

MATERIALS CHARACTERIZATION AND TESTING

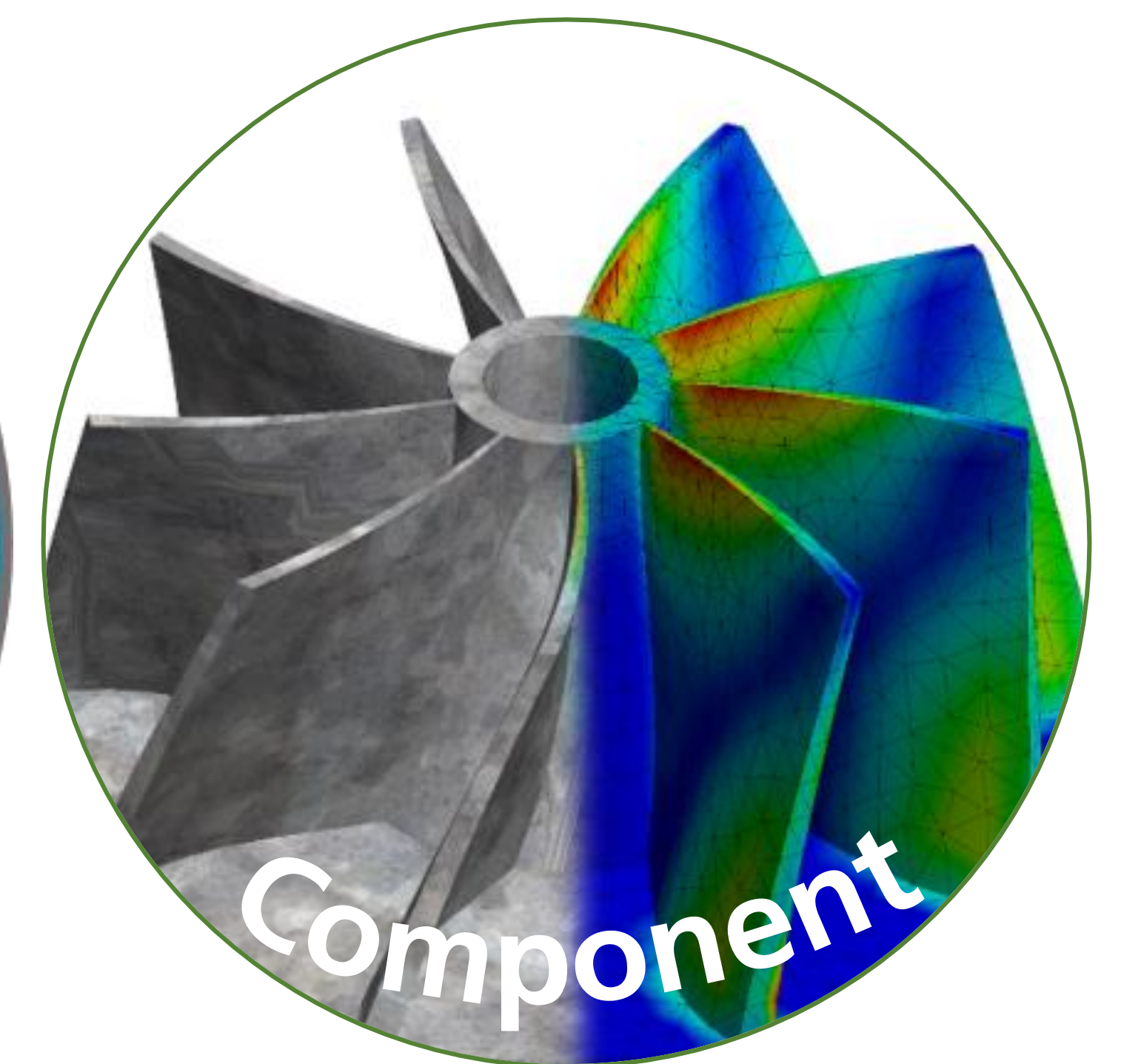
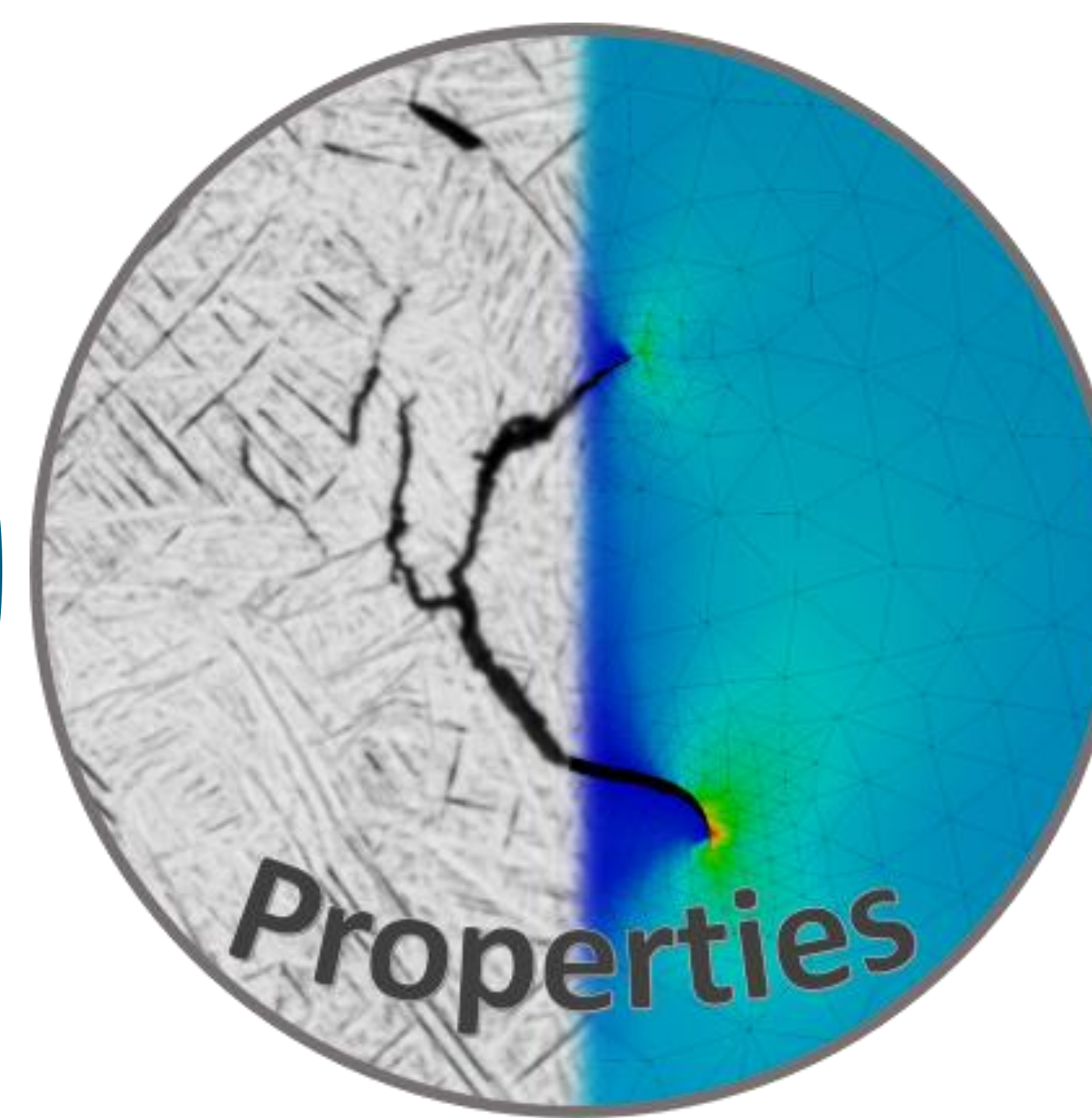
