

2012 INTERNATIONAL PH.D. INTENSIVE SCHOOL
“AGEING SOCIETY: ISSUES, THEORIES AND PRACTICES FOR AN ACTIVE AGEING”

With the support and patronage of AIP (Associazione Italiana di Psicologia)

In memory of Silvia Ciairano

Scientific Program

- September 23 (Sun)

- 16:30~ Arrival, registration for the accommodation at the university residence
- 19:30~ Networking dinner

- September 24 (Mon) – “Mind and Body” (Chair Ferdinando Rossi)

- 14:00-14:30 Opening: *Greetings* (T.Hondoh, Hokkaido University Vice Rector; M.Gola, Politecnico di Torino Vice Rector; F.Rossi, Università degli Studi di Torino NIT Director; L.Ciferri, International University of Japan)
- 14:30-14:45 Welcome to Torino (Torino Municipality)
- 14:45-15:00 Remembering Silvia Ciairano
- 15:00-16:15 Key Lecture: *Smart Ageing. Improve Cognitive Functions by Interventions Methods Driven by Cognitive Neuroscience* (Kawashima)
- 16:30-17:15 Lecture: *Age-dependent Neural Plasticity and Repair* (Rossi)
- 17:15-17:30 Introduction to the School (Ciferri)
- 17:30~ Discussion with lecturers and tutors

- September 25 (Tue) – “Science and Technology” (Chair Paolo Ariano)

- 8:30-9:30 Lecture: *Early Neural Impairments in Alzheimer's Disease: Moving beyond the Hippocampus* (Marcantoni)
- 9:45-10:45 Lecture: *Microfluidic and Bio-MEMS Technologies for Biomedical Applications* (Ohashi)
- 11:00-12:00 Lecture: *Wearable Robotics and the Future Age of Performance Enhancing Technologies* (Margaria)
- 13:30-14:00 Presentation: *Motion Analysis in Neurodegenerative Diseases* (Gastaldi)
- 14:00-15:30 Discussion with lecturers and tutors
- 15:30~ Time for working groups' activity

- September 26 (Wed) – “Environment and Society” (Chair Patrizia Lombardi)

- 8:30-9:30 Lecture: *Towards an Age-friendly City* (Mela)
- 9:45-10:45 Lecture: *Universal Design for Adaptive Ageing* (Tadano)
- 11:00-12:00 Lecture: *The Economic Impact of an Ageing Population: Geographical Scales, Policy Objectives and 'Common Sense'* (Ietri)
- 13:30-14:00 Presentation: *Re-thinking Contemporary Urban Processes: Slow Cities, Small Cities, Transition Towns for the Ageing Society?* (Spaziante)
- 14:00-15:30 Discussion with lecturers and tutors
- 15:30~ Time for working groups' activity

- September 27 (Thu) – “Research and Innovation” (Chair Ludovico Ciferri)

- 8:30-9:30 Lecture: *Information Technology (IT), a Possible Solution to Overcome Population Ageing in Developed Countries* (Cho)
- 9:45-10:45 Lecture: *Epidemiology of Dementia among the Elderly in Japan. Health Disparity* (Tamashiro)
- 11:00-12:00 Lecture: *Sensor Network Technologies for a Safe and Comfortable Ageing Society* (Yamamoto)
- 13:30-14:00 Presentation: *Ageing-related Problems as a Family's Matter* (Rivoiro)
- 14:00-15:30 Discussion with lecturers and tutors
- 15:30~ Time for working groups' activity

- September 28 (Fri)

- 8:30-12:00 Discussion of working groups' final presentation
- 12:00-12:15 Official closing
- 19:30~ Farewell dinner

Organization

Chair and Program coordination: □ Ludovico Ciferri (International University of Japan) □ □

Co-Chair and Scientific coordination: □ Paolo Ariano (Istituto Italiano di Tecnologia), Silvia Ciairano (Università degli Studi di Torino), Patrizia Lombardi (Politecnico di Torino/ Università degli Studi di Torino)

Lecturers and/or Session Chairs:

