

## Seminar im Rahmen des GRK 2078

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Date: Tuesday, July 24, 2018  
Time: 14:00h

Location: Bldg. 10.23, 3<sup>rd</sup> Floor (R 308.1 – KM-Seminar room)

Title: **Smart applications of carbon nanomaterials and their composites**

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### Abstract

Recent advances in the smart applications of carbon nanomaterials (carbon nanotubes (CNTs), graphene, exfoliated graphite nanoplatelets (xGnPs), etc.) and their composites will be presented. In particular, the underlying principles and applications for strain sensing and structural health monitoring will be highlighted. The common fundamental principle is piezoresistivity of the percolated conductive network formed by carbon nanomaterials, that is, the phenomenon where the resistivity changes upon mechanical loading or in the presence of physical deformation.

Recent results from various forms of carbon nanomaterials and their composites, including free-standing sheets, polymer-impregnated sheets, sprayed-on coatings, graphene hydrogels, and uniformly dispersed polymer-matrix composites, will be presented. Main topics include: (1) large-area strain sensing using CNT-graphene hybrid sheets and polymer-impregnated composite sheets; (2) transparent graphene coatings with strain sensing capability; (3) polydopamine-functionalized graphene/PVA composites with humidity sensing capability; (4) tactile sensing using hierarchical nanocomposite pillar array; and (5) real-time, in situ structural health monitoring and fiber-reinforced composite manufacturing process monitoring using spray-coated carbon nanomaterial network.

A portion of the talk will be devoted to recent studies on the self-sensing ability of continuous-carbon-fiber-reinforced composites (not containing carbon nanomaterials), which paves the way for cost-effective, easy-to-implement, “smart” composite structures.

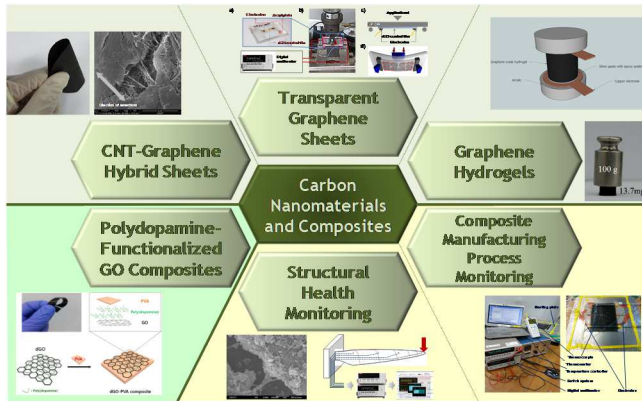


Fig. 1 Overview of carbon-nanomaterial-based sensing

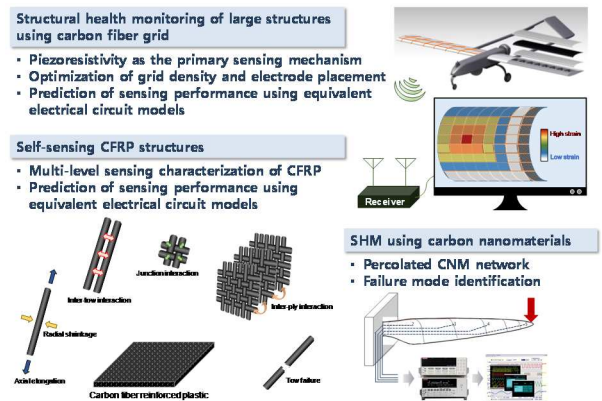


Fig. 2 Overview of self-sensing carbon fiber composites

All interested listeners are cordially invited to join the audience.

Prof. Dr.-Ing. Thomas Böhlke  
(Speaker of GRK 2078)