PROCESS SYNTHESIS AND PROCESS DYNAMICS
Prof. Dr.-Ing. Achim Kienle
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The research activities of the group are concerned with computational methods and tools for the analysis, synthesis and control of complex chemical – and also, more recently, – biological systems. Applications focus on process integration, plantwide control, the dynamics and control of particulate processes and new modeling strategies for cellular systems.

SYSTEMS AND CONTROL THEORY
Prof. Dr.-Ing. Jörg Raisch
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The group explores new concepts in systems and control theory and, for example, investigates hierarchical control systems, and control and, for example, investigates hierarchical control systems, and control.

ANALYSIS AND REDESIGN OF BIOLOGICAL NETWORKS
Dr.-Ing. Steffen Klamt
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Research lies in the field of Systems Biology where biology, mathematics and the engineering sciences intersect. The group develops theoretical methods for the analysis, inference, and targeted modification of bio-molecular networks and employs these methods in collaboration with partners working experimentally, for example, on identifying cellular signaling networks from experimental data or rationally (re)designing the metabolism of bacteria for the production of certain chemicals. A long-term goal is the routine use of mathematical modeling in biology, biotechnology, and biomedicine.

MOLECULAR SIMULATIONS AND DESIGN
Dr. rer. nat. Matthias Stein
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The group simulates intra- and intermolecular interactions at multiple time-scales to provide detailed insight into reaction mechanisms, aggregation and recognition phenomena in biology and chemistry. The rationalization of complex phenomena in chemistry and biology requires a combination of various simulation approaches. The group develops and applies tools from quantum mechanics, molecular and Brownian dynamics to bioinformatics and protein structural modeling.

NUMERICAL LINEAR ALGEBRA FOR DYNAMICAL SYSTEMS
Dr. Martin Stoll
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Many processes in the natural and life sciences are modeled using partial differential equations. Solving them efficiently and accurately is important for many scientists. The group works on the development and implementation of fast and robust solvers for a variety of mathematical aspects and models based on differential equations.

Creating knowledge, broadening horizons
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About the institute
The Max Planck Institute for Dynamics of Complex Technical Systems, which was founded in 1996, is the first engineering institute established by the Max Planck Society. It performs an important bridging function between fundamental research and industrial applications.

The institute has nine research groups and various scientific service groups working closely together on different interdisciplinary projects (in engineering, chemistry, information technology, biology and mathematics). Currently, the institute employs about 240 people.

The International Max Planck Research School Magdeburg (IMPRS), a joint initiative by the Max Planck Institute and Otto von Guericke University Magdeburg, provides an excellent training and research program for Ph.D. students.

About the Max Planck Society
The Max Planck Institute for Dynamics of Complex Technical Systems in Magdeburg is one of 83 institutes working under the aegis of the Max Planck Society (MPG) for the Advancement of the Sciences. The MPG is an independent, non-profit organization. It was established on February 26, 1948 as the successor organization of the Kaiser Wilhelm Society, which was founded in 1911. In addition to the institutes, the MPG also supports a range of research units, laboratories and working groups dedicated to the natural and engineering sciences, the humanities and medicine.

About Magdeburg
In recent years, Magdeburg has become an important center for science, research and technology. Apart from the Max Planck Institute and Otto von Guericke University Magdeburg, it is also home to other important research and higher education institutions, including the Fraunhofer Institute for Factory Operation and Automation, the Virtual Development and Training Center, the Leibniz Institute for Neurobiology, a branch of the German Center for Neurodegenerative Diseases within the Helmholtz Association, the Magdeburg-Stendal University of Applied Sciences and the Institute for Automation and Communication.