

ICRA 2006 Workshop
Robotics Based Medicine
Orlando, USA
Friday, May 19th, 2006

1. Co-organizers

Mamoru Mitsuishi, The University of Tokyo, Japan

Koji Ikuta, Nagoya University, Japan

Paolo Dario, Scuola Superiore Sant'Anna, Italy

Kazuo Kiguchi, Saga University, Japan

2. Objectives and Topics

The workshop named “robotics based medicine” focuses on the new contribution of the robotics into the biomedical area including nano and micro biotechnology. The workshop includes, for example, the following topics: (1) surgical system considering the biomedical characteristics of a tissue, bone and organ, (2) miniature medical robotics, and (3) muscle MEMS.

Medical applications are some of the most promising areas for robotic technology. Many researches on “robotics based medicine” have been carried out in these days. Robotics in surgery and rehabilitation is especially expected as a new medical technology. Therefore, the workshop mainly deals with robotic surgery and robotic rehabilitation.

To support the surgical operations, processes performed before, during and after surgery can be assisted and the following items should be considered: medical CAD/CAM systems including medical image processing, needle insertion assist, reconstruction of three dimensional models from radiographic studies, registration and navigation during the operation, mechanisms for producing dexterous motion, safety, and issues related to disinfection and irrigation in the clinical environment. These systems must be considered the biomedical characteristics. Future trends, such as miniature medical robotics and muscle MEMS, are also discussed as a main part of the workshop.

To support the rehabilitation operation, patients’ motion in rehabilitation or daily activities can be assisted can be assisted. This is important for injured, disabled, and elderly persons. Presentations in the proposed workshop will cover the latest topics of these wide areas in the U.S., Europe, and Asia.

3. Schedule

8:00-8:10: Opening

Mamoru Mitsuishi (The University of Tokyo, Japan)

8:10-8:40: Towards the development of a cybernetic hand: scientific, technical and clinical issues

Maria Chiara Carrozza (Scuola Superiore Sant'Anna, Italy)

8:40-9:10: A Robotic Rehabilitation Environment with Visual Feedback Distortion

Yoky Matsuoka (Carnegie Mellon University, USA)

9:10-9:40: Human Centered Approach in Surgical and Rehabilitation Robotics

Jacob Rosen (University of Washington, USA)

9:40-10:10: Haptic and Robotic Technology for Medical Rehabilitation and Assessment

Darwin G. Caldwell (University of Salford, England)

10:10-10:40: Coffee Break

10:40-11:10: Broadcast Feedback of Cellular Muscle Actuators and Bio-Nano Systems

H. Harry Asada, Jun Ueda, and Lael Odhner (Massachusetts Institute of Technology, USA)

11:10-11:40: Robot-Aided Neurorehabilitation

Robert Riener and Tobias Nef (ETH Zurich and University Hospital Balgrist, Switzerland)

11:40-12:10: Advanced Technologies for Rehabilitation: State of the art and future perspectives

Paolo Dario, Silvestro Micera, and M. Chiara Carrozza (Scuola Superiore Sant'Anna, Italy)

12:10-13:30: Lunch

13:30-14:00: Power Assist Robots for Physically Weak Persons

Kazuo Kiguchi (Saga University, Japan)

14:00-14:30: Non-Contact Impedance Sensing for Medical Application

Makoto Kaneko (Hiroshima University, Japan)

14:30-15:00: What is the intelligence for useful medical robot ?

Masakatsu G. Fujie (Waseda University, Japan)

15:00-15:30: Coffee Break

15:30-16:00: Micro/Nano Robotics for cellular biology and future biomedicine

Koji Ikuta (Nagoya University, Japan)

16:00-16:30: Image Guided Robotics Surgery – Towards Less Invasive Therapy

Tobias Ortmaier and Rainer Konietzschke (German Aerospace Center (DLR), Germany)

16:30-17:00: How to Give Intelligence to Medical Robots ?

Dong-Soo Kwon (KAIST, Korea)

17:00-17:30: Minimally Invasive Orthopedic Surgical System for TKA/UKA Considering the Biomedical Characteristics of the Bone

Mamoru Mitsuishi and Naohiko Sugita (The University of Tokyo, Japan)

17:30-18:00: Discussions

18:00: Adjourn