# Science and Research

## A+B Department orientation

**The Department focuses on the following fields of study:**

- The principles of morphology, functional anatomy, kinesiology and biomechanics of human body structure and movement behaviour in normal, pathological and professionally stressful conditions
- Methodological aspects of analysing human motion in sport and work, including adapted motions of a handicapped human
- Tolerance of organism to mechanical stresses
- Problems of bioengineering and sport engineering in relation to substitutes for and functional support of the motion system and to protective functions of outfits and equipment.

## Research and scientific orientation of the A+B Department

**Traditional subjects of core research include:**

- Complex structure of organism - Interstitial fluids as a medium of transmission and the mechanics of their transport
- Biomechanics of the musculo-skeletal system. Phenomenon of muscular spasm and its rheology.
- Spread of deforming forces in the human body as a result of impact loads.
- Stability of body shape and problems of identifying the pattern of shape changes.
- Muscular redundancy in the control of articular kinetics.
- Analysis of human body motions. Problems of synthesis and animation.

**Applications:**

- Biomechanics of the spine in relation to aetiology of vertebrogenic syndrome.
- Problems of measuring muscular spasm as applied in physiotherapeutic diagnostics.
- Mechanical interactions at the foot/surface interface. Problems with their detection and interpretation in relation to the structural and functional changes in the locomotion system.
- Pregnancy and its effects on transfer of impacts and vibrations within the body (forensic focus).
- Questions of applied ergonomics (analysis of stress processes; tolerance of the human organism to mechanic loads; possibilities for favourable changes from altered behaviour or the use of technical devices; biomechanical aspects of regeneration and repair).
- Cranio-spinal and intracranial pathobiomechanics in relation to a sport and work traumatology.