

# IFTOMM JAPAN & TOKYO TECH SMS-CENTER SEMINAR

**DATE:** November 6, 2015

**TIME:** 17:00-18:30

**PLACE:** Conference Room 304, 3F, Ishikawadai 3<sup>rd</sup> Building,  
Ookayama Campus, Tokyo Institute of Technology

**CONTACT:** Yukio Takeda (takeda@mech.titech.ac.jp)

## SEMINAR 1

### Towards the development of a multi-purpose assistive robot vehicle

Dr. Jorge Solis, Associate Professor, Karlstad University

**Abstract:** At Karlstad University, we have proposed the development of a multi-purpose human-friendly robot for assisting elderly persons as well as assisting care givers. The focus of the research is embodying perceptual (sensing the incoming stimuli), cognitive (processing the incoming stimuli) and bodily-kinaesthetic (response to the incoming stimuli as a result of combining perceptual and motor skills) capabilities. Due to the complexity of the proposed research, two assistive robots vehicles are under development at Karlstad University: an intelligent carrying-medical tools robot vehicle (Solis et al., 2014) and a human-friendly assistive robot vehicle for supporting physically elderly (Solis et al., 2015). The human-friendly robot vehicle for carrying-medical tools (iCAR) is composed by a mobile robot vehicle with on board sensors, and two-actuated and four-passive wheels. On the other hand, the human-friendly walking assistive robot vehicle (hWALK) is composed by a two-wheeled inverted pendulum mobile robot, a 3-DOFs desktop haptic interface, a mobile computer and a wireless module for communication purposes. A PID controller has been implemented for the stability control and preliminary experiments were presented to verify the stability of the two-wheeled inverted pendulum.

## SEMINAR 2

### Overview of Research Areas in Mechanical and Materials Engineering at Karlstad University

Dr. Gunnel Fredriksson, Lecturer, Karlstad University

**Abstract:** The presentation will give an overview of research areas at the department of Mechanical and Materials Engineering at Karlstad University, Sweden. Most of the courses at advanced level are given in English and are open to exchange students. The research at the department is mainly conducted within the multi-disciplinary research group "CMM, Characterizing and modeling of materials – from nano to macro". Here scientists from different disciplines; materials engineering, materials physics, mechanics and manufacturing, are working together. Focus areas in research are fatigue, tribology, solar cells and new carbon-based nanomaterials. Examples of applications in these research areas will be explained in detail.

## Jorge Solis - CV

Associate Professor

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### 1. PhD degree

- Ph.D. in Robotics, *Robotic Control Systems for Learning and Teaching Human Skills*, Scuola Superiore Sant'Anna (Supervisors: Prof. Massimo Bergamasco, Prof. Carlo Alberto Avizzano, Prof. Paolo Ancillotti)

### 2. Docentship level

- Docent in Electrical Engineering, Karlstad University

### 3. Present employment

- Associate Professor, Department of Engineering and Physics, 2011-present

### 4. Previous employments

- 6/2011- Current: Adjunct Researcher, Research Institute for Science and Engineering, Waseda University, Tokyo, Japan
- 4/2009 - 5/2011: Assistant Professor, Research Institute for Science and Engineering, Waseda University, Tokyo, Japan
- 10/2009 - 11/2009: Visiting Professor, Warsaw University of Technology, Warsaw, Poland
- 4/2006 - 03/2008: Research Associate, Department of Modern Mechanical Engineering, Waseda University, Tokyo, Japan

### 5. Appointments/board participation

- General co-chair of the 14th Mechatronics Forum International Conference, Karlstad, Sweden, June 16-18th 2014.
- Representative from Karlstad University to the steering group for the Vocational Education in Automation Engineering, Vocational School, Karlstad City
- Representative from Karlstad University to the steering group for the Automation Network, Karlstad City
- Co-Chair of the IEEE/RAS TC on Biorobotics
- Official External Reviewer for Mexican National Council on Science and Technology in area of Engineering and Industry, Mexico
- Associate Editor for the International Journal of Advanced Robotic Systems, IEEE International Conference on Robotics and Automation, etc.

### 6. Selected scientific research grants (Principal investigator)

- Development of a human-friendly assistive robot vehicle for supporting physically elderly and assisting care givers for the ambient assisted living, Grant-in-aid for Associate Professor and Professor Research Support (LOPS14) from Karlstad University (Dnr C2014/633), 2015~2017, Total Fund: 800,000 SEK
- Development of an active interactive human-friendly robot by emulating the dexterity and perceptual capabilities of humans, Japanese Ministry of Education, Culture, Sport, Science and Technology, 2011~2014, Total Fund: 3.3 million JPY

## **Gunnel Fredriksson – CV**

Lecturer

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### **1. Academic qualifications**

- Degree of Licentiate in Materials Science, *Electrical Discharge Machining and the Properties of Tool Steels*, Uppsala University (Supervisors: Prof. Sture Hogmark, Prof. Jens Bergström)
- MSc in Engineering Physics, Uppsala University

### **2. Present employment**

- Lecturer in Materials Engineering, Department of Engineering and Physics, 1987-present

### **3. Previous employments**

10/1982 - 9/1987: Component Engineer, Ericsson, Stockholm

### **4. Appointments**

- Programme co-ordinator of the Master Programme in Mechanical Engineering (2012 - present)
- Head of department of Materials and Mechanical Engineering (2006 – 2012)

### **5. Research Interests**

- Electrical discharge machining of tool steels with focus on its influence on microstructure and fatigue properties.
- Additive manufacturing and selective laser melting of stainless steels, with focus on microstructural characterization and electron microscopy.