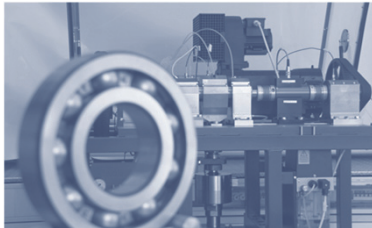


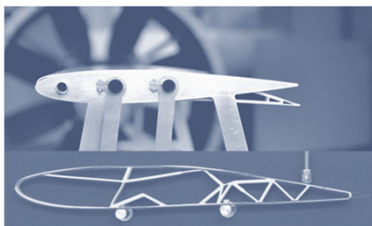
# Research focus areas



Virtual product development  
and design methodology



Machine elements and  
component design



Mechatronic systems in  
mechanical engineering

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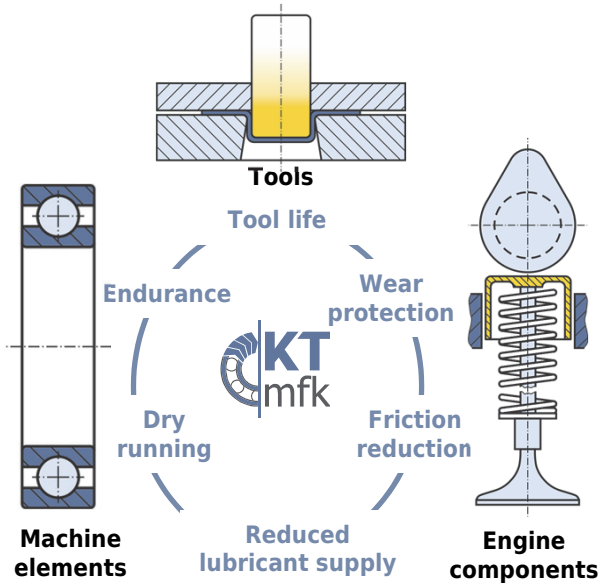
## PVD-/PACVD- coating systems



It is our vision to develop energy-efficient and low-friction systems by modifying surfaces with tribological coatings. We consider tribological PVD/PACVD coatings as independent design elements, which require specific expertise. Our services include:

- coating development and selection
- tribological model and component tests
- dimensioning specifications
- provision of component design guidelines

### Application and typical coatings



KTmfk has the expertise and skills for coating systems based on

- amorphous carbon coatings
- hard coatings
- solid lubricant coatings

### Coating machine

For research, we have a scaled production system which has the following features:

- automated process management and control
- two steered rectangular arc cathodes
- two MF pulsed rectangular sputter cathodes
- a liquid vaporiser
- continuous or MF pulsed substrate bias
- up to four inert gases/reactive gases
- mass spectrometer for process and residual gas analysis

### Coating processes

The coating is applied in a vacuum vapour deposition process by means of:

- (reactive) sputtering
- (reactive) arc evaporation
- plasma-assisted chemical vapour deposition (PACVD)

### Coating characterisation

With a large selection of equipment at our disposal we can characterise coatings comprehensively:

#### Mechanical and physical properties

- ultra micro hardness tester
- adhesive strength tests (scratch test and Rockwell test)
- calo tester
- stylus instrument
- impact tester
- contact angle measuring device

#### Tribological properties

- temperature controlled vacuum pin-on-disk tribometer
- pin-on-disk tribometer
- twin-disk tribometer
- tribometer under climate conditions
- load scanner (cylinder on cylinder)

#### Topographic and morphological properties

Available through FAU's materials science cluster:

- glow discharge spectrometer
- micro-Raman spectrometer
- X-ray photoelectron spectroscopy
- X-ray diffractometers
- scanning electron microscopes
- optical microscopes, confocal microscope
- 3D laser scanning microscope

#### Component testing

We develop project-specific test rigs for testing coating systems under realistic operating conditions.



#### Simulation

Computer-aided simulations using continuum mechanics and fracture mechanics can be conducted to supplement experimental tests.