- Paolo Ariano (Istituto Italiano di Tecnologia)
- Youngtae Cho (Seoul National University)
- Silvia Ciairano (Università degli Studi di Torino)
- Ludovico Ciferri (International University of Japan)
- Laura Gastaldi (Politecnico di Torino)
- Daniele Ietri (Università degli Studi di Torino)
- Ryuta Kawashima (Tohoku University)
- Patrizia Lombardi (Politecnico di Torino/ Università degli Studi di Torino)
- Andrea Marcantoni (Università degli Studi di Torino)
- Valentina Margaria (Istituto Italiano di Tecnologia)
- Alfredo Mela (Politecnico di Torino/ Università degli Studi di Torino)
- Toshiro Ohashi (Hokkaido University)
- Chiara Rivoiro (Università degli Studi di Torino)
- Ferdinando Rossi (Università degli Studi di Torino)
- Agata Spaziante (Politecnico di Torino)
- Shigeru Tadano (Hokkaido University)
- Hiko Tamashiro (Hokkaido University)
- Tsuyoshi Yamamoto (Hokkaido University)

Paolo Ariano, Istituto Italiano di Tecnologia

Profile: Paolo Ariano received a M.Sc. degree in physics from Università degli Studi di Torino and after establishing a service company for blind people technologies (AIEM) and a researcher working experience for the National Institute for the Physics of Matter (INFN) he took a Ph.D. in Neuroscience. Awarded with a fellowship at the Università degli Studi di Torino from 2006 to 2010, he mostly worked on neuronal migration, TRPc channels and on extracellular recordings with diamond electrodes demonstrating for the first time that a single diamond macroelectrode can be used to record electrical activity from a population of spontaneously firing neurons. He is now at the Artificial Physiology Lab, Center for Space Human Robotics, Fondazione Istituto Italiano di Tecnologia. Currently his research interests are surface Electromyography and soft materials for robotics.

Youngtae Cho, Seoul National University

Title: Information Technology (IT), a Possible Solution to Overcome Population Ageing in Developed Countries

Abstract: Rapid population ageing, along with very low fertility, threatens the near-future sustainability in a number of developed countries. There have been many approaches to overcome the problems of rapid population ageing, ranging from promoting childbearing to reforming social security systems. Recently, the concept of ‘active ageing’ has gained attention and been incorporated into academic and political discourses on population ageing.

Under the rubric of active ageing, this class will discuss the possibility of information technology (IT) as a tool that helps the elderly or those soon to be the elderly maintain their production capacity by promoting physical and mental health status. Among the various IT devices, we will pay particular attention to the so called ‘smart phones.’

The smart phone penetration rate has dramatically increased in many countries. The closest thing to many people in their daily lives that never be detached from their body may be the smart phones. The infinite potential of smart phones can turn the phone into a daily health management device or a disability-aid device. Particularly when the smart phone is connected to various other smart devices (i.e., TV, car, bike etc.), its capability as a health manager or a productivity enhancer will be remarkably enlarged. Since the accessibility to smart phones are relatively lower than any other IT devices, in terms of its price and technical complexity, the concern of information- divide will be much lower than it used to be with other IT devices.

The lecture will introduce empirical evidence that smart phones are used as a health manager or a productivity enhancer for the elderly or the elderly to be. Students will discuss the feasibility of such a view that smart phones or smart technology can bring us ‘active ageing’ much closer than ever before.

Profile: Youngtae Cho achieved his Ph.D. in demography from the University of Texas-Austin (USA) in 2002. He has been assistant and associate professor of health demography at the School of Public Health, Seoul National University (South Korea), since 2004 after his service at Utah State University (USA) during 2002-2004. As a health demographer, Dr Cho has conducted a number of research projects on the social determinants of health and health inequity. He also has an interest in the issues of very low fertility, its causes and consequences, in Korea. Recently, he developed a new interest in ‘*mHealth* (mobile health)’ as an emerging social determinant of health that may enlarge or diminish the social disparities in health. Dr Cho is currently serving as a member of International Organizing Committee for the 2013 International Population Conference that will be held in Korea.

