Innovation of Health Engineering for Ageing Society

14:00 Opening: Prof. Zhiwei Luo, Kobe University

14:05 Prof. Masatoshi Takeda, Osaka University
       "How to Cope with Rapidly Aging Society
       -Prevention and Early Intervention against Alzheimer's Disease-"

14:45 Assoc. Prof. Lena Rosenberg, Karolinska Institutet
       "Technology in the Hands of People with Dementia and their Significant Others"

15:25 Prof. Rumi Tanemura, Kobe University
       "How Can We Support Elderly People with Cognitive Impairments?"

15:55 - Coffee Break -

16:10 Prof. Yasuyoshi Yokokohji, Kobe University
       "A Survey Method for Identifying the Real Support Needs of People
       with Early-stage Dementia for Designing Assistive Technology"

16:40 Dr. Bernard Pauwels, In-HAM vzw
       "From 'Doing the Things Right' to 'Doing the Right Things' in Assistive Technology
       for Elderly"

17:10 Dr. Emmanuel B. Vander Poorten, KU Leuven
       "Novel Technologies for Navigation Assistance of Robotic Wheelchairs
       in the EU-funded Project RADHAR"

17:30 Discussion
       "International Cooperation for Innovation of Health Engineering"

The session 4 titled [Innovation of Health Engineering for Ageing Society] was organized in three parts. The first part focused on the elderly people's cognitive function disorder, where Prof. Masatoshi Takeda of Osaka University gave his comprehensive overview on "How to Cope with Rapidly Aging Society, -Prevention and Early Intervention against Alzheimer's Disease-", followed by the presentation by Assoc. Prof. Lena Rosenberg from Karolinska Institute on "Technology in the Hands of People with Dementia and their Significant Others" and Prof. Rumi Tanemura of Kobe University's research on "How Can We Support Elderly People with Cognitive Impairments?" from Japan side. The second part targeted on health engineering, here Prof. Yasuyoshi Yokokohji of Kobe University reported "A Survey Method for Identifying the Real Support Needs of People with Early-stage Dementia for Designing Assistive Technology", and from EU side's Dr. Bernard Pauwels's speech where he pointed an important view on "From 'Doing the Things Right' to 'Doing the Right Things' in Assistive Technology for Elderly" and Dr. Emmanuel B. Vander Poorten in KU Leuven published his recent research on "Novel Technologies for Navigation Assistance of Robotic Wheelchairs in the EU-funded Project RADHAR". The researchers from life science and engineering were then had a hot discussion related to the further "International Cooperation for Innovation of Health Engineering". The session received active questions and comments on how to promote the cooperation between EU and Japan for the aging society. The session also accepted attentions from EU's government, industries as well as universities. After the session, Prof. Yokokohji, Prof. Tanemura and Prof. Luo from Kobe University also visited a practical society near Brussels, where the welfare technologies were produced and applied and the society was enjoyed by people with Disabilities.

Masatoshi Takeda, MD, PhD

Professor and Chairman
Department of Psychiatry
Osaka University Graduate School of Medicine

"How to Cope with Rapidly Aging Society -Prevention and Early Intervention against Alzheimer's Disease-"

Experience of donepezil, galantamine, rivastigmine and memantine has now demonstrated limited clinical usefulness to most of Alzheimer patients, because the patients may show the cognitive decline below the baseline after one year continuous use of these symptomatic drugs. Disease-modifying drugs to slow down or suppress the pathological process of the disease is highly expected. The development of disease-modifying drugs, however, has not been successful despite of the continuing endeavor in these 20 years. Many compounds, including gamma-secretase inhibitors, gamma-secretase modulators, and BACE inhibitors, all failed to produce good results in clinical trials. The results of the clinical trials of immunotherapy for Alzheimer's disease was released last summer with disappointing results. Considering these situations, there is a pessimism concerning the development of disease-modifying drugs under the present system of the clinical trial.

New style of clinical trials of disease-modifying drug for Alzheimer's disease is proposed and discussed, in which the reduction of the conversion rate from MCI to dementia, or even from preclinical stage to MCI could be used as the primary outcome of the clinical trials. Establishment of biomarkers for early detection of possible patients is necessary and our data of APLP1 and APLP2 peptides will be discussed as the surrogate marker for pathological gamma-seretase activity.

Lena Rosenberg, Ph.D., OT (r)

Assistant Professor at the Division of Occupational Therapy, Karolinska Institutet, Stockholm, Sweden

"Technology in the Hands of People with Dementia and their Significant Others"

This presentation summarizes research findings from our research team concerning the use of everyday technology and assistive technology. In this research, the person using the technology is in focus as an active agent and user, rather than the technology per se. Since persons with mild/moderate stage dementia and mild cognitive impairment (MCI) often live in their ordinary home they will encounter a variety of technologies that are needed in daily activities at home and in society.

