

## Motion Analysis Laboratory

Human gait is a complex and cyclic movement. Gait analysis is the systematic study of human walking that can be done either without any technical support (observational analysis), or augmented by complex and expensive instrumented systems (quantitative analysis) for measuring the movement patterns and the associated interpretation of these.

Contemporary motion analysis is performed both for research purpose, diagnosis and rehabilitation, improvement of sport performance, and injuries prevention.

Quantitative motion analysis systems perform non-invasive and non-harmful in vivo experimental analysis.

### Main research activities:

- *Gait analysis* and *Static and dynamic* study of the *plantar pressure distribution* of both of normal subjects and patients having different deficiencies in order to evaluate the *disability rate* or the *rehabilitation* process;
- *Motion analysis* of sportsmen in order to *evaluate* and *improve* their *performances*, and prevent the possible injuries;
- *Cervical* and *lumbar spine* mobility assessment;
- *Posture* analysis.

### Educational activities:

Biomechanics – Bachelor Programme in *Medical Engineering*;

Experimental techniques for biomechanical evaluation – Master Programme *Implants, prostheses and biomechanical evaluation*.

### Measuring systems

- Zebris CMS-HS Measuring system for motion analysis;
- Zebris FDM measuring system for force distribution;
- ARIEL Performance Analysis System (APAS) for motion analysis;
- Exercise equipments (body massage device, upright bike, treadmill).

<p><b>3D real time gait analysis with the CMS-HS measuring system</b> Zebris measuring system performs a simple and fast analysis of all important kinematical parameters of the human upper and lower limbs.</p>	
<p><b>Assessment of the mobility of the cervical and lumbar spine</b> Zebris measuring system, together with special recording accessories allows a precise and fast determination of cervical and lumbar mobility.</p>	

**Motion analysis with APAS system**

APAS created by Ariel Dynamics, Inc. is a video-based 3D motion analysis system. APAS can capture video from multiple cameras simultaneously and perform a biomechanical analysis automatically.



**TUNTURI F30 Upright Exercise Bike** displays the effort level and gives detailed feedback on a variety of data during exercise. It monitors time, distance, speed, energy consumption, effort and heart rate, and there's a multi-step condition test for a complete, safe workout schedule.



**HAMMER Walkrunner Pro Treadmill** has digital display for monitoring performance and heart rate. It has many programs, monitors calories, speed, pulse, time, distance and allows inclination multiple settings.



**HAMMER Massager Body Nova XP** is ideal before cardio training. Using 5 massage belts with different effects and 4 different massage speeds, it performs a warm-up and relaxation of muscle tension before the training.

