Center for Translational Imaging at Ulm University
“From Molecule to Man” (MoMAN)

The Center for Translational Imaging is headed “From Molecule to Man” (MoMAN) and aims at supporting, advancing and extending research projects in the field of biomedical translational imaging at Ulm University and Medical Center. For this ambitious research initiative the center provides a variety of outstanding imaging techniques, which range from cellular imaging to small animal imaging and finally applications in humans and provides support for its users in all aspects of translational imaging. The long-term goal of MoMAN is to bundle the activities of the multitude of research units and core facilities by establishing a central contact platform and to further promote synergies between the institutes in order to facilitate the access to advanced biomedical imaging infrastructure for interested users. Furthermore, regular seminars and hands-on workshops are organized to offer efficient framework conditions for excellent interdisciplinary research in the field of translational imaging.

Infrastructure

Confocal and Multiphoton Microscopy
- inverted confocal microscope
- intravital microscope
- fs-pulsed Ti:Sapphire Laser
- spectrally resolved laser scanning microscope
- high-throughput screening microscope
- time-correlated single photon counting microscope
- cell culture facility

Electron Microscopy
- transmission electron microscopes (TEM): JEOL1400, JEOL 2100F with cryo stage, Zeiss 912 with energy filter
- scanning electron microscopes (SEM): Hitachi S-5200 with cryo stage and X-ray detector, Zeiss 962 with X-ray detector
- high-pressure freezing
- electron tomography
- cryo-TEM, cryo-SEM
- cell culture facility

Super-resolution Microscopy
- stimulated emission depletion (STED) microscope
- stochastic optical reconstruction microscopy (STORM)
- photo-activated localization microscopy (PALM)
- reflected light sheet microscope
- ultrafast atomic force microscope

Methods
- phosphorescence/fluorescence lifetime
- Förster resonance energy transfer
- fluorescence recovery after photobleaching
- high-pressure freezing
- ultrafast sectioning
- electron tomography
- cryo-TEM, cryo-SEM
- cell culture facility

Applications

Exemplary applications:
- functional imaging of molecular interactions
- imaging of cell metabolism, oxygen imaging
- subcellular structures down to about 3 nm
- 3D reconstruction of subcellular volumes
- subcellular multi-protein localization down to 10 nm
- live cell single-molecule tracking
- time-resolved binding kinetic measurements
- conformational studies of proteins

Services

In the field of translational imaging, MoMAN
- serves as initial information and contact platform
- offers comprehensive technical and scientific support in planning, developing and performing research projects
- combines the state-of-the-art imaging facilities of Ulm University and Hospital with the expertise of an international research team
- facilitates and optimizes the access to advanced biomedical imaging infrastructure
- discusses potential new projects and identifies experts within the center
- aims at establishing a unified infrastructure by defining standard operational procedures
- provides an efficient scheduling, documentation and finance management software
- offers application support for ethical and animal welfare boards
- organizes hands-on workshops and regular events for scientific exchange

Contributors

- Core Facility for Confocal and Multiphoton Microscopy
  (Dr. A. Rick)
- Central Facility for Electron Microscopy (Prof. P. Welter)
- Core Facility for Small Animal Imaging (Prof. V. Rasche)
- Core Facility for 3T Whole Body MRI
  (Prof. G. Grön, Prof. J. Kassubek)
- Department of Nuclear Medicine (Prof. A. Beer)
- Department of Radiology (Prof. M. Beer)
- Department of Neurology (Prof. A. Ludolph)
- Department of Internal Medicine II (Prof. W. Röttbauer)
- Institute of Biophysics (Prof. J. Michaels, Prof. C. Gebhardt)
- Institute of Physiological Chemistry (Prof. T. Wind)
- Institute of Comparative Molecular Endocrinology
  (Prof. J. Tuckermann)

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More information

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