



Institute Jožef Stefan **Department of Automatics, Biocybernetics and Robotics**

The Jožef Stefan Institute is the leading Slovene research organization. More than 780 people are employed by the Institute; more than 360 of them have a Ph.D. and work as scientists. The main research areas are physics, chemistry, molecular biology and biotechnology, information technologies, reactor physics and technology, energy and environment.

Department of Automatics, Biocybernetics and Robotics is an interdisciplinary group of researchers specializing in electrical, mechanical and biomechanical engineering, computer sciences and applied mathematics. The department is engaged in three basic activities: research, development and education. The research in the department is dedicated to the robotics and introduction of flexible automation in the industry, and to the biorobotics and biocybernetics. A wide range of research activities is covered, from basic and applied research to the development of technologies and systems. Most of the research topics are connected to the so-called "movement of man and machine". Our approach is to investigate the problems that arise in industry or medicine and to transfer the results into practice. The activities of the department are divided into two research laboratories: the Biocybernetics Laboratory and the Robotics Laboratory.

Our expertise

Control theory

- Control of kinematically redundant robot systems
- Compliant control and force control
- Model based control

Service robots

- Integration of mobile platform Nomad XR400, robot arm Mitsubishi Pa10, humanoid vision, proximity sensors and force-tactile sensors.

Humanoid robots

- Generation of full-body movements
- Imitation learning

Humanoid (Robot) vision

- Human motion capture
- Object tracking and recognition
- Foveated vision & visual servoing

Automation and industrial robotics

- System integration
- Design and simulation of robotized production lines
- Automation in food industry
- Automation in shoe production industry
- Development of industrial robots and special mechanism for testing shoes, sports equipments, etc.

Modeling and simulation

- Modelling and simulation of robot systems
- Multibody dynamic modelling
- Matlab based modelling
- Hardware-in-the-loop simulation

Applications in sport and medicine

- Testing of sports equipment with industrial robots (alpine and cross-country skis, ski boots, etc.)
- Testing of synovial joints in medicine using force controlled robot