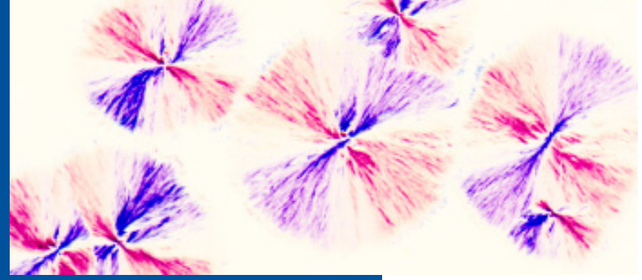


SOFT MATTER

Soft matter science is an interdisciplinary field of research, attracting attention from chemists, physicists, biologists and engineers. To some extent, this appeal comes from the amazing properties of "soft materials" e.g., from their unique capability to respond to external stimuli. Even weak stimuli may induce significant changes in behaviour due to softness and mesoscopic structuring of these materials. While softness results from weak interactions between the constituents, mesoscopic structuring is often a consequence of spontaneous self-assembly into ordered arrangements much larger in size than the constituent molecules.

ORGANIC ELECTRONICS

Many properties of macromolecular and soft matter materials depend on molecular order/disorder on various length scales. For instance, order may be beneficial for enhanced mechanical properties, while disorder may allow for high ductility. Consequently, it is reasonable to expect that optoelectronic properties and charge transport in conducting soft materials, e.g. conjugated polymers, are also strongly affected by morphological aspects (conformational degrees of freedom, molecular order, lamellar orientation, domain size, ...).

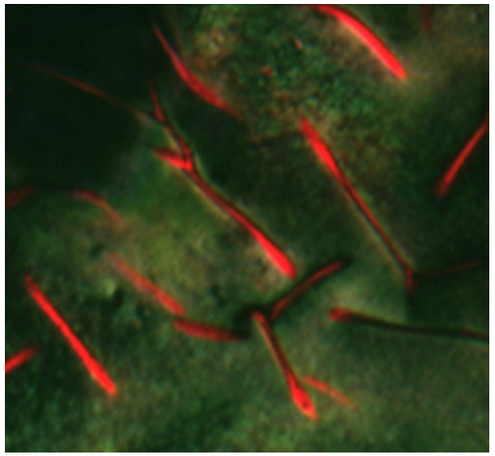
For example, conjugated polymers, in particular when they are semi-crystalline, exhibit various structural features on hierarchical length scales. Quantum mechanical phenomena and charge transport depend not only on the chemical structure of the monomers, but also on the local molecular packing and the corresponding (delocalized) electronic states. Spatial ordering and morphology of conjugated polymers can be strongly influenced and even controlled via processing stages, often resulting in hierarchically structured systems. The charge transport across boundaries between various structural building blocks and the possibility of trapping at local defects will have significant impact on macroscopically (averaged) measured transport and the overall performance of the material.

PROGRAMME

The SoMaS Summer School 2017 aims to give attendees a broad overview of **Organic Electronics: Correlations between Structure and Electronic Properties**. The school integrates knowledge from chemistry, materials science, biology and physics.

The SoMaS School 2017 consists of:

- Introductory courses and lectures
- Research seminars and tutorials
- Poster sessions
- Career seminars



INVITED SPEAKERS

Denis Andrienko
Max Planck Institute for Polymer Research Mainz, Germany

Bryan Boudouris
Purdue University, USA

Richard Hildner
Universität Bayreuth, Germany

Jenny Nelson
Imperial College London, UK

Irina Nyrkova
Université de Strasbourg, France

Frank Pammer
Universität Ulm, Germany

Christoph Scherer
Max Planck Institute for Polymer Research Mainz, Germany

Simon Schmidt
Universität Freiburg, Germany

Rachel Segalman
UC Santa Barbara, USA

Michael Sommer
Universität Chemnitz, Germany

Uli Würfel
Fraunhofer-Institut für Solare Energiesysteme ISE, Freiburg, Germany

ORGANIZERS

Pursuing the tradition of **Soft Matter Science** in the Rhine Valley by introducing the young generation of researchers to this field, the **International Research Training Group (IRTG) "Soft Matter Science: Design of Functional Materials"** organizes a series of annual summer schools in Alsace, France.

Strasbourg ● ● Freiburg
IRTG SoMaS Soft Matter Science
Mulhouse ● ● Basel

Supported by Université franco-allemande Deutsch-Französische Hochschule

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INTRODUCTORY COURSES

Structure-property relationships in molecular electronic materials *(Jenny Nelson)*

Physics of organic solar cells *(Uli Würfel)*

Coarse-graining techniques and multiscale simulations *(Denis Andrienko)*

- Introduction to coarse-graining
- Techniques: force matching, inverse Monte Carlo, relative entropy
- Practicals: liquid water, hexane, polymer melts
- Material design example: linking to quantum chemical calculations and master equation

High performance materials for organic electronic devices: From synthesis aspects to applications in photovoltaics, field-effect transistors and beyond *(Michael Sommer)*

- General design principles of high performance conjugated polymers for organic electronics
- A comparison of available syntheses towards conjugated polymers
- Characterization of conjugated polymers–trivial or not?
- Molecular parameters that govern electronic processes in devices exemplified by selected examples

How to use assembly and mesoscale structure to generate energy *(Rachel Segalman)*

- Basics of how organic photovoltaics and organic thermoelectrics operation
- Strategies for controlling crystallinity to affect electrical and thermal conductivity
- Block copolymer self-assembly to control mesoscopic properties
- Electrochemical reactions and free radicals in thermoelectrics

GENERAL INFORMATION

Centre de Mittelwihr
16 rue du Bouxhof
68630 Mittelwihr, France
+ 33 (0) 3 89 47 93 09
www.mittelwihr.com

Duration of the Summer School
Beginning: Sunday, July 2nd (afternoon)
End: Friday, July 7th (after lunch)

Participation Fee
(including accommodation): 300,– €
Reduced fee for Master students: 150,– €

Deadline for Registration and Abstract
May 25th, 2017

Further Information and Registration
www.softmattergraduate.uni-freiburg.de/summerschool2017

CONTACT

Dr. Jana Husse
softmattergraduate@uni-freiburg.de
+49 (0) 761 203 678 34

IRTG SoMaS
International Research Training Group

ANNUAL SUMMER SCHOOL JULY 2-7, 2017

ORGANIC ELECTRONICS: CORRELATIONS BETWEEN STRUCTURE AND ELECTRONIC PROPERTIES