Silvia Ciairano, Università degli Studi di Torino

Title: Current Rate and Potential Future Weight of Mild Cognitive Impairment in Ageing People: Some Preliminary Findings from Northern Italy

Abstract: Mild Cognitive Impairment (MCI) is a syndrome defined as a kind of cognitive decline, greater than expected for the individual's age and educational level, but that does not interfere notably with activities of daily life (Gauthier et al., 2006). The MCI does not necessarily lead to dementia, even if a high proportion of old people with MCI will progress to dementia. Considering the classification proposed by Petersen and colleagues (2001) this cognitive decline can generally involve memory impairment (Amnesic MCI single or multiple domains) or other cognitive domains (Non-Amnesic MCI single or multiple domains). The prevalence of MCI in elderly population is said to vary from 3% to 19% in people older than 65 years (Gauthier et al., 2006). The lecture will build up on a general introduction of MCI to present the preliminary findings about the incidence of MCI in a wide elderly population in Northern Italy to whom a specific battery of neuropsychological tests was administered to detect MCI (Perri et al., 2001) for investigating several cognitive domains (memory, attention, executive function, language, reasoning and visual-spatial abilities) and a questionnaire for investigating ability of daily living. (In cooperation with Marcella Maria Caglio, Filippo Candela and Antonella Roggero)

Profile: Dr Silvia Ciairano is Professor at the Department of Psychology and President of the Bachelor Degree in Motor and Sport Activities at the University Interfaculty School in Motor Science, Università degli Studi di Torino.

Her main research activities concern four areas. The first area is the use of cooperative, non-cooperative and neutral interactions among peers during childhood and early adolescences. The second is health and psychosocial risk behaviour of adolescents. The third is the promotion of psychosocial wellbeing and the risk prevention, and their potential mediators as individual and collective efficacy, particularly in relation to motor and sport activity during the life span. The fourth concerns the developmental transition characteristics of adulthood.

She has extensively published: books, book chapters in international edition, papers in ISI and psycho-info journals, chapters and papers in national editions available upon request. She is project manager of the “Act on Ageing” project, a wide research that has involved 400 elderly in cognitive trainings and physical activities for which she received funding from the Piedmont Region.

Ludovico Ciferri, International University of Japan

Profile: Ludovico Ciferri (MA, ETP) teaches Mobile Business Strategy and Private Equity & Venture Capital at the Graduate School of Management, International University of Japan (Niigata, Japan). Researcher at Mobile Internet Capital, Inc. (Tokyo, Japan), a Japanese venture capital firm, he sits on the Scientific Board of the Private Equity Monitor – PEM®. Lately he has been focusing on the “silver population”, in particular the role that technology can play to address the issues that an ageing society poses, and “sustainable energies”, in particular technologies for renewable energies within energy-mix policies.

Laura Gastaldi, Politecnico di Torino

Title: Motion Analysis in Neurodegenerative Diseases

Abstract: Neurodegenerative diseases affect the ability to control muscle movements: in fact muscle tone, involuntary movements and smoothness of movement are significantly impacted; the range of motion and the muscle mass are instead unaffected. An instrumental analysis of motorial ability allows to single out disease's signals for an early diagnosis, while being also a powerful means to quantify motor outcomes in order to optimize time and resources spent in rehabilitation, to monitor therapy follow-up and to predict illness rate and exhibition of degeneration. To accurately measure human motion, technology is essential: over the years gait analysis techniques improved and took the form of gait laboratories using a technological combination of hardware and software. Gait analysis is the systematic measurement, description and assessment of the measures used to characterize human locomotion. Through gait analysis, kinematic and kinetic data are acquired and analyzed to provide information which describes fundamental motion characteristics and which is ultimately interpreted by the clinicians to form an assessment.

Lately gait analysis has been successfully employed in neurodegenerative pathologies to point out deviations from normal kinematic, kinetic, or EMG patterns with diagnostic purposes, to predict the outcome of treatments, to determine the effectiveness of training programs and the diseases' progression.

Profile: Laura Gastaldi graduated in Mechanical Engineering at the Politecnico di Torino in 1993 and she received her Ph.D. title in Applied Mechanics from the Politecnico di Torino in 1997. Researcher in applied Mechanics since 2000, she is currently Lecturer and an Assistant professor of Applied Mechanics in Bachelor and Master of Science level classes.

