Lehrstuhl für
Aerodynamik und
Strömungsmechanik

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Working Group: apl. Prof. Dr.-Ing. habil. Thomas Indinger

Project Description:

M.Sc. Saiful Sulaiman
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The increase in tall building construction requires designs that accommodate wind impacts. Researchers are exploring aerodynamic modifications to mitigate these effects. However, these modifications are typically tested in isolation, not accounting for interference from nearby structures. In this work, we investigate the effectiveness of these modifications under interference effect using a CFD approach validated by experimental data, alongside a machine learning model to predict responses and optimize building design.

M.Sc. Evelyn Rugerri
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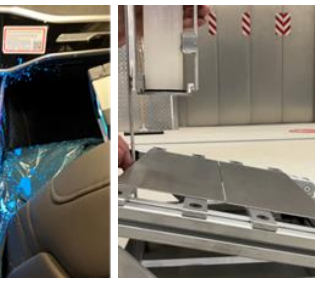
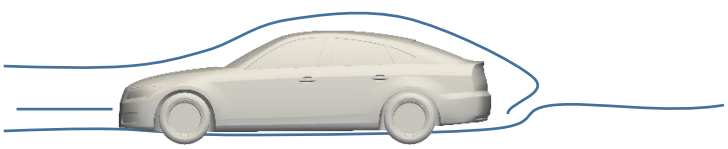
Spilling beverages or keeping the sunroof open during a rainy day often happens by accident, which leads to an inevitable water exposure of electronic and mechatronic components in the vehicle.

The predominant physical tests are to be complemented with CFD simulations, for which the Lagrangian solver MESHFREE is utilized. Despite the flexible nature of the method, it is to be further optimized to overcome the complexities, brought by the intricate geometry.





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M.Sc. Matthew Sleight
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Battery production today is an important topic for every car manufacturer. This research project focuses on optimizing quality control of the airtightness of batteries which is one of the longest and challenging steps in its production. This method requires air to be introduced into the battery housing under pressure to detect any leakage. The optimization of this process is made through the numerical simulation of the changing air pressure by the SPH method and experimental studies.

M.Sc. Luca Bauer
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In the scientific world, Large Eddy Simulations have already demonstrated a good agreement with wind tunnel results. However, for industrial applications (flows with high Reynolds numbers) the computational effort is very high. Our work deals with the Wall-Modeling of Large Eddy Simulation (WMLES) for external vehicle aerodynamics using OpenFOAM. Simple validation cases, such as cylinder flow, are utilized to ensure the accuracy and reliability of the introduced modeling assumptions.

Requirements:

- Motivated, independent, and proactive approach to research.
- Familiarity with fluid dynamics and aerodynamics principles.
- Strong written and verbal communication skills in English and/or German.

Application Process:

Interested candidates should submit their applications, including a CV, academic transcripts, and a brief statement of interest. Please highlight any relevant experience.

For any questions about the project or application process, please do not hesitate to reach out. We look forward to receiving your application.