



Der Vorsitzende des Promotionsausschusses

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## EINLADUNG

Hiermit lade ich ein zum öffentlichen Promotionskolloquium von

**Herrn M.Sc. Julian Müller**

Automatisierungs- und Energiesysteme  
(Prof. Dr.-Ing. Georg Frey)

am

**Montag, 16. Juni 2025, 10:00 Uhr s.t.**

per Videokonferenz: Link für MS Teams: <https://bit.ly/4ltwHnB>

Raum für die Prüfung: Gebäude E2.9; Seminarraum 0.07

### Thema der Dissertation:

#### **Energy Consumption Prediction in Vehicle Power Nets Using High-Dimensional Network Communication Data - A Machine Learning Approach**

The dissertation addresses a data-driven approach to analyze and predict the energy consumption of auxiliary components within the low-voltage electrical system of electric vehicles. A scalable data-processing pipeline was developed to preprocess measurement data for machine-learning models using state-of-the-art feature engineering methods. An appropriate regression algorithm is selected and validated to accurately forecast energy consumption. To improve interpretability and enable root-cause analysis, explainable AI techniques were integrated into the pipeline. The developed methods provide deeper insights into influencing factors of energy consumption, helping engineers optimize vehicle architectures and operational strategies in a data-driven manner, ultimately enhancing the accuracy of range estimation already during the development phase.

Saarbrücken, 5. Juni 2025

Prof. Dr. Uli Kazmaier