Laura Gastaldi's research activity is related to the study of mechanical, actuation and biomedical systems' functional behaviour. Her most significant research biomedical activities focus in particular on modelling and numerical simulation of physiological systems, gait analysis and biomechanics of sport gestures in athletes with physical disabilities.

Daniele Ietri, Università degli Studi di Torino

Title: The Economic Impact of an Ageing Population: Geographical Scales, Policy Objectives and 'Common Sense'.

Abstract: The lecture will discuss the economic impact of an ageing population and the possible strategies that could be adopted by policy making in order to attenuate the negative effects.

The impact of a growing population of seniors, and the growing number of elderly people suffering from forms of dementia, affects the economy in several ways (e.g. healthcare, retirement etc.). The impact of ageing on government revenues and expenditures is a composite of several individual items, some of which will improve the net fiscal position of governments while others will make it worse. The situation is made more complex due to the different sharing of program responsibilities in each country between the national and sub national level of government, and by the different roles played by private sector in each country. This means also that acting at local scale entails complex interaction with other levels of government in terms of competences, tax revenue, expenditure of public and private funds.

The lecture will first specify some of the individual elements in the calculation of the impact; then the organization of sub-national government levels in the EU and the US will be examined, discussing how the ageing of the population is anticipated to have impact on the different bodies responsible for healthcare, pensions, education, etc. The possible impact of forms of dementia will be discussed in particular, according to their expected impact on the cost of healthcare and on the financial situation of individuals and families - e.g. discussing to what extent the costs of health care have an impact on the inter-generational transfer of income and savings. The case studies and the theoretical approach will be discussed showing that a policy making attentive to both the economic impact and the health conditions of the elderly population, aim at general objectives that most of the times are congruent and coherent with our 'common sense'.

Profile: Daniele Ietri earned his Doctorate (2005) and Master Degree in Economics (2002) from the Università degli Studi di Torino. After the Ph.D, he has been post-doctoral research fellow at the Inter-university Department of Territorial Studies and Planning, in Turin, at the Faculty of Geosciences of the University of Lausanne, Switzerland, and at the Università della Valle d'Aosta.

He is lecturer of Economic Geography at the Faculty of Economics in Cuneo, Italy and lecturer of Local development at the Faculty of Political Sciences in Cuneo, Italy.

He serves as consultant for local administrations and research institutions in Italy and the European Union, working mainly on urban and regional competitiveness and on the elaboration of local development policies. He is member of the Board of AISLo, the Italian Association for Meetings and Studies on Local Development, senior consultant of BeP-Business e Persone, Milan, and member of the Council of the Global Urban Competitiveness Project.

On the topic of demographic change and the ageing of the population he published two books written with Peter Karl Kresl, Bucknell University (USA): "The Ageing Population and the Competitiveness of Cities" (Edward Elgar, 2010) and "Buone notizie per le città? Impatti economici positivi dell'invecchiamento della popolazione" (Rubbettino, 2012). The former book will be translated and published in China by the Chinese Academy of Social Sciences.

Ryuta Kawashima, Tohoku University

Title: Smart Ageing. Improve Cognitive Functions by Interventions Methods Driven by Cognitive Neuroscience

Abstract: In general, ageing is considered negatively as the loss of something that people have in their youth or a form of regression. As a result, a false image that ageing is something like an illness or ugly, and that young people are superior to the elderly in many respects, has been formed. However, we consider that ageing means that people can grow and become wiser as they reach later stages of life. We call this concept smart ageing and have proposed the concept to society. Generally, many people tend to lose their sense of purpose in life when they lose their connection with society, triggered by, for example, retirement, leading to a decrease in their quality of life. However, we believe that the quality of life can be increased up until the last moment if one pays careful attention to the following four factors, i.e., cognitive stimulation, regular exercise, balanced nutrition, and relationship with society, and if a social system to realize this for everyone can be established.

With regard to changes of cognitive functions during ageing, it is important to note that although cognitive functions related to semantic knowledge do not decline during ageing, cognitive functions requires the function of the prefrontal cortex, particularly the executive function decline linearly during ageing. We previously demonstrated that a plastic change is induced in the brain structure of healthy young subjects, in addition to the improvement of their non-trained cognitive functions (transfer effects), through cognitive intervention using an intensive adoptive training of working memory.

