

## Proposal for Master's thesis, April 15, 2026

# Data-driven analysis, prediction and experimental validation of process parameters in WAAM

### Description

As part of this master's thesis, an existing database in the field of Wire Arc Additive Manufacturing (WAAM) will be systematically expanded and analyzed. The objective is to identify relevant trends and correlations within process and material data.

A particular focus will be placed on investigating potential relationships between mechanical properties, especially tensile strength, heat input, interpass temperature, and the chemical composition of the materials used.

The methodology is based on establishing a robust data foundation and its systematic evaluation. The work will begin with data collection through a comprehensive literature review. This will be followed by structured data preparation and statistical analysis to identify patterns and key influencing factors.

The results will be critically interpreted and contextualized to enhance the understanding of process–structure–property relationships in WAAM. Based on these findings, implications for industrial applications will be discussed, particularly with regard to process optimization and material-specific parameter selection.

Finally, predictive models for process parameters will be derived from the analyzed data. These predicted parameters will be experimentally validated through welding trials to assess their accuracy and practical applicability.



### Organisation

**Supervisor:** Assoc.Prof. Dipl.-Ing. Dr.techn. Norbert Enzinger, [norbert.enzinger@tugraz.at](mailto:norbert.enzinger@tugraz.at)

**Duration:** immediately for at least 6 months

**Location:** Working Group Joining Technology, Kopernikusgasse 24, 8010 Graz

**Remuneration:** € 3000 + € 500 Performance bonus

### Further Information

For further information, please contact the institute's secretariat or the supervisor.

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