



#InvestEUresearch

# Horizon 2020 Work Programme for Research & Innovation 2018-2020

EMRS Event  
Strasbourg 20th June 2018

**Workshop:** Europe in Motion-EUMAT Session  
Time: 13:45-16:10  
Proponent: Bosch Corporate Research – Matthias Wieler  
Proposal title: **Data-driven virtual microstructure design for fuel cell materials**

DG Research & Innovation

Research and  
Innovation

# Data-driven virtual microstructure design for fuel cell materials

## Motivation: Increase efficiency and lifetime of fuel cells

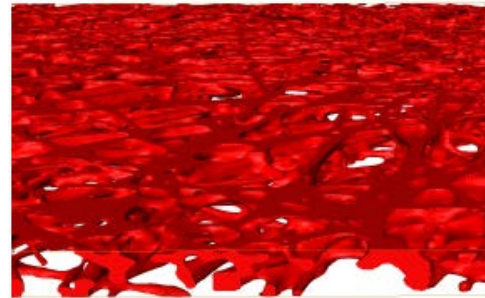
### Fuel cell vehicle



Source: Spiegel online

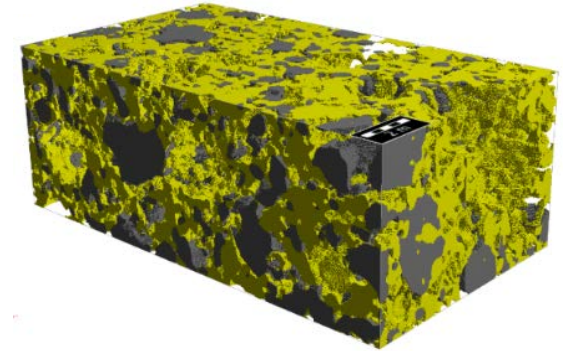
### Microstructures of fuel cell materials

#### Gas diffusion layer (GDL)



Source: ZHAW

#### Anode of solid oxide fuel cell (SOFC)



- ▶ The efficiency and degradation rate of fuel cells depends strongly on the microstructure of its electrodes and gas transport layers.
- ▶ Optimize the microstructures by data-driven virtual design based on multiphysics simulation.

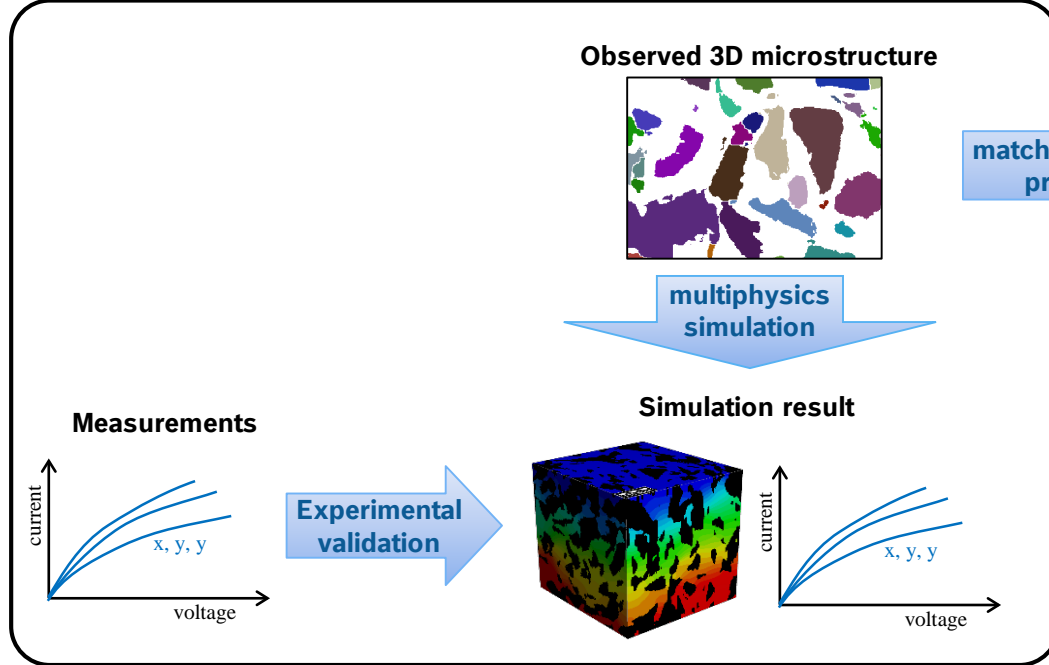
# Data-driven virtual microstructure design for fuel cell materials