Recently, we proposed a smart but less expensive system for cognitive stimulation program designed for dementia care (2) and prevention of dementia (3), named Learning Therapy. The materials for the training program were two tasks in arithmetic and Japanese language, which were systematized basic problems in reading and arithmetic. Reading aloud is accomplished by the combination of several cognitive processes, for example, recognition of the visually presented words, conversion to phonological representation from graphic representation of words, analysis of the meaning of words, and control of pronunciation. Solving arithmetic problems is also accomplished by many cognitive processes, for example, recognition of visually presented numbers, performance of arithmetic operations, and control of hand movements. It is obvious that both reading aloud and solving arithmetic problems require working memory. In addition, both reading aloud and solving arithmetic problems can be very simple and easy, so that even people with senile dementia can understand, perform, and continue the tasks prepared. The results of our investigations indicate that the transfer effect of cognitive intervention by reading and solving arithmetic problems was demonstrated, and are convincing evidence that cognitive training has the beneficial effects of maintaining and improving cognitive functions of dementia patients and healthy seniors.

Profile: Dr. Ryuta Kawashima is a Professor of Institute of Development, Ageing and Cancer (IDAC), Tohoku University (Japan) from 2001, and a Director of the Smart Ageing International Research Center, IDAC, Tohoku University from 2009. His scientific interest is in functional brain mapping of higher cognitive functions of humans. He also has been paying his attention to return benefits of basic sciences to public, so that he has proposed systems for improvement of the prefrontal functions of humans by industry-university cooperation. He has won the Prizes for Science and Technology, The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology in 2009. His scientific output includes over 200 peer reviewed papers and the 150 books.

Patrizia Lombardi, Politecnico di Torino/ Università degli Studi di Torino

Profile: Dr Patrizia Lombardi is Professor in Planning Evaluation and Project appraisal at Politecnico di Torino and Head of the Interuniversity Department of Regional and Urban Studies and Planning. An established figure in the field of Evaluating Sustainable Urban Development, she

is Visiting professor at the IMI - Institute for Advanced Studies, in Lucca (Italy), Scientific Director of the “Management of Cultural Projects and World Heritage” UNESCO Masters Course at the Turin School of Development managed by ITC-ILO and is a member of the Scientific Board of the ICT Company of the Piemonte Region.

In 2009, professor Lombardi was member of the Sous-sherpa Unit that drafted the “Declaration on Education for a Sustainable and Responsible Development” and since then has been representing Politecnico di Torino within the G8 University Council, supporting the development of the Global University Summits, in France (2010), Canada (2011) and USA (2012).

She has provided several distinguished lectures and keynote addresses including the “6th Annual Distinguished Lecture Series in Sustainable Development 2008” at the University of Cambridge and the Sustainability Week at Hokkaido University (2009). She received her first special prize in 1997 from the Italian Centre of Territorial & Economic Studies (CeSET, Italy), as best researcher in this field. More recently, she received two best award papers, at the 2009 International Conference on Sharing Cultures and at the 2010 Sustainable Architecture & Urban Development International Conference in Jordan.

Andrea Marcantoni, Università degli Studi di Torino

Title: Early Neural Impairments in Alzheimer's Disease: Moving beyond the Hippocampus

Abstract: Alzheimer’s disease (AD) is the most common cause of progressive dementia in aging human populations, and one of the most important medical, social and economic problems confronting contemporary society. It is characterized by progressive disturbances of cognitive functions including memory, judgment, decisionmaking, orientation to physical surroundings and language.

The lecture will discuss a new methodological approach aiming to identify the first neural impairments at the early stage of AD and the use of alternative technological tools (microelectrodes arrays, MEA) will be discussed. The MEA system is made of 60 recording electrodes of 30 µm diameter separated by 200 µm distance (MCS GmbH, Reutlingen, Germany). It is able to record extracellular field potentials generated by one single or a populations of excitable cells (neurons) and offers the possibility to monitor the activity of neurons in slices or in culture over extended periods of time, up to several months. Moreover, electrical activity from different regions of a preparation can be recorded, yielding information on spatial effects that might go undetected with other recording methods. Particular attention will be given not only to the study of the hippocampus necessary for the consolidation of information from short-term to long-term memory and spatial navigation, but also to the main source of afferent input to the hippocampus represented by the entorhinal cortex (EC) and considered one of the first brain regions impaired during the early stages of AD.

