveness by reducing weight, facilitated by the combinations of designs achievable only through AM, and CFC-metal structures. These combinations make the component lighter and stronger than aluminium or steel and improves the recyclability and reusability of materials.

The joining of dissimilar materials has been a longstanding challenge across various industries, limiting innovation in product design, manufacturing processes, and sustainability. The MULTHEM project has demonstrated a breakthrough in addressing this challenge by utilising advanced joining technologies such as friction stir welding and electron beam bonding which opens the door to exciting new possibilities for product design and fabrication.

## 2. Description of the Hackathon

The purpose of this hackathon is to inspire innovative use cases based on the MULTHEM project's advancements in designing products with multi-material and joining solutions to multi materials components, translating ground-breaking research into practical industrial solutions. By fostering collaboration among diverse participants, the event aims to drive sustainable innovation, promote awareness of MULTHEM's potential, and empower industries to develop next-generation products.

The hackathon will bring together teams of 4 to 5 students from universities across the EU and the UK. Following four MULTHEM training sessions, running from 24 March to 14 April 2025, MULTHEM experts will conduct online mentoring sessions to support participants with their solutions, ideas, pitch or presentations. Teams will submit their presentations by 23 May 2025.

An elimination round will determine the selected teams or finalists who will be invited to an online pitch session on 6 June 2025 to present their final solutions. The selected teams invited to the online pitch will be announced on 30 May 2025.

The winner of the hackathon will receive a grand prize of €1,500, while the team in second place will receive €1,000 and third place will receive €500 respectively. The hackathon will be held online, and selected teams or finalists will receive an email with detailed instructions and event links to join the online pitch session.

### 3. Schedule

Date	Time (CET)	
<b>28 April 2025</b>	1:00 PM	Announcement of the Challenge
<b>28 April 2025</b>	1:00 PM	Registration Open
<b>9 May 2025</b>	5:00 PM	Registration Deadline
<b>12 -22 May 2025</b>	9:00 AM – 5:00 PM	Mentoring session and Feedback
<b>23 May 2025</b>	5:00 PM	Presentation Submission Deadline
<b>30 May 2025</b>	9:00 AM	Announcement of Finalists
<b>6 June 2025</b>	9:00 AM – 9:30 AM	Official Hackathon Day - Welcome Session
	9:30 AM – 11:30 AM	Team Presentation/ Pitch Session
	11:30 AM – 12:00 PM	Break
	12:00 PM – 1:00 PM	Deliberation of the Jury
	1:00 PM – 2:00 PM	Results and Award Ceremony
	2:00 PM	End of the Hackathon

### 4. Who can join?

**Participants must complete the following criteria:**

- Being a full time or part-time student at any degree level at a university in the EU or UK. This includes undergraduate and postgraduate (Master’s and PhD) students.
- Having completed the registration form on the platform.
- The hackathon will be conducted on a team basis, with each team comprising 4 to 5 members. Participants must register as a team.

### 5. Where, when and how to register?

Registration will open on 28 April 2025 and the deadline for registration is on 9 May 2025, at 5:00 PM (CET).

The applicant will receive an email from the Organisers to confirm their registration.

