



Student assistant opportunity for Conceptualisation & execution of experiments

Application deadline	28.02.2025
Duration	31.12.2025
Start	Summer semester
Working hours	20 hrs/month, with an option to increase if required

In the railway industry, aluminothermic welding process is a well-established technique for joining and repairing rails, valued for its portability, robustness and cost-effectiveness. However, gaining a detailed understanding of the fluid dynamics and solidification behaviour within this process presents significant challenges due to the system's opacity and the extremely high temperatures involved, reaching up to 2200 °C.

At TTD, we develop advanced numerical models using Computational Fluid Dynamics (CFD) to simulate the complex multiphysics phenomena such as melting and solidification, as well as multiphase flows during the AT welding process. To ensure the accuracy and reliability of these models, it is essential to conduct experimental validation through meticulously designed laboratory-scale setups. These experiments involve the development and application of analogue models, such as water-oil or wax systems, as well as low-temperature melting metals, to replicate the key physical processes under controlled conditions.

Your Duties and Responsibilities

- Conducting intensive literature research to review existing similarity experiments
- Assessment, discussion and documentation of design concepts
- Conceptualisation and constructing the test rig
- Creating CAD models for initial designs (with optional CFD simulations if needed)
- Performing experiments and maintaining detailed documentation of results

Relevance:

Your work will actively contribute to our on going project.

Skill Development:

This position will offer you a hands-on experience in experimental research, data analysis, CAD design, and interdisciplinary collaboration, providing valuable skills for both academic research and future industry careers.

Your Profile:

- Currently enrolled as Bachelor's or Master's student at TU Freiberg
- Fundamental knowledge of heat and mass transfer and fluid mechanics
- Familiarity with Python, imageJ or image processing tools
- Good German and English language skills (B1 level or higher)
- Enjoy working in an interdisciplinary team
- Work independently and take responsibility for your tasks, proactively seeking new challenges

Advantageous:

- Familiarity with CAD design, particularly SolidWorks
- Experience in experimental work

What We Offer:

- An office space at TTD
- Flexible working hours
- Friendly working atmosphere
- There will be an option for extension
- Compensation in accordance with standard pay grades.

Should you have any questions, please don't hesitate to contact

Herr M.Sc. Ravi G. Kewalramani,

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If this opportunity interests you and you are ready to make an impact, please send your motivation letter, CV, and scorecard as a single PDF file (max. 5 MB) to Ravi.Kewalramani@ttd.tu-freiberg.de. Use "**SHK-SS-2025**" as the subject of your email if you are a Bachelor's student or "**WiHi-SS-2025**" if you are a Master's student.

We are looking forward to receiving your application!