Profile: Andrea Marcantoni received the degree in Biology in 1999 and the Ph.D. degree in Physiology in 2004. During 2004 he moved to the laboratory of Cellular and Molecular Cardiology, Faculty of Pharmacy, Université Paris Sud, INSERM U-446, Chatenay Malabry (France), and worked under the supervision of Dr Vandecasteele and professor Fischmeister. There he was involved in a project concerning the study of the role of a cAMP dependent protein (EPAC) in governing cardiac hypertrophy. From 2005 to 2011, he worked in the laboratory of Physiology at the Department of Neuroscience, Università degli Studi di Torino, where, under the supervision of professor Emilio Carbone, started working on neuronal excitability and synaptic activity modulated by calcium channels.

In 2011 Andrea Marcantoni moved to France at the Institut de Pharmacologie Moléculaire et Cellulaire, UMR6097 (CNRS), Sophia Antipolis (Valbonne), and, under the supervision of Dr Marie Hélène, was involved in a project concerning the study of the role of calcium channels during the early stages of Alzheimer’s disease. He recently got a research position at the Department of Drug Science of Università degli Studi di Torino.

Valentina Margaria, Istituto Italiano di Tecnologia

Title: Wearable Robotics and the Future Age of Performance Enhancing Technologies

Abstract: Demographic change and ageing society are potential disruptive drivers for the development and implementation of technologies. From a technological point of view the achievement of an Active and Healthy ageing requires a multidisciplinary approach involving Medicine, Physiology, ICT and Robotics.

Valentina Margaria's lecture will be focused on the development of person oriented robots to ensure elderly autonomy.

Originally, robots were only intended for use in industrial environments to replace humans in repetitive tasks, but the current scenario is one of transition towards increasing interaction with the human operator, from a mere exchange of information (in teleoperation tasks) to a close action involving physical and cognitive modalities. It is in this context that the concept of Wearable Robots has emerged. A wearable robot can be seen as a technology that extends, complements, substitutes or enhances human function. The key role of a person oriented robot is the generation of supplementary forces to empower and overcome human physical limits, be they natural or the result of a trauma, disease or age impairment. Wearable robotics, therefore, represent an extremely important tool able to play along with elderly and provide independence in their everyday life.

Profile: Valentina Margaria graduated in Medical Biotechnology from Università degli Studi di Torino in 2003. She has worked as a research fellow at the Institute for Cancer Research and Treatment until 2007, when she earned a Ph.D. in Complex system applied to post genomic biology. As the result of her multidisciplinary training, she worked on convergence between biotechnology and nanotechnology to design non-invasive diagnostic systems and powerful tools for drug discovery and testing and led the BioMEMS unit at Techfab Srl.

In 2010, she graduated from the Singularity University, at NASA Ames Research Park, whose mission is to deal with, and solve, humanity's Grand Challenges using new developing technologies. The experience she had in Silicon Valley led up to the foundation of Axelera, a non for profit organization whose aim is to promote Italian technological innovation.

Currently, she is working at Center for Space Human Robotics IIT@poliTO developing artificial physiology systems to support the interaction between humans and robots. Her research is specifically devoted to hand exoskeleton control system to facilitate EVA operations in space flight. Since 2011, she is young associate at NewTO, a think-tank that promotes meritocracy as a key driver for social and economic renovation.

Alfredo Mela, Politecnico di Torino/ Università degli Studi di Torino

Title: Towards an Age-friendly City

Abstract: During the first years of 21th century, the world's population living in urban context has surpassed the threshold of 50%. At the same time, the cities in the most developed countries show an increasing proportion of senior people. Increased life expectancy results in heavy problems, especially for the part of population suffering from various forms of dementia, like Alzheimer's. Even though this type of disease can affect people belonging to every social condition, its effects are more severe especially for most disadvantaged social groups and persons isolated or less connected to assistance and social support networks. Such a situation challenges not only health systems, but also planners, architects and designers. In fact, elderly population and especially the frailer part of it need a friendly type of urban environment; an age-friendly city could improve the quality of life of these people and give them an opportunity for a satisfactory participation to urban life. Many studies and experiences have given some basic suggestions for a friendly city to elderly people; their application to urban planning and design should be done through participatory processes, directly involving also senior people, their relatives and caregivers.

