# Additive Manufacturing of High-Performance Superalloys for Aerospace Engines

## PhD Scholarship

The University of the Bundeswehr Munich (UniBwM) offers a PhD scholarship within a joint research project with the Technical University of Munich on laser-based additive manufacturing of the nickel-based superalloy CM247LC.

CM247LC exhibits outstanding high-temperature properties and is particularly attractive for aero-engine and rocket propulsion applications. However, its high γ′ precipitation strengthening leads to a pronounced susceptibility to cracking during additive manufacturing. The project aims to develop a predictive and ultimately crack-free PBF-LB/M process through targeted control of melt-pool behavior, solidification, microstructure evolution, and thermomechanical stresses. Experimental process development and physics-based simulation will be closely coupled to achieve this goal.

### *PhD Position – UniBwM | Experimental Process and Materials Development*

Supervision: Prof. Dr. Eric A. Jägle and Dr.-Ing. Thomas Stoll

Development of innovative PBF-LB/M process strategies using laser beam shaping, beam oscillation, and dual-laser processing. Their effects on melt-pool geometry, solidification conditions, microstructure, and crack formation will be investigated. In-situ process monitoring using high-speed imaging and thermography will be combined with microstructural and materials characterization. The objective is to establish robust process windows and manufacture CM247LC components with strongly reduced cracking.

**Your Profile:**

- Excellent university degree (Master's or equivalent) in mechanical engineering, materials science, physics, computational engineering, or a related field
- Interest in additive manufacturing, laser materials processing, and/or numerical simulation
- experimental research, physical metallurgy, laser processing, and materials characterization
- Independent, structured, and research-oriented working style
- Very good English skills and enthusiasm for interdisciplinary collaboration

**We Offer:**

- Opportunity to pursue a PhD in a scientifically and technologically highly relevant research field
- Two closely interconnected PhD projects in collaboration between UniBwM and TUM
- Modern PBF-LB/M, laser-processing, process-monitoring, materials-characterization, and simulation infrastructure
- Interdisciplinary scientific environment and close supervision by Prof. Dr. Eric A. Jägle and Dr.-Ing. Thomas Stoll (UniBwM)
- Opportunities for scientific publications, international conferences, and professional exchange

Project duration: 2027–2029 | Locations: UniBwM, Neubiberg & TUM, Munich

**Interested?** Please send us your application including relevant documents (cover letter, CV, certificates, transcript of records) in PDF format to Júlia Csomor: stipendien@munich-aerospace.de.

**We're looking forward to your application.**