



Der Vorsitzende des Promotionsausschusses

EINLADUNG

Hiermit lade ich ein zum öffentlichen Promotionskolloquium von

Herrn M.Sc. Tajbeed Ahmed Chowdhury

Smarte Materialsysteme für
Innovative Produktion
(Prof. Dr.-Ing. Paul Motzki)

am

Freitag, 14. August 2026, 11:00 Uhr s.t.

per Videokonferenz: Link für MS Teams: <http://bit.ly/4y79vBO>

Raum für die Prüfung: Konferenzraum Groß, Halle 10, ZeMA gGmbH,
Eschberger Weg 46, 66121 Saarbrücken

Thema der Dissertation:

**A Multimodal Human Digital Twin Framework for
Predictive Modeling and Simulation with Integrated
Bidirectional Feedback Mechanism**

The concept of the Human Digital Twin (HDT) offers transformative potential for addressing the growing complexity of industrial and clinical tasks, among others. By creating a virtual model of the human worker, the HDT system can reduce occupational hazards, optimize the work environment, and make better-informed decisions. However, state-of-the-art research remains largely theoretical, with little to no functional real-world applications in industrial settings. To bridge the gap, this dissertation develops a comprehensive HDT framework for simulating industrial tasks, tracking multimodal kinetic and biometric data, and delivering real-time cognitive state analysis. The system is evaluated for functionality, effectiveness, accuracy, and robustness through comprehensive quantitative and qualitative assessments, lab experiments, and real-world application tests. The validation of the system shows promising results in the metric score by achieving state-of-the-art and reliable performance that aligns with the expected simulation outcome.

Saarbrücken, 31. Juli 2026


Prof. Dr.-Ing. Georg Frey