

# Rail Vehicle Engineering in Aachen

Prof. Dr. Raphael Pfaff

Fachhochschule Aachen University of Applied Sciences

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# Who we are

Rail expertise from all perspectives: operator, integrator, supplier and science

## ■ Prof. Dr.-Ing. M. Enning:

- Railway Systems Engineering
- Formerly RWTH Aachen
- Experience:
  - Control Engineering
  - Freight
  - Adhesion control systems
  - Train protection systems
  - Networks
  - Traffic estimation



# Who we are

Rail expertise from all perspectives: operator, integrator, supplier and science

- Prof. Dr.-Ing. B. Schmidt

- Railway Drive Systems
- Formerly large Consulting Firm
- Experience:
  - Transport science
  - Consulting
  - Whole Life Cost
  - Reliability
  - Bid Processes



# Who we are

Rail expertise from all perspectives: operator, integrator, supplier and science

## ■ Prof. Dr. Raphael Pfaff

- Rail Vehicle Engineering
- Formerly Faiveley Transport, Siemens
- Experience:
  - Braking systems
  - Buff and Draft Gears
  - System Engineering
  - Product Engineering
  - Reliability Engineering
  - Claim Management
  - Sales and Marketing

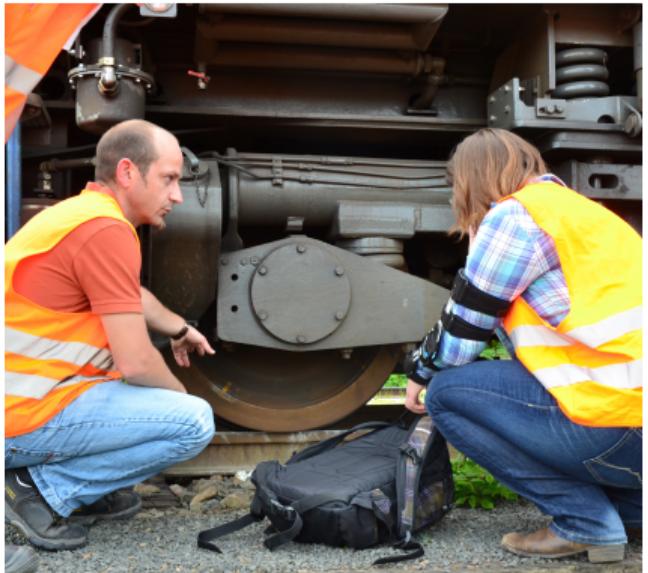


# What we do

Teaching, Research, Development and Consulting along the value chain in the rail sector

## ■ Teaching:

- Rail Vehicle Engineering
- Railway Drive System
  - Electrical Drives
  - Diesel and Hybrid Drives
- Signalling and Interlock
- Control and Simulation Techniques
- Manufacturing and Marketing
- Drives Technology
  - Electrical Drives
  - Pneumatics
- Statistical Methods
- Methods in Quality Management

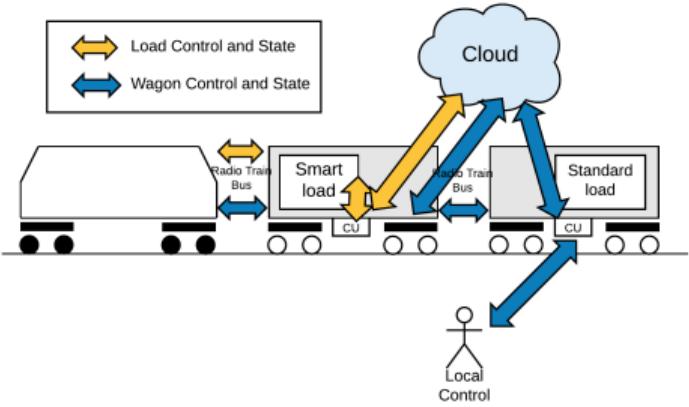


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Teaching, Research, Development and Consulting along the value chain in the rail sector

## ■ Current R&D foci:

- IoT-connected wagon “Wagon 4.0”
- Refurbishment of legacy electrical locomotives
- Reliability Estimation using Big Data approaches
- Usage of Additive Manufacturing
- Wheel-Rail-Contact Modelling
- Ad hoc-Estimation of braking curves
- Applications of machine learning for railways