## 6. Challenge Description

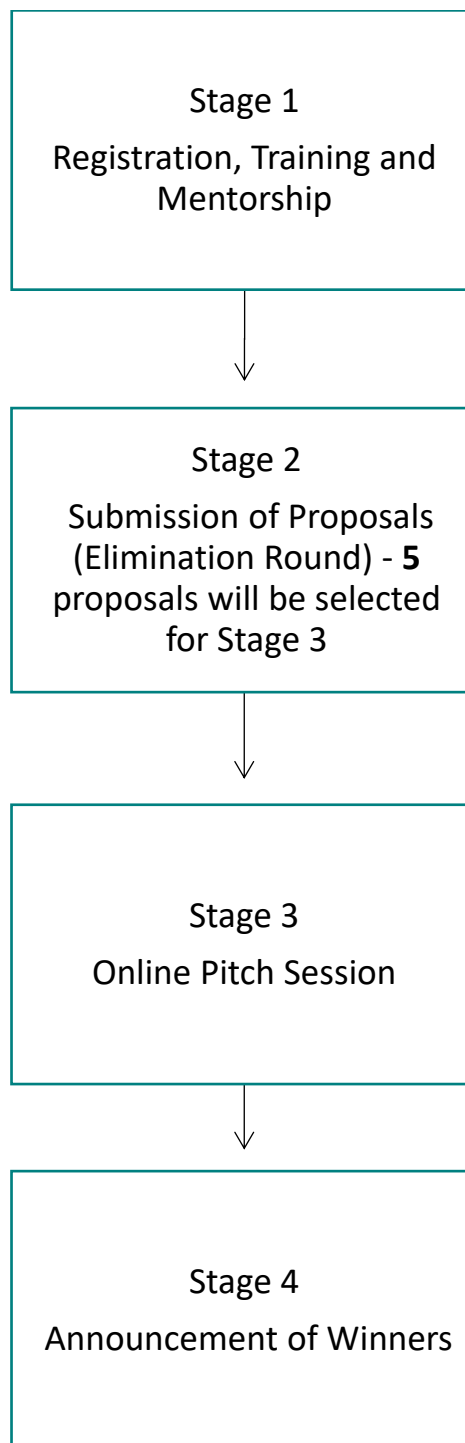
In this hackathon, the participants will address the following challenges:

What potential products can be developed for lightweight applications using 3D printed aluminium-carbon fibre composites multi-materials joined together by technologies demonstrated in the MULTHEM project?

- Identify potential 100% metal made products / use-cases (equipment or components) from any industrial sectors such as transport (locomotive, aviation, maritime), medical, production, manufacturing etc., designs of which can be optimized while satisfying key performance characteristics.
- Devise optimized design proposals of the identified products integrating Aluminium-Carbon Fibre Composites, 3D printing technologies and joining methods from MULTHEM project

At the end of the hackathon, participants must submit the results of their work to the jury in the form of a presentation consisting of 8-10 slides, using the provided template. The participants should submit both the original PowerPoint format and a converted PDF format. Participants are encouraged to include images and videos in their submissions to effectively showcase their ideas and solutions. All solutions, ideas, and presentations must be in English. The presentation must be submitted to the provided OneDrive folder on 23 May 2025. The solutions will be presented during the morning pitch session on 6 June 2025.

## 7. Evaluation Process



### Stage 1: Training and Mentorship

- Participants are encouraged to watch the MULTHEM training sessions which are uploaded to the MULTHEM website to gain insights into the multi-materials, advanced technologies, and processes used in the MULTHEM project.

**24th March 2025** - Introduction to Additive Manufacturing of Metal and Composites

**31st March 2025** - Overview of Joining Technologies for Similar and Dissimilar Materials

**7th April 2025** - Simulating 3D printed Metal-CFC Multi-Materials Designs and their Joining Methods

**14th April 2025** - What is a LCA and why Does it Matter for Multi-Material Products?

- Based on the training sessions, mentoring sessions will be conducted from 12 to 22 May 2025 by the MULTHEM experts to provide guidance and answer questions.
- Participants will be able to book one 15-20 minutes mentoring session with the MULTHEM experts by emailing their booking request to [info@multhem.eu](mailto:info@multhem.eu)

### **Stage 2: Submission of Proposals**

- Teams will submit their presentations in PowerPoint and PDF format before the submission deadline - 23 May 2025. Submission must use the provided template.
- Proposals will be submitted on a OneDrive folder. The PowerPoint, PDF and videos (if used) are to be uploaded.
- Submissions must follow the required format, include 8–10 slides, use a minimum font size of 20, and incorporate embedded images or videos to effectively communicate their ideas.
- Proposals will be evaluated by the jury based on the following criteria, each scored out of **20** points (total: **100** points):
  1. **Innovation and Creativity** – The originality of the idea and its creative approach to addressing the challenge.
  2. **Technical Feasibility**– Logical structure, realistic implementation, and sound understanding of materials and joining techniques.
  3. **Application Potential** – Relevance and suitability for lightweight applications.
  4. **Impact and Value Proposition** – Potential contribution to industry or society in terms of sustainability, efficiency, or performance.
  5. **Clarity and Structure of Slides** – Organisation, clarity of information, visual design, and ease of understanding.
- Only the **top 5 highest-scoring teams** from this round will advance to the next stage.

