

# A web-based e-training platform for Extended Human Motion Investigation in Orthopedics



www.ortho-eman.ro

## ORTHO-eMAN

Project 2011-1-RO1-LEO05-15321 (Contract LLP-LdV/Tol/2011/RO/008)

### Partners:

- University of Craiova (Romania)
- National Center for Scientific Research "Demokritos" (Greece)
- Biomechanics Institute of Valencia (Spain)
- Clinical Emergency Hospital Bucharest (Romania)
- Democritus University of Thrace (Greece)

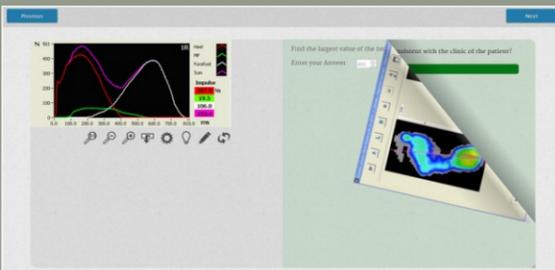


### WHAT WE WANT TO DEVELOP

The project proposes formation of engineers that will apply the principles of medical and biomedical engineering sciences for the use, adaptation, evaluation, projecting and/or distribution of technological and medical solutions that lead to improvement of the patients' health. The project aims to develop an e-learning platform that offers to engineers interested in the medical field, a learning tool, with interdisciplinary approaches, trying to close the gap between engineering and medicine, by creating a new e-learning environment for human motion analysis.

### WHAT WE WANT TO DO

The objective of this LLP-LdV project is to train qualified engineers for health systems and medical instrumentation technology support positions in hospitals, health industry and research centers.



### On-line COURSE for human motion analysis

The chapters of our on-line course for human motion analysis are:

1. Physics of the human body motion. Basic knowledge on materials and biomaterials properties.
2. Basic anatomy of human body motion.
3. Modern techniques in human motion analysis.

Only through an interdisciplinary approach and achievement of border knowledge by both involved fields (medical and engineering fields) will be possible to improve quality of care.

### Target group: engineers

Human motion is a complex process achieved through a highly coordinated mechanical interaction between bones, muscles, ligaments and joints within the musculoskeletal system. To be able to perform and interpret the results of a motion analysis, a global training including knowledge of the musculoskeletal system, physics and human biomechanics and the use of measurement techniques is required.

For this purpose, there have been developed the following educational materials in the ORTHO-eMAN e-learning platform:

1. A theoretical part including all issues regarding motion analysis (anatomy, biomechanics, principles and main technical approaches);
2. Case studies from clinic orthopedic practice;
3. Case studies using up-to-date investigation methods (data acquisition and analysis using various techniques).

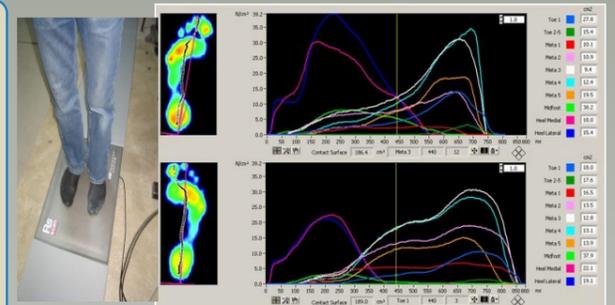
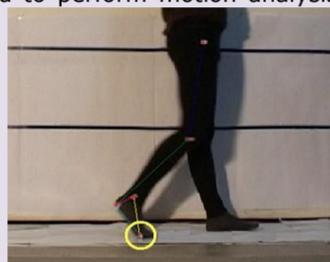
The teaching units for the new developed course are structured on multiple modules that contain: off-line courses (ppt), medical imaging, video files of motion analysis, graphs of forces, muscle and joint reaction forces, numerical data, contact pressure diagrams, an evaluation and self-assessment software. The system provides feedback by showing trainees the correct diagnosis. The training modules are available in English and partners' languages.

### Case Studies

In a case study, a description of a real or imagined situation is presented, and the trainee must analyze the data given in order to answer a particular question. To solve the case studies developed in the ORTHO-eMAN course, the trainees will need to apply the knowledge acquired in the three learning modules, at the same time that they will get some of the technical skills that they will need to perform motion analysis studies in the future.

By means of this learning approach, the following goals are foreseen:

- Establishment of the theoretical concepts regarding motion analysis;
- Development of new technical skills to perform motion analysis studies;
- Development of the ability of solving problems and taking decisions;
- Learning how to analyse the results of specific motion analysis systems.



### Motion analysis methods and applications

Very often human motion alterations appear as consequence of a physical or a neurological impairment.

The *Module 3 - Modern techniques in human motion analysis* intends to give to the trainee a global view on the most important aspects of motion analysis:

- Description of motion analysis techniques and methods;
- Development of motion analysis studies;
- Interpretation of the results.

The case studies are the best way to transmit these practical concepts to the trainees. They offer to the trainee the possibility of work with real data from several measurement systems and they may receive feedback on the correct manner to perform the analysis.

### Registration for ORTHO-eMAN

The process of registration for developed e-learning course is now open. If you want to register as a trainee for human motion analysis course, you can access the ORTHO-eMAN project website ([www.ortho-eman.ro](http://www.ortho-eman.ro)), Registration menu. The course will begin on September, 2013.

The target group will be formed by engineers and by residents, medical doctors.