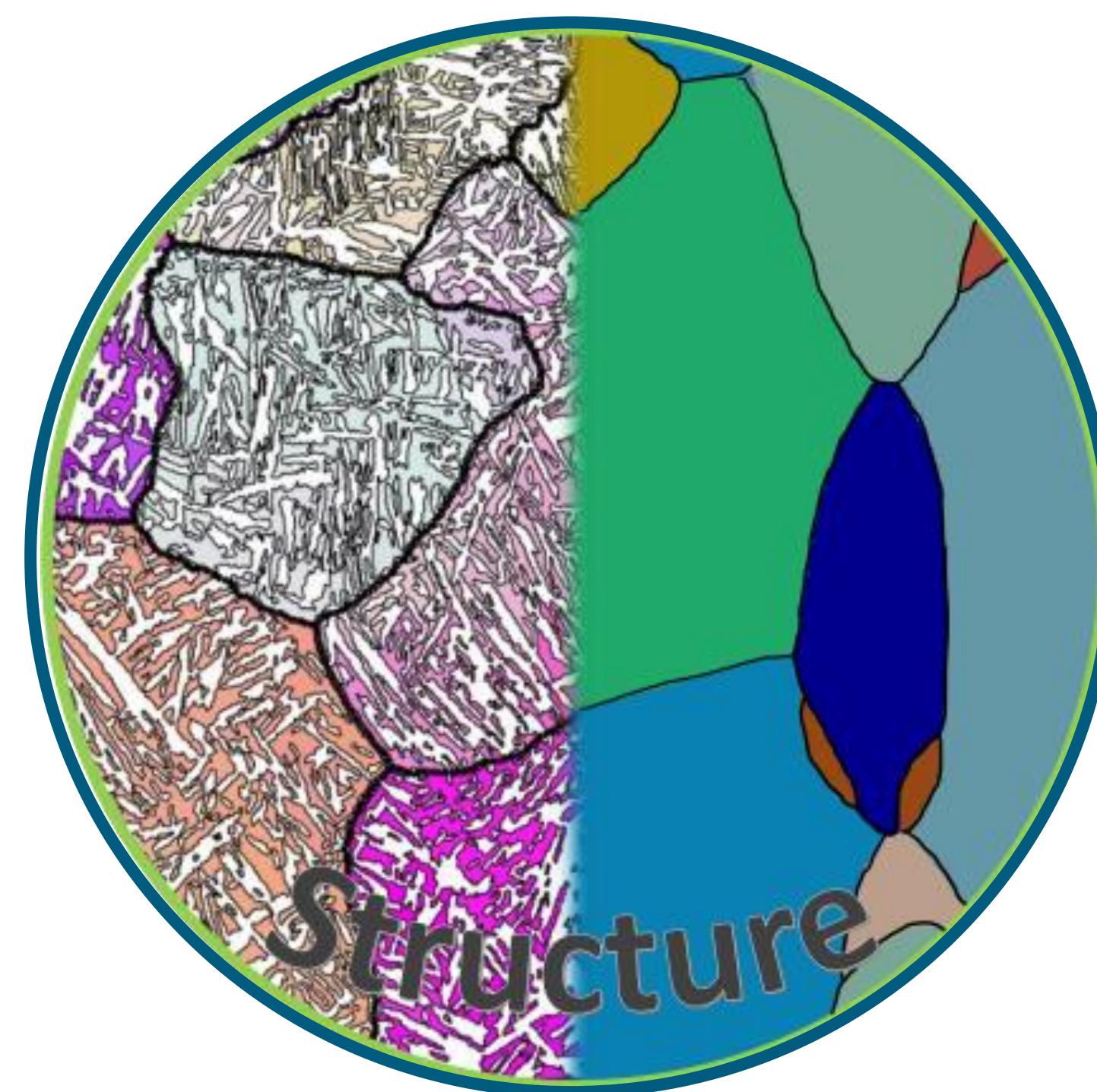