Technology is generally seen as a resource in our societies, however, our studies have shown that persons with dementia and MCI might have difficulties in technology use and this will in turn affect their possibilities to perform activities in daily life and to participate in society. In an attempt to facilitate participation in valuable social activities for people with dementia we have recently developed a design concept for an easy to use videophone. Moreover, our studies have shown that becoming a user of assistive technology is not self evident but takes place in a process where the person with dementia makes decisions that will be decisive for becoming a user of assistive technology or not. This process is also influenced by the views of the person's significant others and the professionals involved. Finally, in order to use everyday technology and assistive technology learning is required. This is known to be difficult for people with dementia and therefore we explore how they solve problems or maintain their knowledge of technology use, and how they learn new.

Prof. Rumi Tanemura
Graduate School of Health Sciences, Kobe University

"How Can We Support Elderly People with Cognitive Impairments?"

In 2012, the population aging rate has become 23.3% and one out of four Japanese people are elderly. The population aging rate will be estimated at 39.9% and one out of 2.5 people will be older than 65. So we have to think about 'how elderly people can live in their own house while keeping healthy?'

Our research purposes are 1) Prevention and maintenance, 2) Support for their living in their own homes for very long, 3) Participation in society by the elderly.

1) Prevention: We have developed a program for prevention of dementia. 92 participants had agreed to join our study. We have administered our program to participants for 3 months. Though there were almost no variations in cognitive functions, changes of oxyHb were recorded by using a functional near-inframed spectroscopy (fNIRS) during this program. 2) Support: Karolinska Institutet and Kobe U are investigating how elderly people use everyday technology (ET) at home, with the ultimate aim of developing a home care system using sensors for elderly people with dementia. We have researched their daily life using Everyday Technology Use Questionnaire (ETUQ). 92 elderly people had agreed and participated in our investigation.

Most elderly people have trouble with TV remote controls, stoves and microwaves. So we developed an easy remote control as assistive technology.

Prof. Yasuyoshi Yokokohji
Graduate School of Engineering, Kobe University

"A Survey Method for Identifying the Real Support Needs of People with Early-stage Dementia for Designing Assistive Technology"

In the area of welfare engineering, various technological research and developmental efforts have been made to support people with dementia. However, it is not clear if these efforts are based on the real needs of these people. When providing support to people with dementia, it is essential to know exactly what their real needs are. Nevertheless, it is not easy to obtain appropriate answers from these people by simply asking "How can we help you?" In addition, it is unlikely that answers from these people will cover all of their support needs.

In this talk, a survey method for identifying the real support needs of people with early-stage dementia for maintaining social living is presented. In order to extract support needs systematically from people with dementia, all of the activities of their daily lives are identified at the beginning of the interview. Then, the interviewer begins by asking what factors are bothering or confusing the patient so that the support needs can be identified naturally. Potential support needs can also be elicited by paying attention to the gap of the feelings of confusion about certain tasks between the patient and the caregiver and/or to the gap between the predicted support requirement and the actual one evaluated by the patient.

Dr. Bernard Pauwels

Advisor care innovation, Sirris
advisor care innovation, In-Ham vzw
Owner, TeWeAD

"From 'Doing the Things Right' to 'Doing the Right Things' in Assistive Technology for Elderly"

In-HAM has evolved from testing and demonstrating of new and existing assistive technology, towards personal advise on which assistive technology to use and advise to the industry and research teams on what technology to develop, up to the current project of assessing the needs of the elderly at home and picking out and trying out the assistive technology that will really matter in the ability to stay independent.

The innovation process in the care sector seems to be slow. However many projects and developments are started but end in most cases once the pilot project is over. Over the years In-HAM has seen many attempts that failed for different reasons. Based on that observation we now start an in depth "needs first" approach, to make assistive technology innovation successful. We want to explain why we believe that this approach will matter in the success rate of care innovation.

Dr. Emmanuel B. Vander Poorten

Department of Mechanical Engineering, KU Leuven

"Novel Technologies for Navigation Assistance of Robotic Wheelchairs in the EU-funded Project RADHAR"

The ageing population poses a great challenge to our society. Already now the number of healthcare workers is lagging behind; unable to meet the demands from the growing group of people that are restricted in their daily life by physical or cognitive limitations.

Assistive technology could come here at the rescue, provided its implementation is sufficiently generic. Solutions must be versatile, scale to a very heterogeneous user group and should require only minimal adjustment by and attendance of healthcare workers. In this talk the approach that is proposed and developed in the EU-funded RADHAR project is introduced. RADHAR focuses on navigation assistance of powered wheelchairs with users ranging from children with cognitive and physical disabilities towards people suffering from MS. By developing novel technology to observe and understand the user's surroundings, the context, and by developing techniques to learn the user's navigational behaviour, RADHAR estimates the true navigation intentions of the user. The system then steers the wheelchair along safe trajectories that match the estimated intentions. Since user behaviour varies over time and from subject to subject, RADHAR continuously learns and updates its understanding of user and context and without input needed from healthcare workers, adapts its behaviour automatically to match these variations, providing navigation assistance tailored to each specific user at each instant in time.