Profile: Alfredo Mela (Degree in Philosophy, 1970) is professor at the Interuniversity Department of Regional and Urban Studies and Planning– DIST, Politecnico di Torino (Italy). He teaches Urban Sociology and Environmental Sociology at the Faculty of Architecture. He was visiting professor at the University Paris 1 (Panthéon Sorbonne) – Institut de géographie, between November 2009 and

January 2010. Since 2010 he is the director of Corso di Perfezionamento in “Habitat, technology and development” at the Politecnico di Torino. He is member of the scientific board of the AIS-Sezione Territorio (Italian Association of Sociology. Section: Community and Urban Sociology). In recent years his main research fields regard: the analysis of urban sprawl and social transformation in metropolitan areas; urban insecurity; socio-psychological support to communities in developing countries; social participation in urban planning and design; mega-events and their spatial effects.

Toshiro Ohashi, Hokkaido University

Title: Microfluidic and Bio-MEMS Technologies for Biomedical Applications

Abstract: Microfluidics technologies have emerged with a great potential for a high throughput analysis. Microfluidic devices require only a small amount of samples and reagents and have been used in the development of total analysis systems including biochemical analysis, drug screening, genetic analysis, more recently, cell analysis, etc. The purpose of the lecture is to first introduce MEMS (Micro Electro Mechanical Systems) fabrication process, working principle and properties of microfluidic devices. Next, biomedical applications such as cell separation/sorting technologies, point-of-care diagnosis, are highlighted. Application of microfluidics technologies to nerve regeneration studies is also introduced as may prove helpful to deal with the consequences of neurodegenerative process caused by pathologies like dementia.

Profile: Toshiro Ohashi received a B.Sc. in 1991 and a M.Sc. in 1994, both from Tsukuba University (Japan). He joined Tohoku University (Japan) in 1994, serving as a research associate from 1994 to 2002 and as an associate professor from 2002 to 2009. During this period, he received a Ph.D. from Tohoku University in 2000. He spent a 1-year at Queen Mary University of London (UK), from 2004 to 2005, and spent a 7-month at Royal Institute of Technology (Sweden) in 2008 as an academic fellow. Since 2009, he is a full professor at Hokkaido University (Japan). His main research areas involve cell/tissue biomechanics and bio-MEMS. He has published 65 peer reviewed scientific papers and has been honoured with 11 national and international awards.

Chiara Rivorio, Università degli Studi di Torino

Title: Ageing-related Problems as a Family’s Matter

Abstract: The issue of people’s ageing is assuming relevance in terms of public health, especially for the related chronic diseases. In Italy, for example, it is estimated that there are about 1,000,000 cases of people with dementia and 3,000,000 familiars involved in their assistance. The international literature underlines the urgent need of integrated management of different competences to cope with these problems. There are also the first evidences that operating in that way bring to positive effects on health, policy and costs both at personal and at country level. The presentation aims at analyzing the consequences on families of the ageing related problems and some possible ways to face this emergency, which the WH already defined as the most important problem for the XXI century.

Profile: Chiara Rivorio is a neurologist, Ph.D. in Neurosciences. She works at Piemonte Regional Health Agency as HTA expert, evaluating, in particular, care management programs for chronic diseases. She collaborates with the Health National Institute for developing integrated pathways for people affected by dementia.

