

# Topics

## for possible student internships, bachelor's, and master's theses

- 1) Chemical vapor deposition (CVD/MOCVD) growth and spectroscopic/microscopic characterization of monolayers of transition metal dichalcogenides and their heterostructures
- 2) Microfabrication and testing of devices (field-effect transistors, photodetectors, memristors, etc.) based on transition metals dichalcogenides
- 3) Microfabrication and testing of devices based on graphene and transition metal dichalcogenide and graphene monolayers for ultrasensitive biological and chemical sensing
- 4) Preparation and characterization of carbon nanomembranes (CNMs) for molecular photocatalysis
- 5) Preparation and characterization of carbon nanomembranes (CNMs) for H<sub>2</sub> and CO<sub>2</sub> technologies
- 6) Surfaces science studies of organic and inorganic monolayers down to the atomic scale
- 7) Preparation and studying biofunctional carbon nanomembranes (CNMs) for biochemical sensing with surface plasmon resonance techniques
- 8) Preparation and studying of antimicrobial coatings for titanium implants based on 2D materials
- 9) Studying of novel electrochemical catalysts based on 2D materials for H<sub>2</sub> and NH<sub>3</sub> evolution reactions
- 10) Electron irradiation induced synthesis on novel molecular 2D materials based on aromatic compounds (e.g., polycyclic carbon-based molecules, boranes, carboranes)

**If you are interested in any of these topics and would like more information, please feel free to contact Prof. Dr. Andrey Turchanin ([andrey.turchanin@uni-jena.de](mailto:andrey.turchanin@uni-jena.de)).**