

## 9<sup>TH</sup> ANNUAL EUROPEAN RHEOLOGICAL CONFERENCE (AERC 2014)

KARLSRUHE, GERMANY

APRIL 8 – 11, 2014

In April, the German Rheological Society (DRG) invited all scientists in the field of rheology to Karlsruhe for the Annual European Rheology Conference (AERC 2014). It was the first time after more than ten years that a European rheology meeting was organized in Germany. Norbert Willenbacher (President of the DRG) and Manfred Wilhelm (both KIT Karlsruhe) were the conference chairs of this meeting with almost 500 participants. The conference took place in the Karlsruhe Convention Center located right in the city center. The local organizing team included members of the research groups of Norbert Willenbacher and Manfred Wilhelm and the secretary of the DRG in Berlin. Christian Wagner (Saarland University), Ulrich Handge (Helmholtz-Zentrum Geesthacht), and Christian Marotzke (Federal Institute for Materials Research and Testing, Berlin) as members of the DRG board as well as Manfred Wagner (TU Berlin) and Christian Friedrich (University of Freiburg im Breisgau) served as scientific committee of the AERC 2014.

Before the official opening of the AERC 2014, three short courses were organized which focused on current topics of rheology. An important aspect of modern rheology is the analysis of nonlinear phenomena. The short course “Non-linear and Fourier-Transform Rheology” was organized by Manfred Wilhelm and Christopher Klein (KIT) and gave an overview on the state of the art of nonlinear rheology. Microrheological techniques have been intensively developed in the last decade and are now established rheological techniques. The short course “Microrheology,” organized by Claude Oelschlaeger and Erin Koos (both KIT Karlsruhe), was devoted to this powerful technique. Since modern materials are structured on various length scales and are associated with a variety of interaction forces, the analysis of flow properties of complex fluids is a challenging task. The third short course of the AERC 2014 with the title “Rheology of Micro- and Nanostructured Polymers” (organization: Ulrich Handge) elucidated the current understanding of the rheology of these complex fluids.

In the evening of April 8, 2014 the AERC conference was officially opened with a welcome reception. The conference location – the Karlsruhe Convention Center – was an ideal congress center for such a large meeting. The lecture halls were located in the same building. The conference registration office was extremely helpful in the case of open questions. Sufficient space for exhibitors, poster sessions and lunch and coffee breaks was provided. Finally, the convention center could be very easily reached using public transportation.

The scientific opening of the AERC 2014 took place on Wednesday morning and was performed by Mats Stading (President of the European Rheological Society), Norbert Willenbacher and Manfred Wilhelm. The first mayor of Karlsruhe, Mrs. Margret Mergen, gave a welcoming speech and sent her greetings to the rheological community. Karlsruhe Institute of Technology which was founded by a merger of the former Technical University of Karlsruhe and the Research Center of Karlsruhe is a scientific place with a longstanding tradition. The Vice-President “Research and Information” of KIT, Detlef Löhe, represented the KIT. In his welcoming speech, he gave an introduction on this unique merger of a state university and a federal research institution of the Helmholtz Association. After the opening ceremony, a plenary lecture initiated the scientific objective of the AERC 2014, i.e. the presentation and discussion of new developments in the field of rheology and the exchange of scientific results and ideas. The first plenary lecture was given by Stephan Herminghaus of the Max Planck Institute for Dynamics and Self-Organization in Göttingen (Germany). In his lecture “Complex fluids far from equilibrium” a very illustrative overview on the dynamics of complex fluids such as granular media was given. An essential part of his lecture was devoted to a detailed analysis of non-equilibrium phenomena in collective media.

