Short Description of Faculty Members - Focus on the Aim of the PhD Program

Assoc.-Prof. Dr. Martina Marchetti-Deschmann is heading this consortium. Her main research focus is Instrumental Bioanalytical Chemistry with a special focus on Mass Spectrometry Imaging; she is a well-known expert in the field of Proteomics and Mass Spectrometry (Founding member and now Vice president auf the Austrian Proteomics Association AuPA) focussing on method development and application. Beside her activities for the Proteomics community (Associated Editor - EuPA Open Proteomics; Editorial Board – Journal of Proteomics; Conference and Communication Board of EuPA (European Proteomics Association)) she is a member of COST BM1104 - Mass Spectrometry Imaging: New Tools for Healthcare Research (Head of a Work Package). Since 2003 57 papers, 2 US patents, more than 60 presentations (oral and poster) at international conferences add to her scientific portfolio. In 2007 a mass spectrometry related paper was awarded with the Beynon Prize. This year (2013) she was granted the Feigl Prize of the Austrian Society of Analytical Chemistry.

Univ.-Prof. Dr. Gerhard Schütz is acting as co-coordinator of this PhD program. The Gerhard Schütz group is renowned in the various fields of single molecule microscopy. A key competence is technology development, as demonstrated by the first realization of a set of experimental strategies including the measurement of single molecule mobility, orientation, stoichiometry, anisotropy, 3D imaging, and the combination of single molecule fluorescence and ion current measurements. In addition, the Schütz group was the first to demonstrate single molecule observations in living cells. Live cell investigations have now become their major field of research; in particular, high-resolution single molecule tracking was advanced to measure the nanoscopic organization of the plasma membrane. Gerhard Schütz is member of the “Junge Kurie” of the Austrian Academy of Sciences, vice president of Biophysics Austria, and board member of the Austrian Society for Biomedical Engineering (ÖGMBT).

Univ.-Prof. Mag. Dr. Günter Allmaier is participating as faculty member of this doctoral program and was bringing together the participants related to the topic as well as initiating the application to this PhD program. He is heading the research group of Bio- and Polymer Analysis with a focus on mass spectrometry, capillary electrophoresis-on-a-chip and nanoparticle analysis techniques. Imaging techniques in the area of viruses, vaccines and bionanoparticles in plant as well as animal tissues combined with high performance separation techniques is the recent field of research. Instrumentation (e.g. the first design to collect rhinovirus particles after separation in the gas-phase) and applications of the mentioned techniques in the area of life sciences and medicine are his major interests. He is founding president of the Austrian Proteomic Association (AuPA), vice-president of the Austrian Society of Analytical Chemistry (ASAC) and member of the MC of the COST program BM1104 - Mass Spectrometry Imaging: New Tools for Healthcare Research as well as COST program 0702 – Urine and Kidney Proteomics. Furthermore he is the Austrian representative in the International Mass Spectrometry Foundation.

Univ.-Prof. DI Dr. Hans Ulrich Dodt and his department is the world wide pioneer in clearing and imaging whole brains. The aim of this group is the 3-dimensional visualization of all nerve cells in the mouse brain with µm resolution. Hans-Ulrich Dodt has a long standing reputation in developing different optical techniques for the neurosciences. The speciality of the group is the strong interdisciplinary nature of their work, e.g. photonics, chemistry and neuroscience are combined. This work resulted in 4 publications in Nature journals in the last years. Pivotal to the success of the group is a very close cooperation with the Center for Brain Research of the MUW where also the work with mice is done. Techniques employed are laser physics, optical simulation and engineering, organic chemistry for clearing and neuroscience, including molecular biology. Hans-Ulrich Dodt is member of the Human Brain Project., one of the two European flagship projects.

Ao.Univ.-Prof. Dr. DI Herbert Hutter is working in the field of two- and three dimensional imaging of trace element distribution in materials, semiconductors and coatings. On one side he has strong cooperation's with the Austrian Industry (INFINEON, VOEST) on the other side he is working on further development of the SIMS measurement techniques. He has experience of SIMS since 25 years, has more than 180 SIMS-papers and is a member of the scientific board of the European SIMS Conference. Within this DK he will acquire experience in the field TOF-SIMS analysis of bioorganic samples.

