The A2M2TECH project concluded its major training and dissemination activities with the **Industrial Training and Final Conference**, bringing together researchers, supervisors, and international experts to discuss scientific achievements and future career pathways in advanced manufacturing.

A2M2TECH Industrial Training and Final Conference

The **A2M2TECH Industrial Training and Final Conference** was successfully held in Garmisch-Partenkirchen, Germany, bringing together Early Stage Researchers (ESRs), project managers, supervisors, and invited experts from academia, industry, and funding organizations.

The conference served as a platform for ESRs to present the outcomes of their doctoral research conducted within the A2M2TECH project. During the scientific sessions, the ESRs shared their research progress, published results, and ongoing studies in the fields of **advanced materials and advanced manufacturing technologies**, demonstrating the interdisciplinary scope of the project.

A central component of the conference was the **Keynote Speakers Day**, organized under the theme *"After the PhD: Career Pathways in Academia and Industry."* Distinguished speakers from industry, academia, and national funding bodies shared their experiences and perspectives on research careers, technological innovation, and opportunities for doctoral researchers.

The keynote speakers included:

- **Prof. Dr. Mahmut Akşit** – TUSAŞ Engine Industries Inc. (TEI)
- **Prof. Dr. İlkay Yavrucuk** – Technical University of Munich
- **Mr. Lars Langhans** – FIT Additive Manufacturing Group
- **Mr. Aleksander Wasiukiewicz** – 3D Lab Company
- **Mr. Ilgın Biriz Yaşar** – TÜBİTAK

Their presentations provided valuable insights into **career development after the PhD, industrial innovation, academic pathways, and international research opportunities**. In addition to the keynote talks, ESRs had the opportunity to engage in one-to-one discussions with the speakers and supervisors, receiving guidance on their future professional directions.

The conference concluded with a gala dinner that further strengthened collaboration and networking among the A2M2TECH community.

Overall, the Final Conference marked an important milestone for the A2M2TECH project, highlighting the scientific achievements of the ESRs and reinforcing the project's mission to train highly skilled researchers capable of contributing to innovation in **advanced materials and advanced manufacturing technologies**.


A2M2TECH
Industrial Training
and
Final Conference
A2M2TECH
LEVI'S
A2M2TECH


VT Theory
Block Maxima Approach uses the Generalized Extreme Value (GEV) distribution which is a family of probability distributions:
$F(x) = exp\left\{-[1+\gamma(\frac{x-\mu}{\sigma})]^{-\frac{1}{\gamma}}\right\}$
Where x is size of defect, μ is the location parameter, σ is scale parameter and γ is the shape factor (the rate at which the tail decays).
For gumbel distribution (Type-I), γ=0:
$F(x) = exp\left[-exp\left(-\frac{x_i-\mu}{\sigma}\right)\right]$
To estimate the maximum defect at a given probability p:
$x_{0.99} = \mu - \sigma.ln(-ln(0.99))$
tail (γ = 0) – exponential tail
(γ > 0) – heavy tail
(γ < 0) – bounded tail


MSCA COFUND 2020
EKTAM
TÜBİTAK
A2M2TECH
ADVANCED MATERIALS AND ADVANCED MANUFACTURING TECHNOLOGIES
Horizon 2020 Marie Skłodowska-Curie Cofund Project
Industrial Training and Final Conference
January 2026
FIT AG – Technical University of Munich
Garmisch Partenkirchen
METU
28
Ni
Nickel
• Thank You for Your Attention
• Your insights and suggestions are greatly appreciated

