

Design of Particulate Products

The key objective and long-term vision of Collaborative Research Centre 1411 is the targeted design of particulate products by rigorous optimization based on predictive structure-property and process-structure functions. Particulate products, as considered in this CRC, consist in the simplest cases of dispersed single particles and in more complex cases of hierarchically organized assemblies of particles in the form of supraparticles, thin films or stationary phases for chromatographic separation. The research consortium targets breakthroughs in the product engineering of nanoparticles with optimized optical properties produced by continuous synthesis directly coupled to property-specific classification of nanoparticles by chromatography. These challenges are addressed from different perspectives in four strongly interlinked research areas. Moreover, they are underpinned by the development of joint methodologies in synthesis, classification, characterization as well as modelling, simulation, and optimization.

To coincide with the consortium entering its fourth year, the **CRC 1411 International Symposium** brings together researchers from around the world to showcase the latest progress in the targeted design of particulate products supported by rigorous optimization of structure-property and process-structure functions.

Symposium supported by

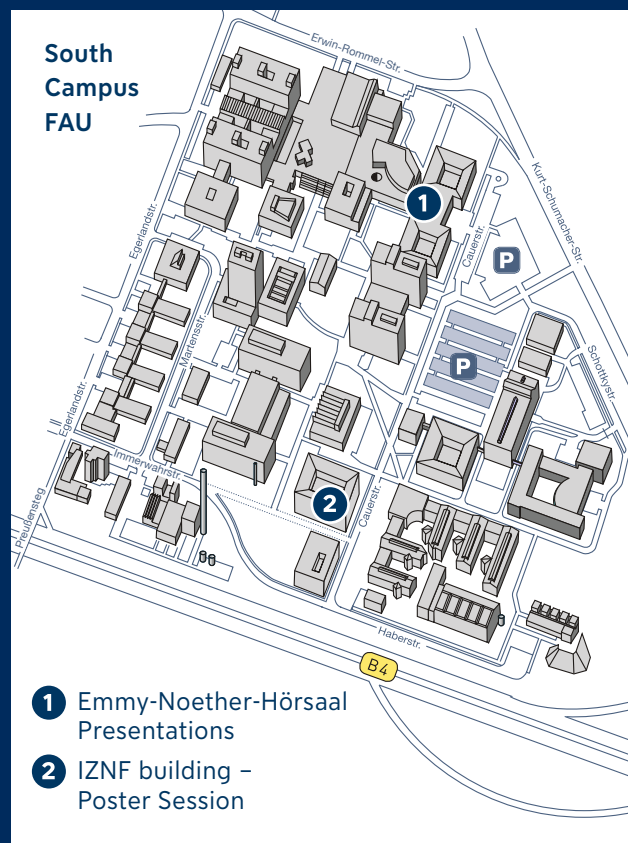


**ENGINEERING
OF ADVANCED
MATERIALS**
COMPETENCE UNIT

Funded by



Deutsche
Forschungsgemeinschaft



VENUE Emmy-Noether-Hörsaal (H12)
Felix-Klein-Gebäude (Mathematik u. Informatik)
Cauerstraße 11 · 91058 Erlangen · Germany

MAPS AND TRAVEL INFORMATION

www.fau.eu/fau/campus-locations-at-fau/fau-campus-erlangen

COORDINATORS Prof. Dr.-Ing. Wolfgang Peukert
Prof. Dr. rer. nat. Martin Hartmann

ORGANIZERS Dr. Monica Distaso · monica.distaso@fau.de
Prof. Robin Klupp Taylor · robin.klupp.taylor@fau.de Institute of
Particle Technology
Cauerstraße 4 · 91058 Erlangen
+49 (0)9131 85-29404

LATE REGISTRATION (ONLINE PARTICIPATION ONLY)

www.crc1411.research.fau.eu



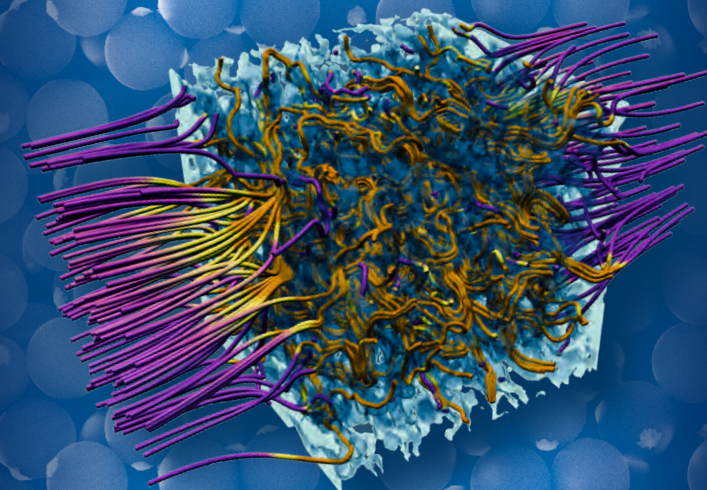
Friedrich-Alexander-Universität
Erlangen-Nürnberg