### **Stage 3: Online Pitch Session**

Selected teams or finalists will be notified via email and invited to an online pitch session which will be held on 6 June 2025.

- During the pitch session, each team will present their solution to the jury, elaborating on their ideas and answering questions. The presentation should be no longer than 10 minutes.
- Final presentations must be delivered in English and follow the criteria outlined above. These presentations will be the same PowerPoint and PDF files submitted in the first round.
- The jury will reassess the proposals during the pitch session to make the final decision based on the following criteria, each scored out of **20** points (total: **100** points):
  1. **Technical Depth and Accuracy** – Clear explanation of the proposed solution’s technical foundation, including materials, joining technologies, and feasibility. Demonstrates solid understanding and critical thinking.
  2. **Communication and Delivery** – Clarity, confidence, and engagement in delivery.
  3. **Visual and Verbal Storytelling** – Effectiveness in guiding the audience through the concept using visuals and narrative.
  4. **Response to Questions** – Depth of understanding, accuracy, and ability to think and express during Q&A.
  5. **Overall Persuasiveness** – Strength of argument, how convincing the solution is in terms of value, feasibility, and potential.

#### **Stage 4: Announcement of Winners**

- After the pitch session, the jury will deliberate and select the winning teams based on their total scores from the evaluation criteria.
- Winners will be announced during the closing ceremony on 6 June 2025.

## **8. Awarding of Prizes**

The winning team of the hackathon will be awarded a cash prize of €1,500. The teams in second and third place will be awarded €1,000 and €500 respectively.

The cash prize will be distributed equally between the members of the team. The prize will be transferred to the bank account provided by the team at the time of presentation submission. A confirmation form must be signed by all team members to confirm their agreement to have the prize sent to this account.



## 9. MULTHEM Hackathon Organising Committee Members

Role	Partner
Organisation and Event Management	CETEMET Brunel University London
Mentoring	Brightlands Materials Center (BM) TNO Luxembourg Institute of Science and Technology Fraunhofer IPK EIRECOMPOSITES Prima Additive
Jury Members	Marta Alvarez, CETEMET (Chair) Marko Bosman, Chief technologist, GKN Aerospace Francisco Jose Bobby, Technical Sales Manager, Curtis Wright Surface Technologies

## 10. Confidentiality

By participating in this Hackathon, all Participants agree to adhere to the following terms regarding confidentiality:

1. **Confidential Information:** During the course of the Hackathon, Participants may have access to or become aware of confidential and proprietary information, including but not limited to ideas, concepts, business plans, technical data, software, and any other materials that are shared by the event organisers, the Challenge Initiator, or other Participants. This information is deemed confidential and proprietary.
2. **Non-Disclosure:** Participants agree not to disclose, share, or discuss any confidential information obtained during the Hackathon with third parties, whether in person, online, or through any other means, except for the purposes of participating in the Hackathon.
3. **Use of Information:** Participants agree to use any confidential information solely for the purpose of the Hackathon and in accordance with the rules and objectives of the event. This includes not using the information for personal gain, for the benefit of others, or for any other purpose outside of the scope of the Hackathon.
4. **Return of Materials:** Participants agree to return or destroy any confidential materials, documents, or electronic files that they may have received or been granted access to during the event upon request by the organisers and/or Challenge Initiator.
5. **Duration:** The confidentiality obligations outlined here shall continue indefinitely, even after the conclusion of the Hackathon.

6. **Intellectual Property:** Participants acknowledge that any intellectual property (IP) developed during the Hackathon may be subject to specific agreements or terms set forth by the organisers or Challenge Initiator.

By participating in this event, you acknowledge and agree to these terms and understand that any violation of this confidentiality agreement may result in disqualification from the hackathon and/or other legal consequences.

