

A fun-spiked quick run through the latest tools in environmental biogeochemistry

Interdisciplinary short-course in Tuebingen attracts PhD students from all over the world

The 4-day workshop on “Advanced Tools in Biogeochemistry” (7-11 August 2011) started under happy omens: Its date was scheduled one week before the Goldschmidt 2011 conference in Prague; generous funding by the European Association of Geochemistry (EAG), the ESF Research Networking Programme “Functionality of Iron Minerals in Environmental Processes Network” (FIMIN) and the National Science Foundation (NSF) permitted the invitation of international experts in the field of biogeochemistry and scientists from the nearby synchrotron facility “Anka” sent out an invitation for a one-day tour to their beamlines.

The expectations of both organizers and participants were accordingly high: “All participants will be able to learn most from an interactive workshop. This is why we reserved plenty of time for coffee breaks and social activities and we provide the participants with the opportunity to analyze their own samples at the synchrotron”, said Andreas Kappler, professor for geomicrobiology at the University of Tuebingen, prior to the start of the course. “But I also expect to learn something about the techniques I am less familiar with myself”, he added, which co-organizers Ruben Kretzschmar, professor for soil chemistry at ETH Zuerich and Thomas Borch, associate professor of environmental soil chemistry at Colorado State University, agreed upon. The 20 participants, all graduate students in chemistry, geology, environmental microbiology or related fields, came from five different countries and with similar expectations. With her statements that she wanted “to get to know analytical techniques to see if they can be applied to my project”, Myriel Cooper, PhD student at the centre for environmental research in Leipzig, probably spoke for all of the participants. Before they could hear about any fancy techniques, however, the participants had to take over the active part and present themselves and their scientific interests in 1-minute presentations. In the course of the following days, scientists from the University of Tuebingen, the CNRS in Paris, the Colorado State University and the ETH Zuerich introduced their techniques of expertise including some practical demonstrations at instruments on-site.

The topics covered a broad range starting at the function and application of microelectrodes in biogeochemical studies over Mössbauer spectroscopy and secondary ion mass spectrometry to different microscopy techniques such as confocal Raman, transmission electron (TEM), focused ion beam/scanning electron transmission (FIB/SEM) and scanning transmission X-ray (STXM) microscopy. After two days of presentations and discussions of possible applications of the individual techniques, the visit of the synchrotron beamlines at “Anka” in Karlsruhe represented a change in location and a highlight of the course. A team of seven scientists working at Anka made a maximum effort to give as much insight as possible into the theory behind X-ray absorption spectroscopy (XAS) and infrared (IR) microscopy as well as into the actual working

environment at the beamlines. They even organized a barbecue in the end of the day, where the new impressions could be well digested. However, this was not the only possibility for the workshop participants to interact with the speakers and amongst themselves in an informal way, to discuss open questions and to set the seed for new collaborations: a workshop dinner at a traditional Swabian restaurant and a “Stocherkahn” tour on the river Neckar completed the course very nicely.

This combination of a strongly interdisciplinary workshop with plenty of enjoyable opportunities for social interactions made many participants state that the workshop even over-fulfilled their initial expectations. The organizers commented in a similar way: “What made this workshop most unique in my eyes was the fact that so many different techniques were covered and the students could keep up and discuss their applications on a very high level”, stated Thomas Borch. This success would not have been possible without the generous funding by EAG, FIMIN and the NSF, which enabled not only the invitation of speakers and participants from all over the world but also the engagement of student helpers who were involved in copying the course material, preparing coffee breaks and ensured that everything worked very smoothly. This is why all organizers and participants would like to use this scope to thank all funding parties.

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Figure 1: *Thomas Borch explains fields of application for advanced methods in biogeochemistry*



Figure 2: Workshop dinner in the traditional Swabian restaurant “Wurstkueche”

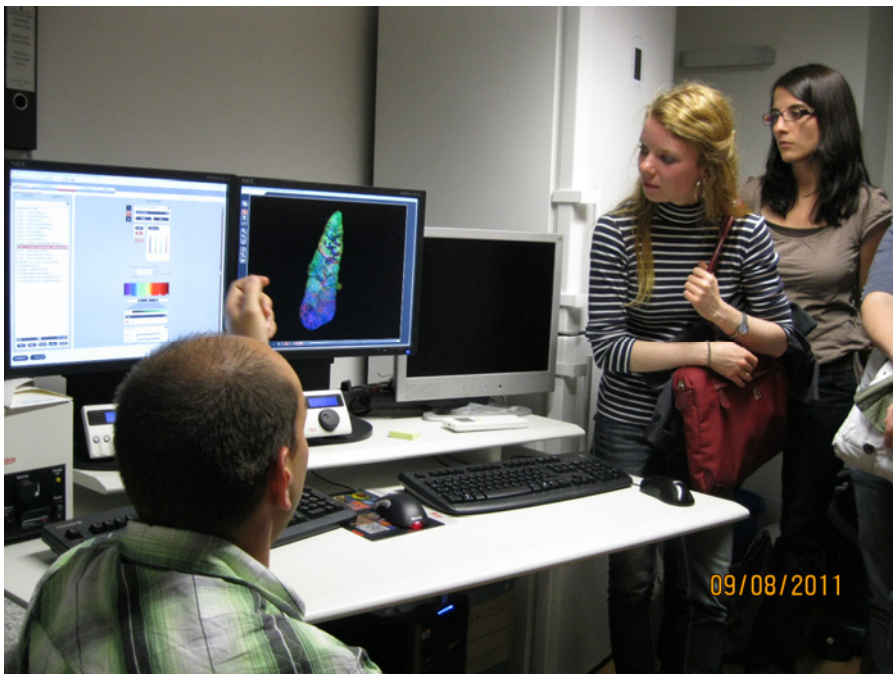


Figure 3: Martin Obst demonstrates features of a confocal laser scanning microscope



Figure 4: Visit at the SUL-X beamline at Anka Karlsruhe



Figure 5: Reviewing the contents of the workshop at the concluding Stocherkahn trip on the river Neckar



Figure 6: *Group picture of all workshop participants, speakers and organizers in front of the geoscience department building at Tuebingen University*