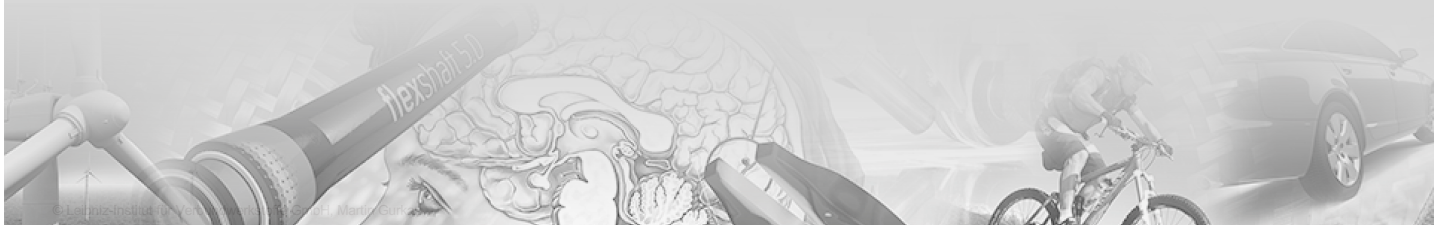


## Qualität durch Simulation und Prüfung - wie geht das?

Jour Fixe CU West  
20. September 2021

Martin Gurka

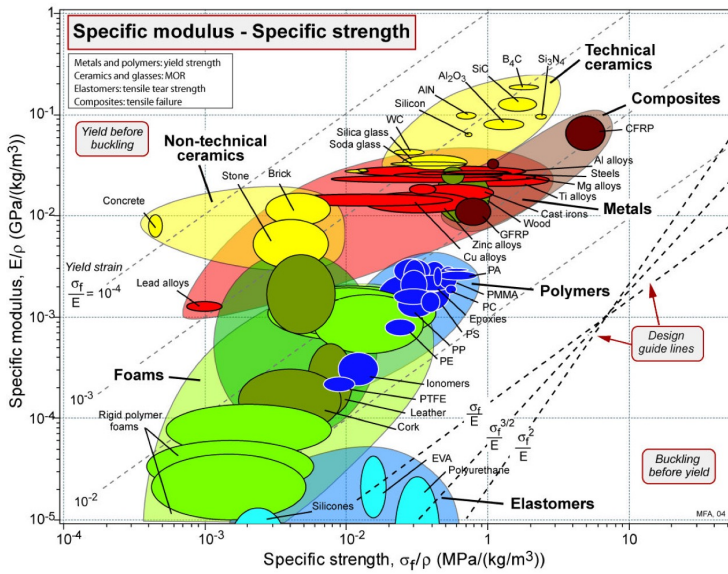


### Dr. Martin Gurka



**Deputy Research Director Materials Science,  
Leibniz Institute for Composite Materials, Kaiserslautern**

- **Tailored & Smart Composites**  
Morphing Structures, Sensing
- **Nondestructive Testing**  
IR-Thermography, Acoustic Emission Analysis,  
PA Ultrasonics
- **3D Structure Evaluation**  
Microfocussed X-ray CT



Granta Design Edu-Pack Resource Booklet

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Outstanding specific strength & stiffness due to highly oriented fibers

High fracture toughness due to fiber reinforcement

Tailored multifunctionality via combination of different materials

Excellent light weight capability

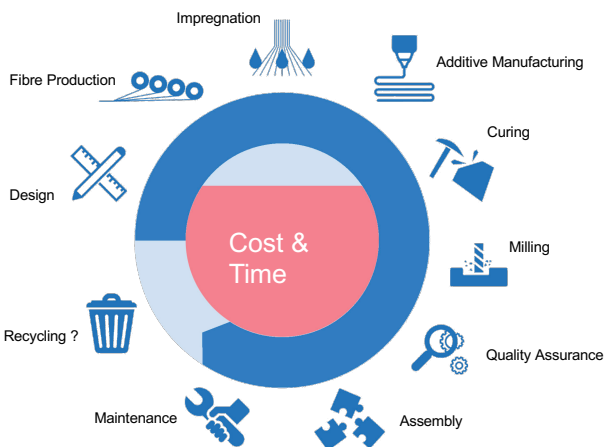
Sensitive to impact damage (most often invisible from outside)