Because of the very large number of scientific contributions, in total 11 scientific sessions were organized. The sessions were chosen in order to cover all recent developments in the field of rheology. New developments in experimental techniques were presented in the session “Advances in rheometry.” The session “Colloids and suspensions” was an example where the flow properties of very important complex fluids were discussed. Theoretical and experimental aspects of rheology were covered in the session “Polymer melts, blends, copolymers and nanocomposites.” The session “Industrial rheology” demonstrated that rheology is a modern field which is highly relevant both for fundamental science and industrial applications. Rheological topics range from polymer processing, food rheology to life science. The latter two topics were part of the session “Biopolymers, active fluids and food rheology.” Additional sessions, e.g. “Flow-induced phase transitions and flow instabilities” and “Microfluidic and microrheology”, were organized and attracted a large audience. In total, 255 oral contributions were presented in 6 parallel sessions. In summary, the scientific sessions of the AERC 2014 covered all main aspects of modern rhe-

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ology. Last, but not least 13 exhibitors displayed the newest instrumentation related to rheology. Besides the lectures and the exhibition, a poster session with around 200 contributions was part of the AERC 2014 and took place on Wednesday afternoon. The scientific level of the poster contributions was very high. A poster award was given to the contributions of Johannes Krüchel (University of Erlangen-Nürnberg), Viviane Lutz Bueno (ETH Zürich) and A. Kate Gurnon (University of Delaware).

The second day started with a plenary lecture of Erich Windhab (ETH Zürich). In his lecture on “Rheology in o-gastro-intestinal structure engineering”, Erich Windhab clearly demonstrated the appearance of rheological phenomena in the human body. He elucidated that rheology can contribute to a more detailed understanding of intake, transport and digestion processes. The relevance of least invasive methods for these investigations was convincingly shown in his plenary lecture. Besides the scientific sessions, a social program and a program for accompanying persons were organized. The latter program focused on activities which were associated with local specialities. For example, in addition to a guided tour through Karlsruhe a wine tasting in a local traditional winery and a visit to the Monastery of Maulbronn, UNESCO world cultural heritage, were offered.

Certainly, a highlight of the AERC conference was the conference dinner in the ZKM on Thursday evening, a famous Center for Art and Media in Karlsruhe. A classical

concert of the highly prestigious academic chamber orchestra of the KIT was the introductory part of the evening program. Then the conference dinner took place in the impressive scenery of the foyer of the ZKM. Furthermore, the participants of the conference had the opportunity to visit this museum and to get an impression of the modern art stimulated by interactive video art. The very pleasant atmosphere in the ZKM let the conference dinner to become a unique event. On the last day of the conference, an outstanding plenary lecture was given by Dimitris Vlassopoulos on “Molecular rheology of entangled branched polymers using combs.” In his inspiring lecture, he presented recent developments in the analysis of rheological properties of entangled branched polymers by considering theoretical and experimental aspects. His lecture convincingly showed that rheology of polymeric materials is a permanently evolving scientific discipline.

After the last sessions on the afternoon of April 11<sup>th</sup>, a farewell coffee was organized giving the chance for discussing the next rheological activities. A possibility to present and to discuss the future progress on rheology will be the AERC 2015 which will take place in Nantes on April 14–17, 2015.

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Helmholtz-Zentrum Geesthacht, Institut für Polymerforschung, Max-Planck-Straße 1, 21502 Geesthacht, Germany  
ulrich.handge@hzg.de



Figure 1: Musical entertainment during the welcome reception (Photo Institute for ITCP, KIT Karlsruhe).



Figure 2: The winners of the poster award (from left to right): A. Kate Gurnon, Manfred Wilhelm (conference chair), Johannes Krüchel, Viviane Lutz Bueno, Norbert Willenbacher (conference chair), Graeme Watt (EPL Association) (Photo Institute for ITCP, KIT Karlsruhe)



Figure 3: Impression of the conference dinner in the ZKM in Karlsruhe (Photo Institute for MVM, KIT Karlsruhe).



Figure 4: The conference chairmen of the AERC 2014 Norbert Willenbacher (right) and Manfred Wilhelm (left) (Photo Institute for MVM, KIT Karlsruhe).

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