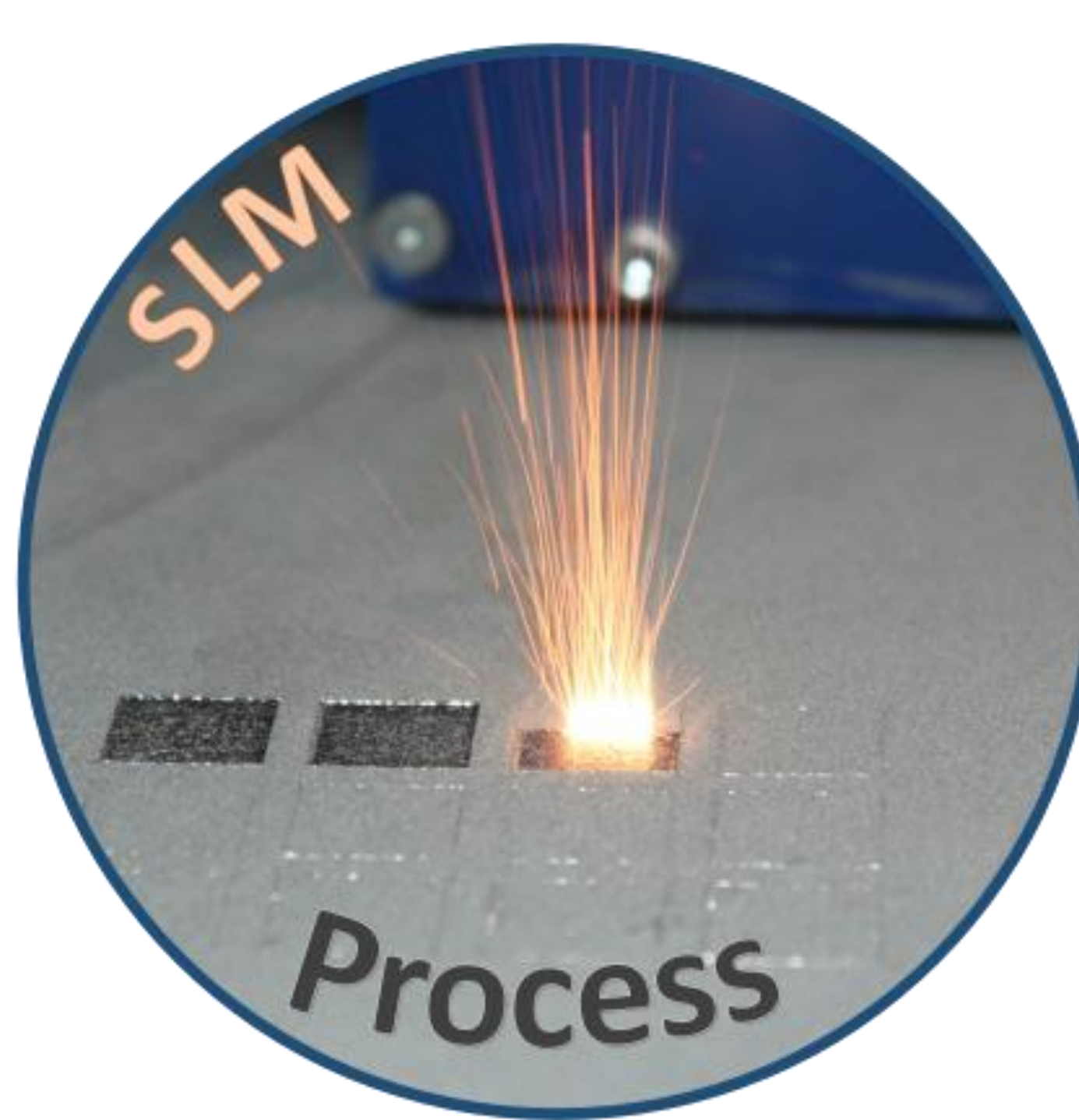
Thesis / Internship / Student assistant