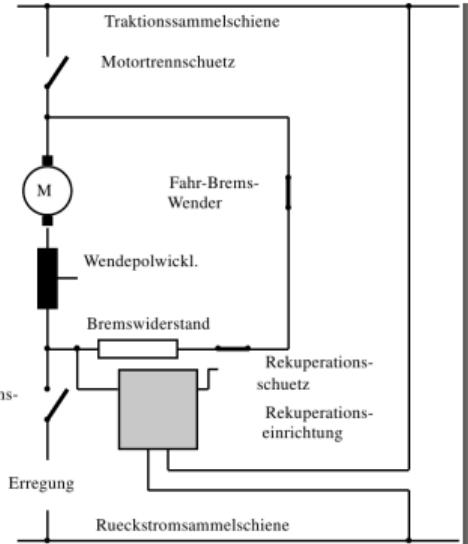


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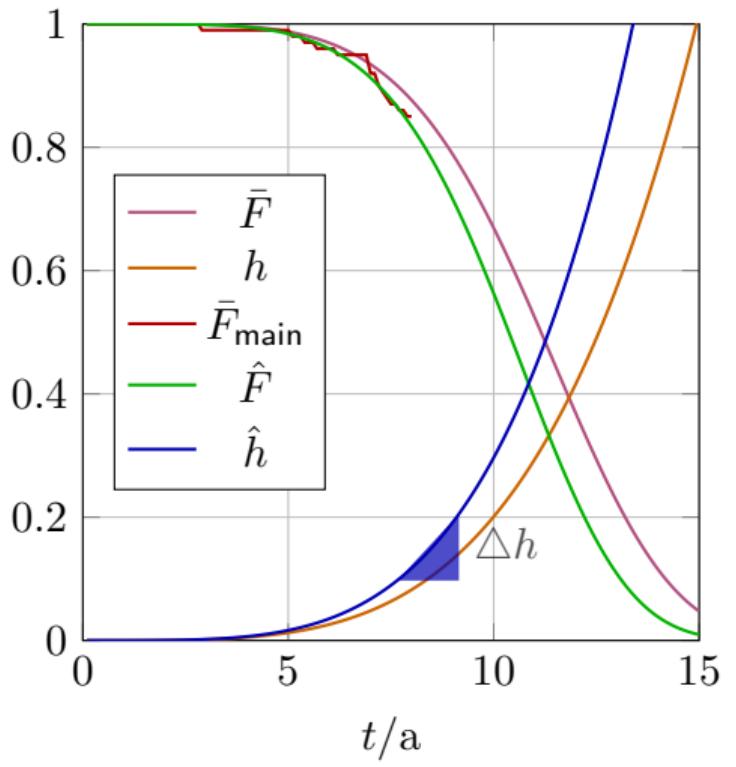


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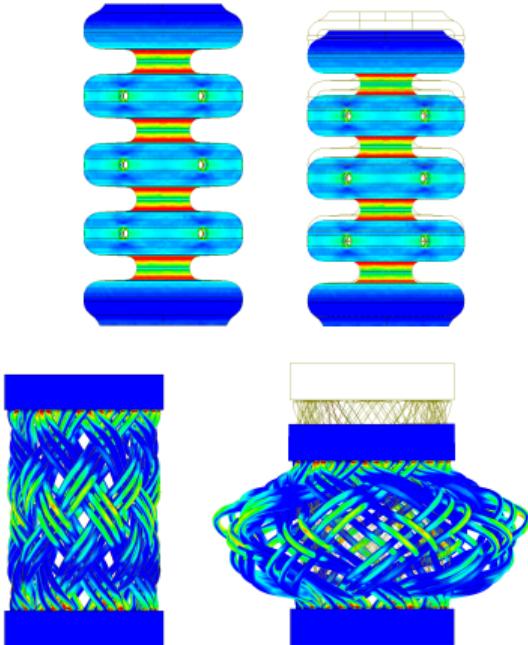


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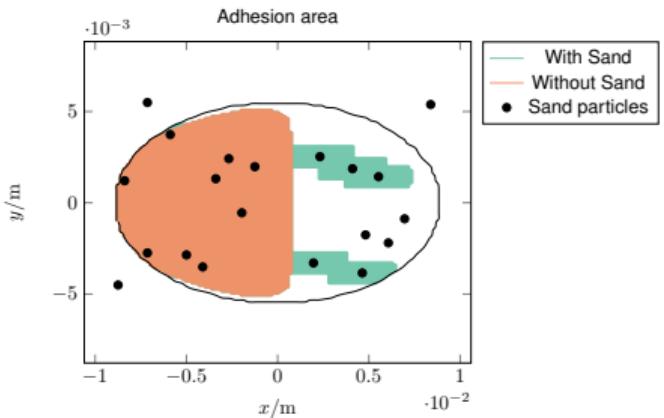