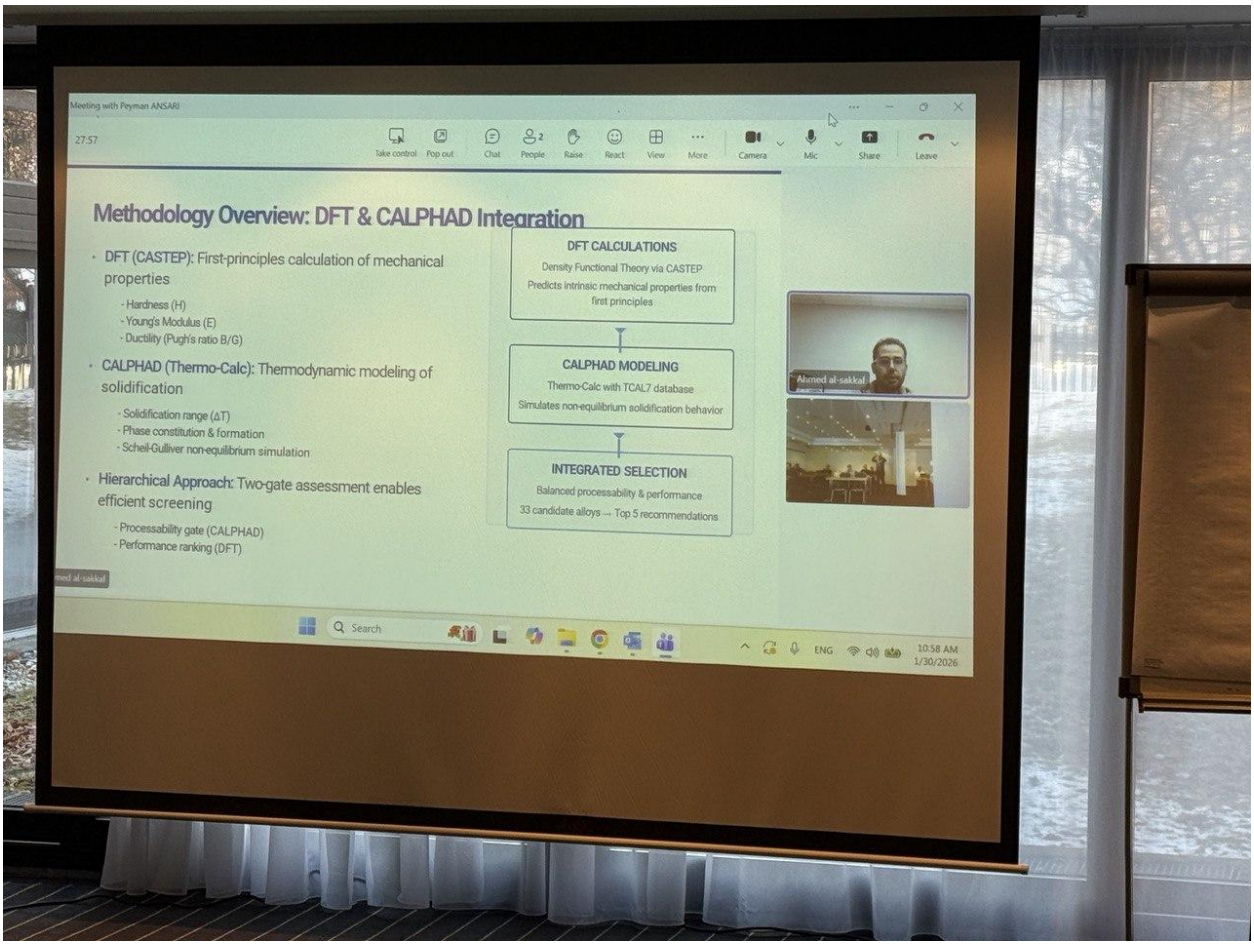

Overview
Measurement Techniques: Capabilities vs. Limitations
iffraction Methods (Non-Destructive):
X-ray Diffraction (XRD)
etecting changes in atomic lattice spacing (d-spacing)- High
rface resolution but poor penetration
Neutron Diffraction
ghly penetrative (up to 50mm). - Full 3D stress mapping of
ick components, expensive, large-scale nuclear facilities.
elaxation Methods (Destructive):
Hole Drilling
rilling a small hole and measuring the resulting surface deformation. - Semi-destructive and limited to near-surface
alysis.
Contour Method
e part is cut in half, and the surface deformation is measured. - 2D cross-sectional map
A2M2TECH
Industrial Training
and
Final Conference

