DIETI UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II
DIPARTIMENTO DI INGEGNERIA ELETTRICA E TECNOLOGIE DELL'INFORMAZIONE

PROF. BRUNO SICILIANO
DIRETTORE DEL CENTRO ICAROS

SEMINAR ANNOUNCEMENT

WHO: **PROF. DR.-ING. HEINZ WÖRN**
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WHAT: **Medical Robots Research at IPR – KIT Karlsruhe**

WHEN: **Monday, 9 May 2016, 9:30–10:30**

WHERE: SOFTel Room, via Claudio, building 3/A, floor 1

Abstract — The main results of the medical robots research at IPR (Intelligent Process Control and Robotics) at KIT Karlsruhe will be presented. In the area of autonomous medical robots, a laser based and interpreter based robot system for bone welding was developed. It uses a CO2 laser system for bone cutting and an OCT based sensor, which automatically measures the rest bone thickness and ensures that no soft tissue or dura can be hurt. Regarding tele-robots, a system for automatic calculation of the trocar positions was developed. For minimal invasive surgery, a robot system which autonomously guides the camera was developed in order to guarantee the best view for the surgeon. The robot autonomously learns the best and personalized trajectory for each type of surgery through learning by doing. In the scope of endo-robotics at IPR a control system was developed in cooperation with Siemens for a pill of Olympia company containing magnets. Due to the control system, the surgeon can control the vector of a magnetic field using joysticks. The magnetic field is generated by coins coming from MRT (Siemens) and can therefore guide the pill through the human organ. The pill continuously sends out images for diagnostic purposes. First research prototypes with fiber bragg grating shape sensors for flexible instruments for endoscopes, catheters and medicine instruments were developed.

Biosketch — **HEINZ WÖRN** is full professor for Complex Systems for Automation and Robots at the faculty of Computer Science at the KIT Karlsruhe. His research field includes autonomous sensor-based robots for production, humanoid robots, medical robots, micro robots, motion planning, robot calibration, new methods for intuitive programming of robots, sensor based human robot cooperation, tactile artificial skin, visual sensor data processing, cooperation and self-organization in robot teams as well as component based and multi-agent-based architectures for automation. In the medical area his research comprises surgical robots for bone-cutting and for soft tissue manipulating, operation planning systems and localisation systems for computer and robot based surgery. Heinz Wörn was coordinator of the collaborative research center 414 (end 2005) and is in the actual collaborative research center TR 125 "Cognition guided surgery" (2012-2024) responsible for medical robots for MIC.