

## MASTER THESIS TOPIC:

### Replacing missing sensor values and sensitivity analysis

To maintain the heat supply, leakages in **district heating networks** should be located as soon as possible so that the damaged part can be disconnected from the rest of the network and be repaired. Sensors for measuring pressure, temperature and flow are installed throughout the district heating network. These are used for, among other things, evaluation with the aid of machine learning methods. However, the sensors only provide values when there is a sufficient change, i.e. at irregular intervals. Furthermore, it is possible for sensors to be inoperative or to provide erroneous values for various reasons. For steady-state evaluation, the values must be aggregated at a certain fixed interval.

The following questions and challenges arise:

- How can missing values be imputed?
- Sensitivity: What influence does the individual sensor have on the overall result? Can and should this knowledge be taken into account when replacing values?
- What are the advantages/disadvantages of imputation over training ML models for a selection of existing sensors? Consideration of efficiency, changes in localization accuracy, information gain.
- Optimal sensor placement for ML models

**Contact:**

Julia Koltermann, M. Sc.  
Office: G29-002, Universitätsplatz 2, 39106 Magdeburg  
[julia.koltermann@ovgu.de](mailto:julia.koltermann@ovgu.de)  
0391-6752209