

Institut für Betriebsfestigkeit und Schienenfahrzeugtechnik (BST)  
 Adresse: Inffeldgasse 25/D, 8010 Graz, Österreich  
 Leiter: Univ.-Prof. Dipl.-Ing. Dr. mont. Martin Leitner, MBA  
 Telefon: +43 316 873 1363  
 E-Mail: martin.leitner@tugraz.at

# Master Thesis

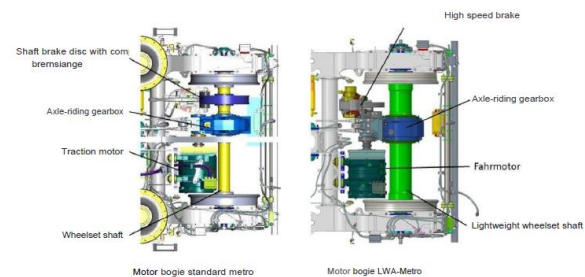
## „Investigating the Impact of Unsprung Mass on Wheel-Rail Interaction in Lightweight Rail Vehicles“

### Short description:

This project aims to investigate the impact of unsprung mass on the wheel-rail interaction in lightweight rail vehicles. By utilizing multibody simulation software like SIMPACK, the research will involve developing accurate models to simulate various operating conditions, including different speeds, track curvatures, and load scenarios. The study will compare standard mass configurations with lightweight alternatives to understand how changes in unsprung mass affect vehicles dynamics and wheel-rail geometry.

### Essential Activities:

- Develop a multibody simulation model using SIMPACK or similar software.
- Input material properties and mass data for both standard and lightweight configurations.
- Execute simulations across a range of operating conditions (speeds, track curvature, loading conditions).
- Analyse simulation results to determine the impact on wheel-rail interaction.
- Validate findings by comparing simulation results with existing data, if available.
- Document the research and compile the findings into a master thesis.
- Present the results to academic and professional audiences.



### Additional Information:

- Candidates should have a fundamental background in mechanical engineering and experience with multibody simulation software (preferably SIMPACK). Familiarity with vehicle dynamics and railway engineering is an advantage.
- The project will be supervised by faculty members specializing in mechanical engineering and simulation modelling. Students will have access to the necessary software tools and any available experimental data.

### Contact:

For further inquiries to submit applications, please contact:  
 Safa Yusuf Cetin, MSc, B.Eng  
 Email: [s.y.cetin@tugraz.at](mailto:s.y.cetin@tugraz.at)