

Position Description

Group of research topics: Additive Manufacturing and AI

Position is funded by	<ul style="list-style-type: none"> - COFUND, Marie Skłodowska-Curie Actions (MSCA), Horizon 2020, European Union - Hamburg University of Technology (TUHH), Germany - RMIT University (RMIT), Australia
Research Host	Hamburg University of Technology (TUHH), Germany
PhD awarding institution/s:	Dual PhD awarded by TUHH and RMIT
Locations	<ul style="list-style-type: none"> - Primary: Hamburg, Germany - Secondary: Melbourne, Australia - Annual workshops in Barcelona, Spain
Contract	Full time, fixed term (24 months) and optional extension up to a maximum of 48 months
Gross annual salary	35.000 EUR
Preferred start date	01/01/2023
Deadline for applications	19/09/2022 (Reference: TUHH-DC1)

Your choice of research topics (only one of these projects will be funded):

Project 1: Federated Learning Framework for AM	Project 2: AM process simulation for AI training data	Project 3: Materials model for AM processes
<p>The aim of this project is to use AI methods to correlate input (machine data, materials, part geometries etc.) with output (mechanical properties, geometrical accuracy etc.) along the process chain of an AM process. Expert knowledge shall be integrated in a hybrid AI approach that combines multi-agent systems and federated learning to enable researchers from different institutions to train the AI. This position shall define specifically the framework for the federated learning approach.</p>	<p>Artificial intelligence is able to predict AM part performance from input parameters such as material and machine set-up, once sufficiently trained. However, AI relies on big data sets to produce valid results, which can often not be realised in experiments due to high costs and time efforts. The goal of this project is to set up simulation for selected AM process steps in order to simulate training data for the AI.</p>	<p>Metals undergo a complex process chain in Additive Manufacturing, involving phase changes as well as different temperature cycles in the solid state. This results in a complex process - microstructure - property relationship, that needs to be understood along the whole process chain. The goal of this project is to set up a material model for a selected metal alloy that covers all phases and conditions experienced along the process chain, and that can be used in subsequent simulations to predict part properties.</p>
<p>Supervisors: <u>Prof. Claus Emmelmann, Dr. Ing. Dirk Herzog (TUHH) and Dr. Andrey Molotnikov, Distinguished Prof. Milan Brandt (RMIT)</u></p>		
<p>Research Fields: Advanced manufacturing and mechatronics, Artificial intelligence and Machine learning</p>		



For more information on the Projects, contact us: redi.help@rmit.edu.au

Are you REDI? (Expected Profile)

Project 1

Your background and skills: You should have a Master's in Information Technology, Production Engineering, Materials Science or similar. Previous knowledge in Artificial Intelligence methods and tools is required. Experience in Additive Manufacturing is of benefit.

Your work experience: Professional experience is not required.

Your research experience: Research experience is not required.

Project 2

Your background and skills: You should have a Master's in Theoretical Mechanical Engineering, Materials Science of similar is required. Previous knowledge in modelling and simulation is expected. Knowledge about Additive Manufacturing is of benefit.

Your work experience: Professional experience is not required.

Your research experience: Research experience is not required.

Project 3

Your background and skills: You should have a Master's in Materials Science of similar is required. Previous knowledge in modelling and simulation is expected. Knowledge about Additive Manufacturing is of benefit.

Your work experience: Professional experience is not required.

Your research experience: Research experience is not required.

For more information about the general conditions of the REDI Program and the Eligibility Criteria, please visit: <https://www.rediprogram.eu/>

Employment Benefits and Conditions

TUHH offers a 24-months full-time work contract (extendable up to 48 months as required), indicatively starting on 01/01/2023. The position will be based in Hamburg (Germany). International travel is foreseen, including to Australia (up to 12 months) and Spain (one week per year). At TUHH, there is a probation period of six (6) months and there are 39 working hours per week.

The remuneration, in line with the European Commission rules for Marie Skłodowska-Curie grant holders, will consist of a gross annual salary of around 35.000 EUR gross per year. Of this amount, it is very hard to give the exact net salary to be perceived by the Researcher as it is subject to national tax legislation and will depend on the personal situation and choices of the candidate, but it would be approximately EUR 1,950.

Benefits include:

- 30 working days off per year.
- Paid sick days up to 6 weeks per year.
- Citizens of foreign countries who live and work in Germany and have a settlement permit or a residence permit can apply for parental benefit (Elterngeld) after the birth of their child.



- 1,000€ yearly travel allowance to cover flights and accommodation to participate in the annual workshop at RMIT Europe in Barcelona (Spain).
- 10,000€ allowance to cover flights and living expenses for up to 12 months in Australia.

For more details, please see:

<https://www.tuhh.de/alt/tuhh/education/degree-courses/doctoral-degrees/doctoral-degree-regulations.html>

If your application is successful, you will be required to:

- Apply for a working visa in Germany (More information): <https://www.tuhh.de/alt/tuhh/international/incoming-international-students.html>
- Apply for a student visa in Australia (More information: <https://www.rmit.edu.au/study-with-us/international-students/apply-to-rmit-international-students/student-visas/apply-for-a-visa>)

Learn more on [RMIT](#) and [TUHH](#) on our website:
<http://www.rediprogram.eu/about/#hostinstitutions>

PhD enrolment. Successful candidates for this position will be enrolled by the following institutions:

Admission at TUHH

You will be enrolled as Doctoral Student at TUHH for the entire duration of the assignment. At admission, you will need to supply:

- CV
- Cover Letter
- Work references / appraisals
- Degree certificate and transcript of records of a relevant Master's degree. Candidates who have successfully completed academic study at a foreign university can be admitted to doctoral studies if the completed studies are equivalent to a German degree. A Master's abroad should encompass regular study over a period of two years.
- Proof of C1 level of English according to the European Framework of Reference for Languages (CEFR)

More information: <https://www.tuhh.de/alt/tuhh/education/degree-courses/doctoral-degrees.html>

Admission at RMIT University

You will also be enrolled as Doctoral Student at RMIT for the entire duration of the assignment. At admission, you will need to supply:

- CV
- Complete transcripts for all academic qualifications
- Research proposal or statement of interest in an available research project
- Language certificates
- List of referees

More information: <https://www.rmit.edu.au/research/research-degrees/how-to-apply>





[Apply now](#)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101034328