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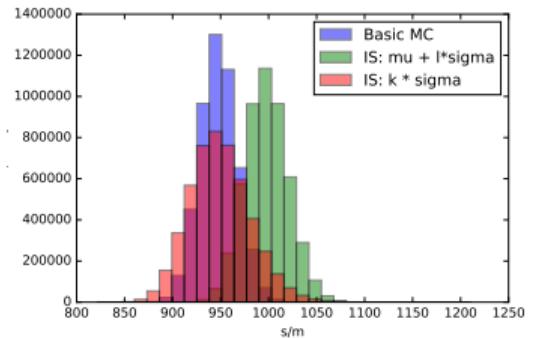
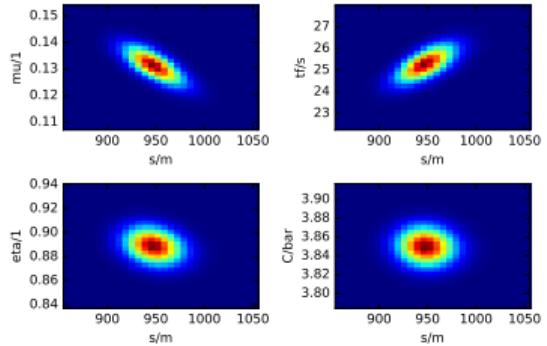


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# Lab Space Rail Vehicle Engineering

## Today:

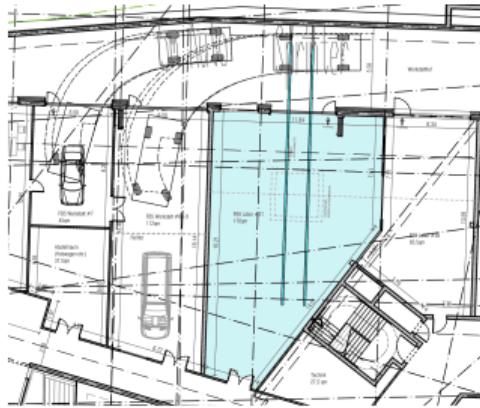
- Lab Goethestraße
  - Several distributed lab spaces
- Rail Access “as a service” in Aachen possible



## 2018:

- Center of Competence Mobility Aachen
  - 180 m<sup>2</sup>
  - Track
  - 15 kV power supply

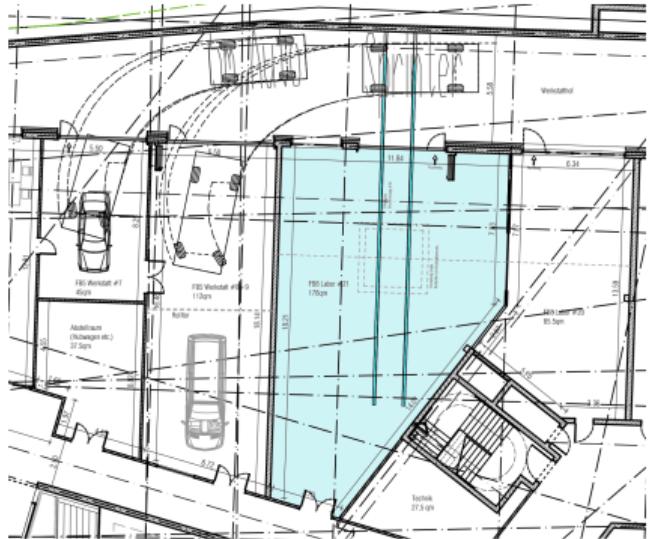
Vision: “Loco in a lab”



# Vision 2020: “Loco in a Lab”

Common lab space for Rail Vehicle Engineering, Railway Drives and Railway Systems Engineering

- Cab simulation
- 700 kW electric motor test rig
- Train braking system
- Door system
  - + Network communication
  - + Hardware-in-the-Loop
  - + Further subsystems, e.g.
    - Hybrid Drive
    - Pantograph
    - Compressed air generation



# Thank you for your participation!



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