# Rehabilitation Robotics
## Chairs: Atsuo Takanishi, Machiel Van der Loos

**A Smart Walker for the Frail Visually Impaired**
S. MacNamara and G. Lacey
Trinity College Dublin

- Increased mobility for people with a visual and mobility impairment
- Highly maneuverable with context sensitive user interface
- Robust local navigation with probabilistic feature detector
- Extensively field tested in many residential facilities for the elderly

**Step climbing using power assist wheel chair robot with inverse pendulum control**
Y. Takahashi[1], S. Ogawa[2] and S. Machida[1]
[1]Kanagawa Institute of Technology and [2]Kanagawa Technical High School, Yokohama, Japan

**Autonomous/Semi-autonomous Navigation System of a Wheelchair by Active Ultrasonic Beacons**
H. Seki, S. Kobayashi, Y. Kamiya, M. Hikizu and H. Nomura
Kanazawa University

- Navigation Assistance for Wheelchair Users
- Positioning System by Ultrasonic Beacons
- Three Navigation Modes Utilizing Detected Position
- Navigation Experiments

**Control Strategies for a Split-Wheel Car-Steering Simulator for Upper Limb Stroke Therapy**
M. J. Johnson, H. F. M. Van der Loos, C. G. Burgar, P. Shor and L. J. Leifer
Stanford University

- Our goal is to create effective and low-cost ways of facilitating upper limb stroke therapy. Our challenge was to devise control strategies to increase the level of impaired limb participation in exercise tasks.
- We interfaced a novel split-steering wheel with a driving simulator to create Driver's SEAT. We designed three therapy modes based on force-reflective control strategies. Normal and stroke subjects performed bimanual steering in each mode.
- We detected significant differences between limb forces exerted on the wheel in each therapy mode. We can also quantify tracking performance on our simulated roads.
- Our car-steering simulator (Driver's SEAT) has the potential to be an effective device for upper limb stroke therapy.

**DSP-Based Controller for a Multi Degree Prosthetic Hand**
H. P. Huang and C. Y. Chiang
National Taiwan University

- Discriminate the EMG features
- Develop a DSP-based controller
- Provide 87.5

**Mouth Opening and Closing Training with 6-DOF Parallel Robot**
Hideaki Takanobu[1], Takeo Maruyama[1], Atsuo Takanishi[1], Kayoko Ohtsuki[2] and Masatoshi Ohnishi[2]
[1]Waseda University and [2]Yamanashi Medical University

- Motivation: Conventional training by human was 1-DOF
- Approach: 6-DOF Universal Dental Robot (UDR)
- Results: Increase of two patients' mouth opening distances from 21 to 32 and 15 to 26 [mm]
- Conclusions: 6-DOF training robot was developed