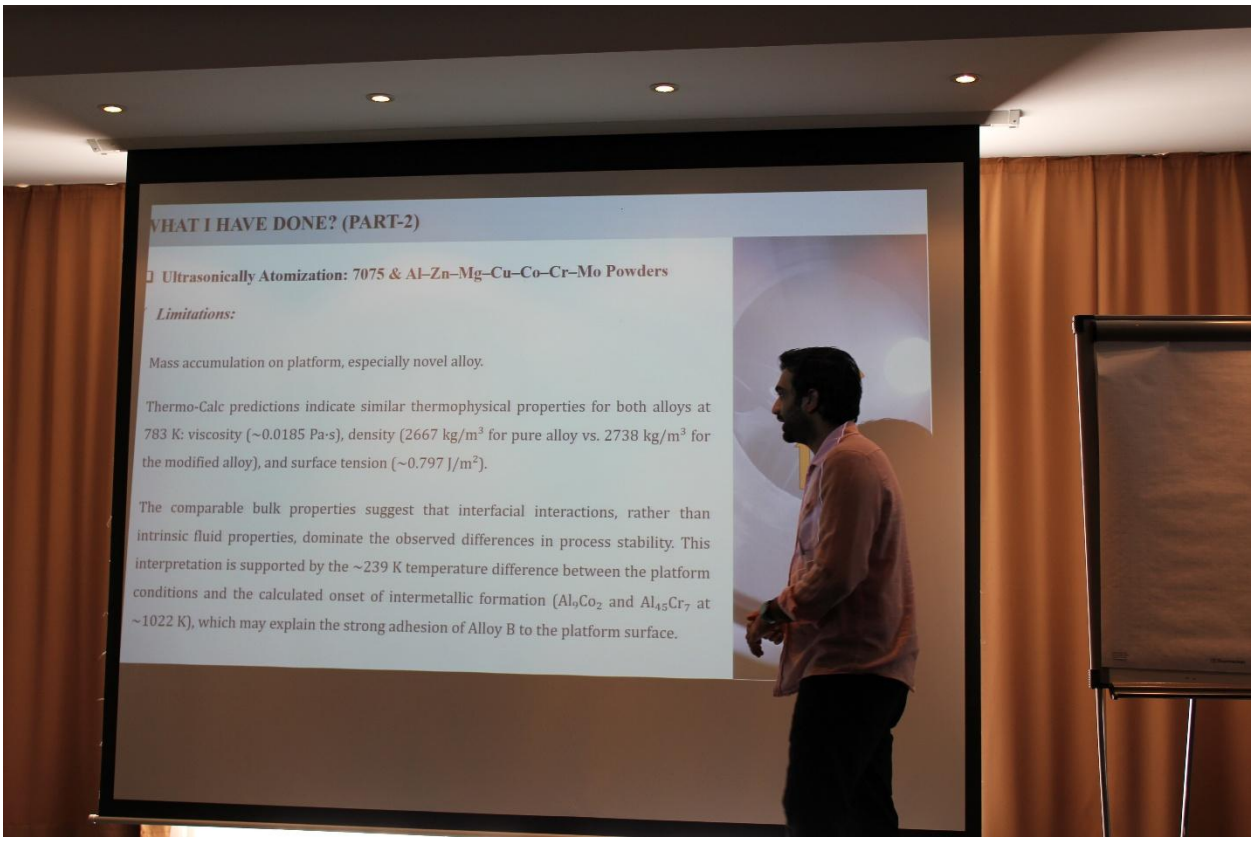

of Additive Manufacturing on bone fracture healing
Callus Growth Model Governing Equations
Tissue phenotype activities
Cell phenotype activities
Cell concentration rate = migration rate
+ proliferation
+ differentiation rate - Apoptosis rate
A2M2TECH
Industrial Training
and
Final Conference
METU