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Subjects and topics:

- Materials design and adaption – high-throughput screening of metallic alloys (performance, sustainability, criticality, costs)
- Advanced structural analysis (3D-Metallography with automated section preparation, scanning electron microscopy)
- In situ deformation and damage analysis (digital image correlation for optical deformation analysis)
- Digitalization, thermodynamic calculations, data management and exploration
- Fatigue behavior and lifetime prediction (efficient property screening through high-frequency fatigue testing)



Process

Structure

Properties

Functionality

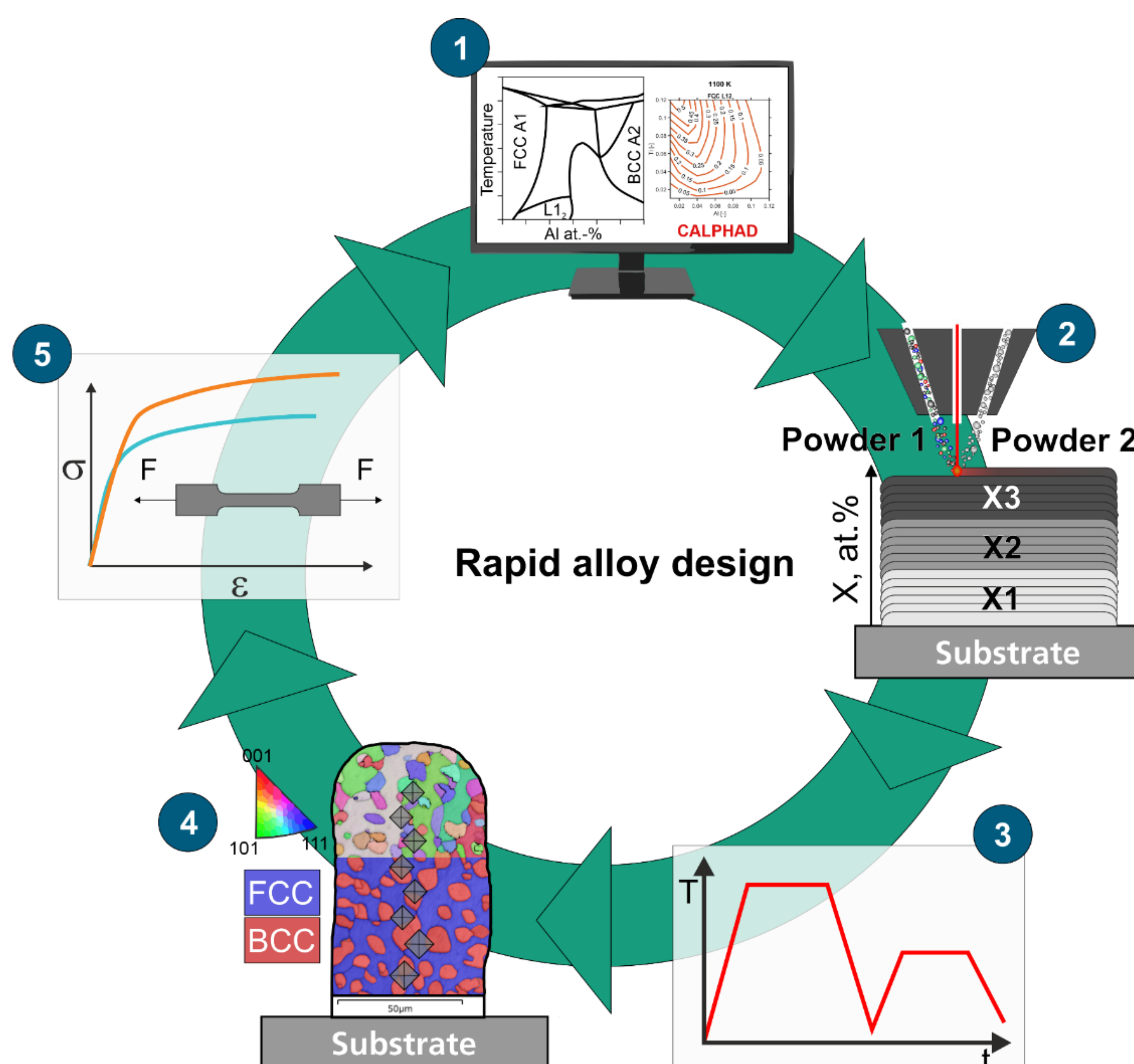
Laser-based manufacturing

- Additive manufacturing
- Coating technologies
- Welding & cutting

- Grains, phases, texture
- Surface, fracture, defects
- Metallography, SEM, EDS, EBSD

- Hardness, impact strength
- Wear & corrosion
- Static and fatigue strength
- In situ monitoring

- High temperature (energy, aerospace)
- Hydrogen (energy, transport)
- Harsh environment (fusion etc.)



Possible tasks:

- Thermodynamic simulations: prediction of phase formation and stability at different temperatures
- Planning and conducting of experiments for characterization of material's microstructure and properties
- Further development of characterization techniques for accelerated alloy development and screening

Facilities & techniques:

- ThermoCalc Software for thermodynamic calculations with MatLab-Toolbox for batch simulations
- Scanning electron microscopy with wide-ranging analytics: EBSD, EDS etc.
- Confocal laser scanning microscopy for surface characterization
- Diverse equipment for mechanical characterization: tensile and bending machines, hardness measurements
- And much more...

If you are interested in described topics, feel free to get in touch with us!