Complicated degradation mechanism

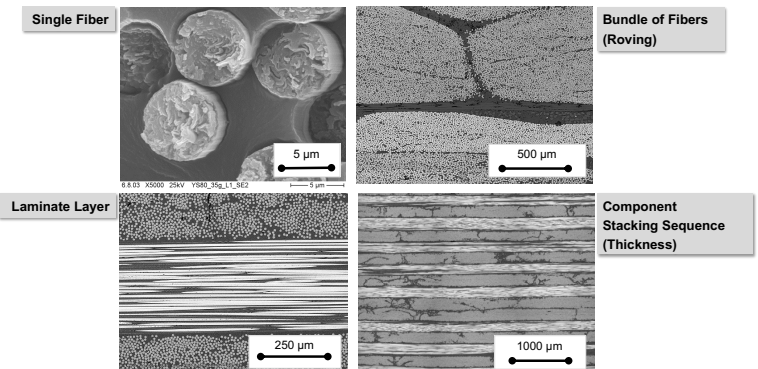
Complex processing

3

## Complex Process Chain

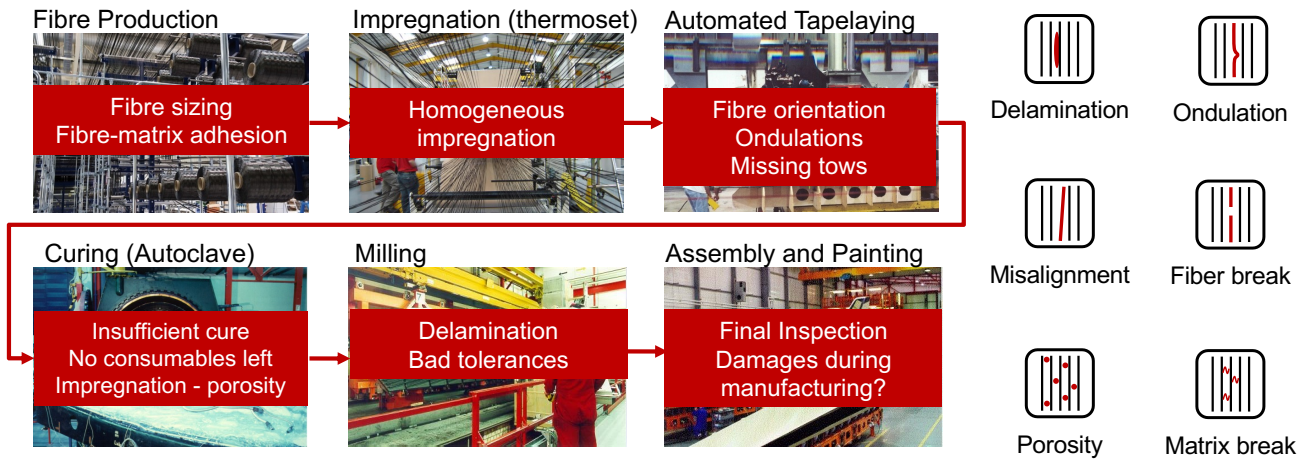


## Hierarchical Structure

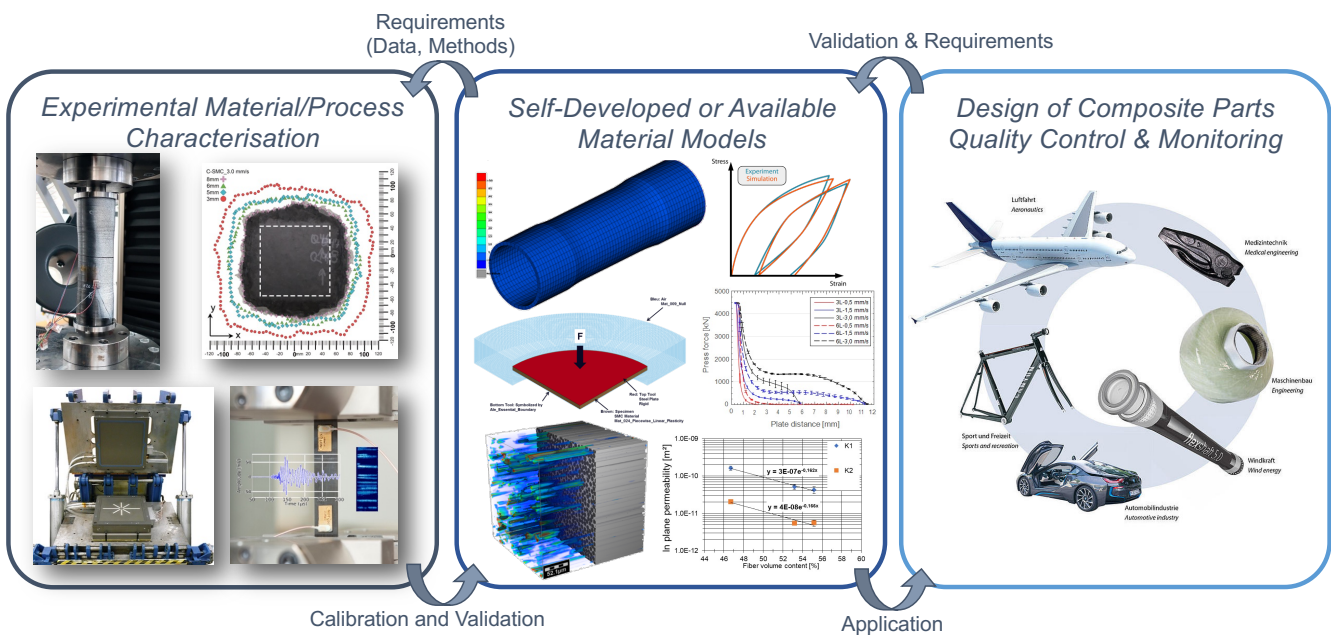


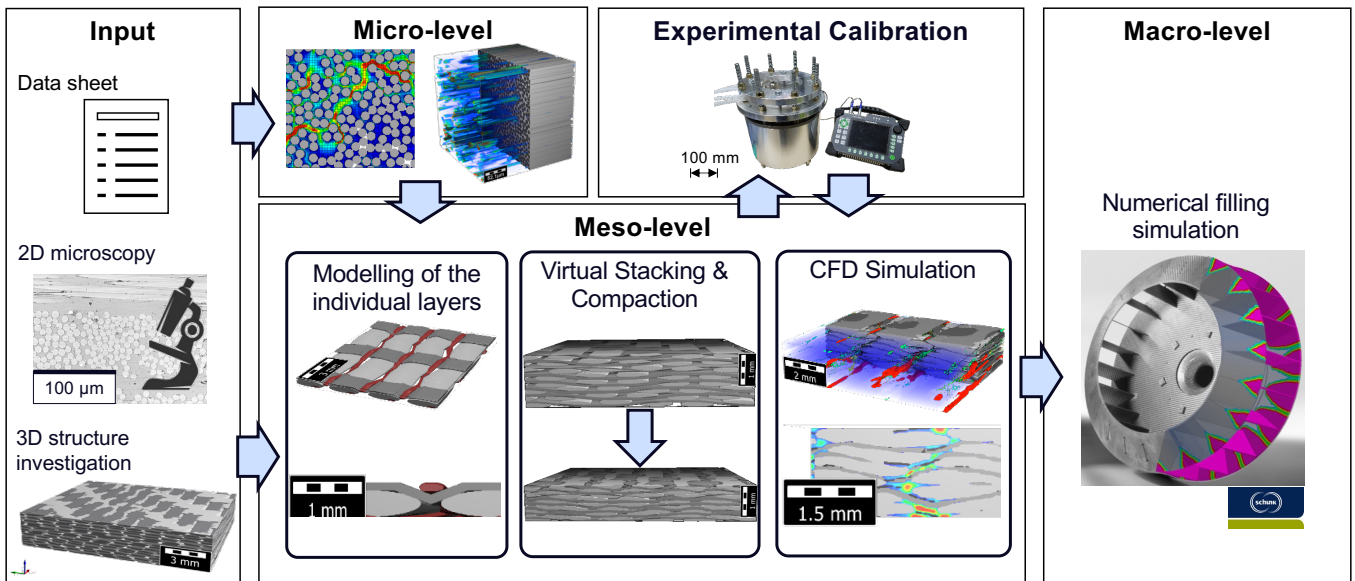
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4



(and many more)





Schmidt, T., May, D., Duhovic, M., Wiedera, A., Hübert, M., Mitschang, P. A combined experimental-numerical approach for permeability characterization of engineering textiles", *Polymer Composites* <https://doi.org/10.1002/pc.26064>

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**Micro-Structure**

- fiber alignment
- porosity / voids
- fiber matrix interface
- fiber volume content
- (micro-) impregnation
- ...

**Property-Simulation**

- stiffness / strength
- fiber alignment (topology)
- electric & thermal conductivity
- ...

**Process-Simulation**

- draping
- Form-filling / mold-flow / Compression / Compaction
- impregnation / permeability
- milling / laser cutting
- ...

**Application-Property**

- stiffness / strength
- weight
- surface coating
- tolerances / dimensions
- ...

**Thank you for your attention!**