International Symposium CRC 1411

20 – 21 March 2023

FAU South Campus, Erlangen
& Online

www.crc1411.research.fau.eu



Monday · 20 March 2023

08:00 Arrival and registration

08:45 Welcome address

Wolfgang Peukert · CRC 1411 Coordinator, FAU

SESSION 1

Porous materials and nanoparticle chromatography

09:00 Methods for the vacuum-driven assembly of microspheres

Gert Desmet · Vrije Universiteit Brussel, Belgium

09:45 Mesoporous material polymer functionalization and resulting properties

Annette Andrieu Brunsen · TU Darmstadt, Germany

10:30 Coffee Break

10:50 Watching paint dry – From colloidal droplets to complex nanostructures

Arash Nikoubashman

Johannes Gutenberg University Mainz, Germany

11:35 Synthesis of hierarchical porous materials for nanoparticle chromatography (CRC1411 Project B01)

Umair Sultan

Institute of Chemical Reaction Engineering, FAU

11:55 Chromatographic classification of gold nanoclusters and nanoparticles by liquid chromatography (CRC 1411 Project B04)

Lukas Gromotka · Institute of Particle Technology, FAU

12:15 Lunch

SESSION 2

Functional nanoparticles

13:20 Room-temperature aqueous synthesis of metallic alloy nanoparticles enabled by microreactor

Satoshi Watanabe · Kyoto University, Japan

14:05 Continuous flow synthesis of patchy particles with tailored morphology and optical properties (CRC 1411 Project A03)

Julia Seifert

Interdisciplinary Center for Functional Particle Systems, FAU

14:25 Luminescent nanoparticles – photophysics, mechanistic studies, and applications

Ute Resch-Genger · Bundesanstalt für Materialforschung und -prüfung (BAM), Germany

15:10 Coffee Break

SESSION 3

From structure to function for optical materials

15:30 From bioinspired structure formation to particle based metamaterials

Andreas Fery · Leibniz-Institute of Polymer Research, Germany

16:15 Strategies for increased color saturation in colloidal photonic crystals (CRC 1411 Project A05)

Gudrun Bleyer

Interdisciplinary Center for Functional Particle Systems, FAU

16:35 Topology, material and shape optimization for particle ensembles (CRC 1411 Project D05)

Nico Nees · Chair of Continuous Optimization, FAU

16:55 Short Break

17:00 Round table discussion

Diversity in STEM fields: Ongoing experiences with active promotion

Moderators: Ana-Sunčana Smith and Nicolas Vogel, FAU

18:00 Poster session and buffet in IZNF (Cauerstr. 3)

Tuesday · 21 March 2023

SESSION 4

Comprehensive characterization

09:00 Quantitative study of nanomaterials for life science applications

Ivo Nischang · Friedrich Schiller University Jena, Germany

09:45 Multidimensional nanoparticle property characterization using sedimentation analytics (CRC 1411 Project C04)

Paola Cardenas Lopez · Institute of Particle Technology, FAU

10:05 Characterisation of functionalised surfaces and porous materials (CRC 1411 Project B03)

Carola Schlumberger · Institute of Separation Science & Technology, FAU

10:25 Coffee Break

10:45 Spectroscopic electron microscopy in two and three dimensions

Georg Haberfehlner · Graz University of Technology, Austria

11:30 Towards micron-scale 3D imaging with atomic detail

Philipp Pelz · FAU

12:05 Scale-bridging tomography of hierarchical porous materials for chromatography applications (CRC 1411 Project C01)

Benjamin Apeleo Zubiri

Institute of Micro- and Nanostructure Research, FAU

12:35 Lunch

SESSION 5

Design and optimization

13:45 Enhancement of electrokinetic transport in micro- and nanochannels by tuning surface properties

Olga Vinogradova · Moscow State University, Russia

14:30 A multi-scale model hierarchy for material flow problems

Simone Göttlich · University of Mannheim, Germany

15:15 Coffee Break

15:30 Continuous flow synthesis and population-balance modelling of InP quantum dots (CRC 1411 Project A02)

Zhuang Wang · Chair of Particle Science and Technology, University of Duisburg-Essen, Germany

15:50 Online Talk! The design of particulate products: An approach based on reliable, minimum, pseudo-elementary step mechanisms plus mechanism-enabled population-balance modeling

Richard Finke · Colorado State University, USA

16:35 Design of particulate products: From synthesis to color (CRC 1411 Project D03)

Lukas Pflug · Chair of Continuous Optimization, FAU

16:55 Closing remarks

Nicolas Vogel

Interdisciplinary Center for Functional Particle Systems, FAU

17:00 End of the Symposium