## Approach: Data-driven microstructure generation for virtual design

### Multiphysics simulation

to establish microstructure-property relationship

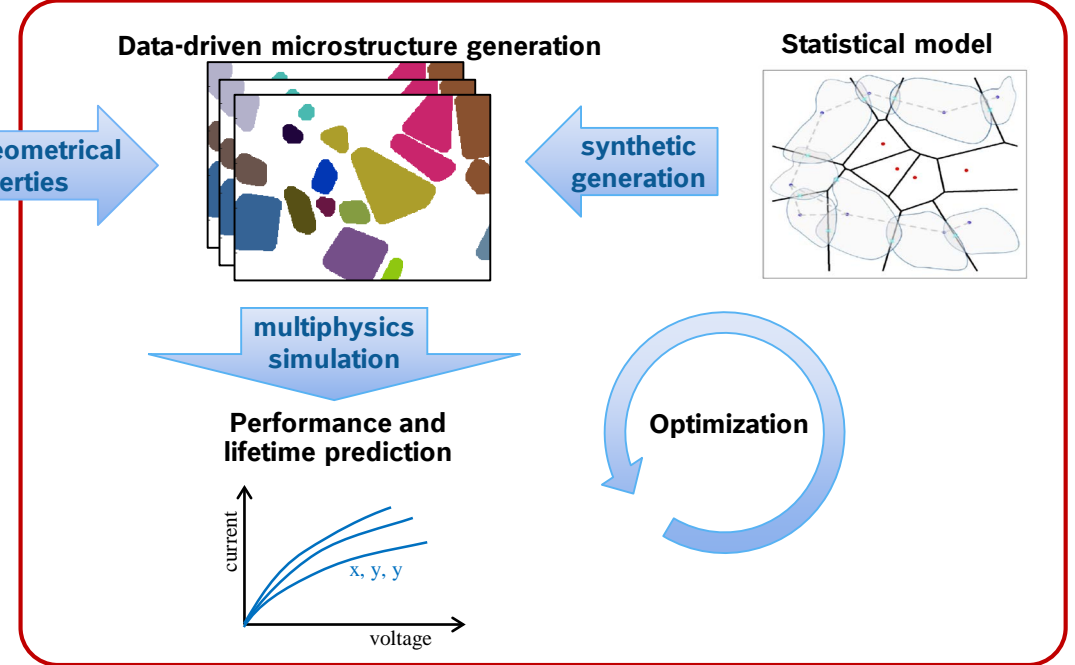
**State of the art**



### 3D microstructure optimization

based on data-driven generation of microstructures

**Innovation**



- Data-driven microstructure generation allows to explore the space of manufacturable microstructures virtually and to optimize the microstructure with drastically reduced experimental effort.

# Data-driven virtual microstructure design for fuel cell materials Consortium

- ▶ **Call:** DT-NMBP-xx or suitable other call (tbd)
  
- ▶ **We are looking for consortium partners with the following expertise:**
  - ▶ Software companies interested in developing/improving software for data-driven microstructure generation
  - ▶ Industrial users that are interested in data-driven virtual microstructure design to improve their products
  - ▶ Experts for multiphysics microstructure simulations (academic or industrial)
  - ▶ All value-contributing interested partners
  
- ▶ **Contact:**
  - ▶ [matthias.wieler@de.bosch.com](mailto:matthias.wieler@de.bosch.com)
  - ▶ (optional also: [Winfried.Keiper@de.bosch.com](mailto:Winfried.Keiper@de.bosch.com))

EUMAT-EMRS Joint Session @ Europe In Motion on 20th June 2018