Ao.Univ.-Prof. Dr. DI Bernhard Lendl focuses on the development and application of novel concepts of infrared and Raman spectroscopy for the analytical sciences. It is the aim of ongoing research efforts to provide solution to yet unsolved problems in the analytical sciences. To achieve this novel developments in analytical chemistry as well as related disciplines join forces like already shown with fibre coupled mid-IR sensors, ultrasound techniques in combination with mid-IR spectroscopy, lab-on-a-chip systems, atom force microscopy (AFM) and novel mid-IR quantum cascade lasers (QCL). Hence, the development and patenting of several novel methods was achieved (e.g. development of an in-line investigation method in industrial fermentation processes, the stand-off detection of concealed traces of explosives at several meters of distance, time resolved tracking of chemical reactions). The TU Vienna spin-off company QuantaRed Technologies produces the oil-in-water analyser ERACHECK and it was already sold to customers from 15 different nations spread over four continents. Recently (May 2013), the combination of AFM and the QCL laser technology could be accomplished successfully to create a new method of near-field IR microscopy.

Privatdozent Dr. DI Andreas Limbeck is expert in the field of atomic spectroscopy with advanced expertise in solid sampling techniques and the automation and miniaturization of sample pre-treatment procedures. The research work of the last years was focused on the development and implementation of improved analytical strategies with a strong emphasis on environment and sustainability issues. Currently the main area of research is spatially resolved analysis of trace elements in solid materials; in particular the potential of Laser-Ablation in combination with ICP-MS detection for the direct analysis of biological, medical or technologically relevant samples is explored. Andreas Limbeck acts as reviewer for international funding agencies and peer-reviewed journals in the fields of analytical chemistry and environmental chemistry.

Ao.Univ.-Prof. Dr. DI Robert Sablatnig is heading the Computer Vision Lab since 2010, and since 2005 he is the Head of the Institute of Computer Aided Automation, engaged in research, project leading, and teaching. His research interests are 3D Computer Vision including Range Finder, Stereovision, Shape from X, Registration, Calibration, Robot Vision; Automatic Visual Inspection, Hierarchical Pattern Recognition, Video data analysis (Motion and Tracking), Automated Document Analysis, Multispectral Imaging, Virtual- and Augmented Reality, and Applications in Industry and Cultural Heritage Preservation. He edited 6 conference proceedings and is author or co-author of more than 160 referred scientific publications published in journals, at several international conferences and workshops. He served in many program committees for international conferences and as member of the editorial board and referee for international journals and conferences; is Vice President of the Austrian Association for Pattern Recognition (AAPR/OAGM), the Austrian branch of IAPR and the IEEE and legally sworn and certified expert witness for computer vision (allgemein beeideter und gerichtlich zertifizierter Sachverständiger).

Privatdozent Dr. Mag. Bernhard Seiboth is focused on cell design and engineering of filamentous fungi, in particular *Trichoderma reesei*. This fungus is today the main industrial source for different enzyme preparations to depolymerize plant biomass to simple sugars which can be further transformed to bioproducts, platform chemicals or biofuels. Research focuses on the improvement of the production processes by designing tailor-made fungal strains. The group participates also in the Austrian Center of Industrial Biotechnology (http://www.acib.at), a K2 Center sponsored by the COMET program. In 2003 he applied successfully for an assistant professor for Molecular Biology of Industrially Applied Fungi and holds since 2009 a permanent position. He organized the Conference on Fungal Genetics (ECFG8) and the Recombinant Protein Production 6 - A comparative view on host physiology. He is editorial board member of Applied and Environmental Microbiology and key researcher within the Austrian Center of Industrial Biotechnology

Ao.Univ.-Prof. Dr. DI Christina Streli has long term experience in X-ray spectrometry, specially using synchrotron radiation sources as excitation source (SR-XRS). Key competence is the development and application of X-ray techniques to specific interdisciplinary problems, 2D and 3D elemental imaging including trace element analysis, micro-XRS and confocal micro-XRS, also combined with XANES (absorption spectroscopy). Since about 10 years exists a collaboration with the Ludwig Boltzmann Institute for Osteology analyzing trace elements in human bones. CS is member of the Scientific Advisory Board of HZB (Berlin), and the proposal review committee of BESSY(Berlin) and PETRAIII (Hamburg) as well as over 15 years Executive Secretary of the Austrian committee for research on Neutron- and Synchrotron Radiation sources of the Austrian Physical Society (NESY), Editorial board member in JAAS- ASU and X-ray Spectrometry and Chair of the European Conference on X-ray Spectrometry, 2012 in Vienna.