Sensory Neuroscience

Perception of the environment is critical for the survival of organisms and represents the basis of cognitive decision-making processes. Different senses detect physical and chemical stimuli from the surrounding environment, which are further processed by the central nervous system leading to their cortical representation. Modular building blocks of molecular and neural networks thereby form the basis of perception, neural processing and behavior.

The research area “Sensory Neuroscience” investigates the function of neural modules and networks and their association with perception and cognition. Molecular, cellular, physiological and evolutionary research approaches focus on the understanding of processes that control the transduction in sensory organs, and the signal pathways in and between cells, and which generate functional neural networks at different organizational levels and create behavioral patterns. Computational modeling will further deepen our understanding of these networks.
Linking these different levels of perception by multidisciplinary approaches is the challenging task of the research area “Sensory Neuroscience”.

Main characteristic features of the Research Center “Neurosensory Science” are numerous basic research projects that are funded by national and international grant giving institutions. This scientific focus is reflected by organisational structures as a Transregional Collaborative Research Center (SFB), a DFG Research Unit, a Research Training Group, Lichtenberg Professorships and by an outstanding publication record as well. New technologies and up-to-date equipment (e.g. STED microscopy, optogenetics, MRI, MEG) provide unique facilities and experimental options for the integration of theoretical and clinical medicine, and the combination of physics, chemistry and computer science. Along this line, new research fields will be developed by means of structured programs.

To strengthen and expand the existing structures more collaborative projects (e.g. magnetic field perception and animal migration, computational neuroscience, new Collaborative Research Center) are supposed to be initiated and the Research Training Group "Molecular Basis of Sensory Biology" to be continued.