



## Shell Technology Center Hamburg

### **Comparative study of Physics-based and Data-driven modeling approaches towards predicting vehicle performance under real world driving conditions**

Master Thesis in the field of energy and vehicle engineering

#### **Who we are**

As part of Shell's global technology development network, our scientists and employees are actively working to reduce society's carbon footprint, reduce emissions from our energy products and find competitive solutions for our customers.

Our Shell Technology Centre Hamburg (STCHa) cooperates with Shell centres in the Netherlands, USA, China, India, UK and Japan. As part of this community of more than 3000 scientists, researchers and engineers, we focus on further differentiating products for mobility and industrial customer requirements. The Energy Application Testing department at the STCHa conducts R&D testing on high-power e-vehicle charger systems and evaluation of electric/electrified powertrains using a road test vehicle fleet.

#### **What you will do**

The goal of the project is to help develop a toolkit consisting of physics-based models and data-driven models to accelerate the ongoing experimental efforts in developing Shell's products line for electric/electrified vehicles, e.g., e-fluids, low-carbon fuels etc. For this purpose, a case study is to be conducted on a BEV, FCEV and HEV, where representative physics-based vehicle models need to be developed using the GT-Suite software. Existing in-house data post processing and modeling tools in Python need to be leveraged for data analysis and rudimentary data-driven modeling approaches. Vehicle powertrain and GPS data under real-world driving conditions is captured using CAN data loggers, and the data will be enriched with contextual information on the road network in a collaborative effort with location data and technology company HERE Technologies.

#### **What you bring to the table**

- You are studying towards a postgraduate technical degree
- Independence and willingness to learn new topics
- Interest in interdisciplinary issues in the field of battery electric and hybrid powertrain and vehicle system modelling
- Some experience and interest in modelling and programming, ideally in GT-Suite, Python/Matlab.

#### **What you can expect**

- As part of a dynamic experimental team, you will be actively developing advanced analysis and model simulation tools.
- Clearly defined goals and responsibilities, as well as mentorship from senior staff members.
- We offer a creative and flexible working schedule.
- Ideal environment to gain practical experience.

#### **Contact**

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