## 11. Ownership of Results

By participating in this hackathon, all Participants agree to the following terms regarding the ownership and use of intellectual property (IP) created or developed during the event:

1. **Ownership of Hackathon Results:** All intellectual property, including but not limited to software, code, designs, inventions, concepts, documentation, and any other work or material created during the Hackathon (collectively, the "Results"), shall be considered the exclusive property of the Challenge Initiator.
2. **Assignment of Rights:** By submitting any Results, participants hereby assign, transfer, and convey all rights, title, and interest in and to the Results to the Challenge Initiator. This includes, but is not limited to, all copyrights, patents, trademarks, trade secrets, and any other intellectual property rights associated with the Results.
3. **No Claim of Ownership:** Participants acknowledge and agree that they will not retain any claim of ownership, control, or any further rights to the Results once submitted, and they waive any claims to compensation or royalties related to the use of the Results by the Challenge Initiator.
4. **Right to Use:** The Challenge Initiator shall have the right to use, modify, reproduce, distribute, and otherwise exploit the Results in any manner, including for commercial purposes, without any obligation to the Participants.
5. **Confidentiality of IP:** Participants agree not to disclose or share any Results or related intellectual property with third parties during or after the Hackathon, except as may be necessary for the purpose of the event or as permitted by the organiser and/or Challenge Initiator.
6. **Exceptions:** If explicitly stated, certain rights to IP may be retained by Participants if the organisers or Challenge Initiator do not wish to claim exclusive ownership over specific portions of the Results. Any such exceptions will be clearly documented and agreed upon by both the Participant(s), organisers and Challenge Initiator.

By participating in the hackathon, you acknowledge and agree to these terms, and understand that the Challenge Initiator will have full ownership and rights to the IP generated during the event. This includes any use, modification, or commercialisation of the Results without further compensation or approval from the participants.

## 12. Data Protection

The personal data of the Participants such as first name, surname, date of birth, institution, email address and possibly photos, video and sound recordings relating to the Participants are collected, processed and stored by the Organiser at the time of registration and during the event.

The purposes of this processing are:

- To meet the needs of organising the hackathon.
- To communicate about the event.
- This processing excludes any commercial use or trading of personal data.

The Participant gives their consent to the processing of personal data as defined in this section and authorises the Organiser to send him/her information about the hackathon and similar events that could be organised in the future by the Organisers.

The personal data of the Participants will be collected and kept for a period of 1 year from the registration to the Hackathon, and then deleted, except for data that have been publicly disclosed.

## 13. Right to Name, Image and Sound Recording

The Participant acknowledges and agrees that the Organiser may use the Hackathon for communication purposes, for a period of two (2) years from the Hackathon registration. This includes, but is not limited to, formats such as website, social networks, newsletter, press release, etc.

To do so, the Participant gives their consent and authorises the Organiser - and any person acting under their control - to use name, first name, the name of the institution, and to publish all photographs, images and videos taken during the Hackathon.

This use does not give right to any remuneration and does not require any additional consent from the Participant.

## 14. Warranties and Liability

Participants are solely responsible for their hardware and software, of which they retain custody, and for any damage that may occur to their hardware and software during the Hackathon. It is expressly reminded that the Internet is not a secure network. The Organiser cannot be held responsible for the contamination by possible viruses or the intrusion of a third party in the system of the Participants' terminal and declines any responsibility for the consequences of the Participants' connection to the Internet. In particular, the Organiser cannot be held responsible for any damage caused to Participants, their computer

equipment and the data stored there. In case of loss or theft of an object, the Organiser declines all responsibility.

The Participants waive any recourse against the Organiser concerning the conditions of the organisation of the Hackathon, its progress and its Results. The decisions taken by the jury are final and are binding on all Hackathon Participants. The Participants have no right to a justification of these decisions.

The Participant agrees to provide accurate and truthful information about themselves in the Hackathon registration form.

The Organiser reserves the right to exclude any individual who disrupts the progress of the Hackathon.

## **15. Contact**

For any questions regarding this hackathon, please contact [info@multhem.eu](mailto:info@multhem.eu)



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