

Magnetic Particle Imaging - one fascinating pillar of Bruker's multimodal life science portfolio

Jochen Franke

Bruker Biospin, Ettlingen, Germany

Preclinical imaging plays an important role in the understanding of biological processes in healthy and diseased states as well as responses to pharmacological, physiological or environmental challenges. A comprehensive understanding of biological systems through the use of state-of-the-art analytical technologies can significantly advance clinical diagnosis and therapy routines.

Bruker BioSpin is a renowned provider of advanced imaging technologies ranging from Magnetic Resonance Imaging (MRI), Computed Tomography (CT), Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT) to the latest imaging technology, Magnetic Particle Imaging (MPI). With our mission to develop each imaging technology to its best, Bruker drives innovation in new methods and solutions for scientists, enabling groundbreaking discoveries. Our instruments enable critical assessments of healthy and diseased mechanisms at the organ, tissue, cellular and molecular levels. Preclinical imaging is also central to evaluating the efficacy and safety of new treatments and quantification of the drug's biodistribution prior to clinical use. That is why Bruker continues to invest in innovation and new technologies.

We seamlessly combine multiple imaging technologies in multimodal, easy-to-use instruments for head-to-toe investigations in your research. Best-in-class hardware and software packages provide streamlined workflows from animal handling to morphological and functional data acquisition to image reconstruction and post-processing. This includes quantification and visualization tools for various biomedical imaging applications.

Through numerous collaborations with leading research centers and our dynamic development teams, Bruker invests in the advancement of Magnetic Particle Imaging in the preclinical area, paving the way for translational and clinical perspectives. The use of nanomaterials and their specific response to external magnetic fields is not only crucial for molecular imaging, but also opens the door to the development of novel theranostic strategies, which in turn can improve patient outcomes and save lives.

This talk will present the basic principle of signal generation and the spatial encoding schemes employed by MPI. The wide range of applications of MPI will be demonstrated by presenting the research results of our customers. Taking advantage of MPI as the basis for a theranostic platform, the vision for future MPI instrumentation will round off the content. Furthermore, a high-level perspective on Bruker's multimodal preclinical imaging portfolio will be presented.

Be inspired by the recent achievements of our outstanding MPI community in the life sciences and join us in taking molecular imaging to the next level.