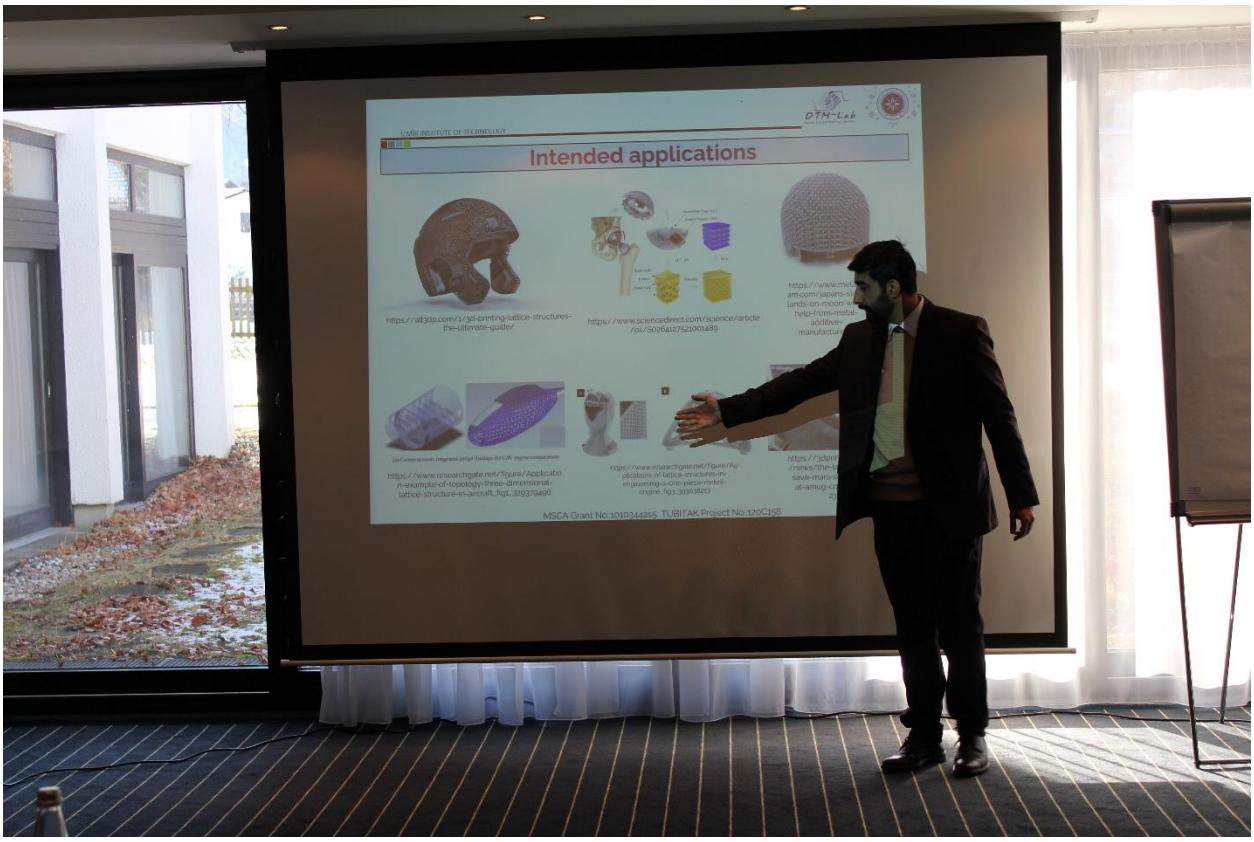

Overview of the Phd Project
• Design new alloys for aerospace applications by using
1st part
• Analytical Models
• Calculation of Phase Diagrams (CALPHAD)
• Prototyping via arc-melting
• Characterizations
• Mechanical Testing
2nd part
• Powdering
• Additive Manufacturing
MSCA COFUND
EKTAM
TÜBİTAK
A2M2TECH
Industrial Training
and
Final Conference
January 2026
METU


ES OF IMPLANTS
avoid Stress Shielding.
ble (Depends on application)
pends on application)
Implant Material
HSCA COFUND
EKTAM
TÜBİTAK
A2M2TECH
Industrial Training
and
Final Conference
January 2026


Constitutive equations
Phenomenological
Physical-based
Artificial neural network (ANN)
1. Phenomenological equations.
A2M2TECH
Industrial Training
and
Final Conference
January 2026
METU


Meeting with Peyman ANSARI
27:57
Take control
Pop out
Chat
People
Raise
React
View
More
Camera
Mic
Share
Leave
Methodology Overview: DFT & CALPHAD Integration
DFT (CASTEP): First-principles calculation of mechanical properties
- Hardness (H)
- Young's Modulus (E)
- Ductility (Pugh's ratio B/G)
CALPHAD (Thermo-Calc): Thermodynamic modeling of solidification
- Solidification range (ΔT)
- Phase constitution & formation
- Scheil-Gulliver non-equilibrium simulation
Hierarchical Approach: Two-gate assessment enables efficient screening
- Processability gate (CALPHAD)
- Performance ranking (DFT)
DFT CALCULATIONS
Density Functional Theory via CASTEP
Predicts intrinsic mechanical properties from first principles
CALPHAD MODELING
Thermo-Calc with TCAL7 database
Simulates non-equilibrium solidification behavior
INTEGRATED SELECTION
Balanced processability & performance
33 candidate alloys → Top 5 recommendations
Ahmed al-sakkaf
Search
ENG
10:58 AM
1/30/2026


WHAT I HAVE DONE? (PART-2)
Ultrasonically Atomization: 7075 & Al–Zn–Mg–Cu–Co–Cr–Mo Powders
Limitations:
Mass accumulation on platform, especially novel alloy.
Thermo-Calc predictions indicate similar thermophysical properties for both alloys at 783 K: viscosity (~0.0185 Pa·s), density (2667 kg/m³ for pure alloy vs. 2738 kg/m³ for the modified alloy), and surface tension (~0.797 J/m²).
The comparable bulk properties suggest that interfacial interactions, rather than intrinsic fluid properties, dominate the observed differences in process stability. This interpretation is supported by the ~239 K temperature difference between the platform conditions and the calculated onset of intermetallic formation (Al_9Co_2 and $Al_{45}Cr_7$ at ~1022 K), which may explain the strong adhesion of Alloy B to the platform surface.


İMBİ INSTITUTE OF TECHNOLOGY
DTM-Lab
Intended applications
https://all3dp.com/1/3d-printing-lattice-structures-the-ultimate-guide/
https://www.sciencedirect.com/science/article/pii/S0264127520304189
https://www.researchgate.net/figure/Application-examples-of-topology-three-dimensional-lattice-structure-in-aircraft_fig1_339379498
https://www.researchgate.net/figure/Applications-of-lattice-structures-in-engineering-a-One-piece-rocket-engine_fig1_339358213
MSCA Grant No:1010344255, TUBITAK Project No:120C158