Ferdinando Rossi, Università degli Studi di Torino

Title: Age-dependent Neural Plasticity and Repair

Abstract: Neural plasticity is a fundamental determinant of phenotypic adaptation to changing environmental conditions. Structural/functional changes of neural circuits comprise a wide range of events, including rewiring of existing connections and integration of new neurons in pre-existing networks. The current notion implies that any process leading to structural remodelling of the nervous tissue is determined by the interplay between intrinsic neuronal properties and growth-regulatory cues expressed in the CNS microenvironment. Nonetheless, it is also clear that the cellular/molecular mechanisms that underlie the structural remodelling of neural networks are influenced by the concurrent interaction of the organism with the external world (in a word “experience”). Therefore, plastic phenomena result from a triadic interplay involving intrinsic neuronal properties, regulatory cues of the CNS microenvironment and experience-related events. Although the capability for plastic adaptation persists throughout the whole lifespan, including adulthood and ageing, the impact of experience is not constant. While in young individuals the mere exposure to external stimuli is sufficient to induce adaptive plasticity, in adults the same processes require active participation and motivation. This age-related change of plastic processes is due to distinct, age-dependent mechanisms that regulate the influence of external stimuli on cellular/molecular components of neural circuits. Current knowledge about this interaction will be reviewed here, with particular focus on issues related to anatomical repair, functional recovery and rehabilitation after CNS injury.

Profile: Ferdinando Rossi obtained the MD (1985) and PhD in Neuroscience (1990) at Università degli Studi di Torino (Italy). He has been assistant professor of Human Physiology (1990-98), Associate professor of Neurobiology (1998-98), Full Professor of Neuroscience (1999-today), at the Department of Neuroscience, Università degli Studi di Torino. He spent two years on sabbatical leave at the INSERM U-106 (Paris). He is now Director of the Department of Neuroscience of the University of Turin and of the Neuroscience Institute Cavalieri Ottolenghi of Turin. He is Associate Editor of European Journal of Neuroscience; member of the editorial boards of Neuroscience, The Cerebellum, Neurobiology of Disease and Frontiers in Neurosciences. His main research interests are focused on the mechanisms of cerebellar development, axonal regeneration and cell replacement following CNS injury, activity/experience-dependent plasticity and repair in the CNS.

Agata Spaziante, Politecnico di Torino

Title: Re-thinking Contemporary Urban Processes: Slow Cities, Small Cities, Transition Towns for the Ageing Society?

Abstract: In times of globalization, where new technologies accelerate life, widen communication flows and city size, improve consumption of not-essential products and services, some associations and movements that explicitly would use slowness, smallness, bio and consumptions as a philosophy, are developing and becoming popular.

Some of these associations and movements had their origin or opportunity of diffusion in Italy sharing the philosophy of “slow food” but there are experiences in many other countries. They are movements of mainly middle-class citizens and cosmopolitan city users, who would substitute quality to quantitative measures of society welfare. A slow city, a small city, a transition town are seen as a places, where people enjoy a comfortable, pleasant and secure life.

Moreover the concepts of resilience and sustainability are typically connected to the transition town initiatives.

The aim of these new ideas about urban processes is to inspire, encourage, connect, support and train communities so that they can self-organize around the new urban models, creating initiatives that improve resilience and reduce environmental impacts.

Which positive and negative effects could be connected to this re-thinking of contemporary urban processes? And finally, is this philosophy more suitable to the ageing society?

Profile: Agata Spaziante, is a full professor at Politecnico di Torino, where she teaches Urban Analysis and Planning. Her research activity deals with urban analysis and brownfields, strategic approach to planning, environmental assessment.

Shigeru Tadano, Hokkaido University

Title: Universal Design for Adaptive Ageing

Abstract: As the elderly population is rapidly increasing in the world, 65 years old and older people are reaching almost near 25% of the total population in many developed countries. This tendency means that household will be less able to care for the aged family members, especially for those affected by dementia that requires special care. The development of care facilities and care devices are therefore needed to promote QOL (Quality of Life) not only of assisted people but also of those taking care of them. Such industrial products must be designed under careful consideration of direct human life style, including regional characteristics and physical and mental conditions of individuals. The lecture, after discussing from an engineering or industrial perspective some social attitudes towards the aged society in Japan and other countries, will introduce the concept and practical application of "Universal Design" for elderly people.

Profile: Shigeru Tadano is Professor of Mechanical Engineering, Division of Human Mechanical Systems and Design, Faculty of Engineering, Hokkaido University (Japan). He received a B.Eng (1978), a M.Eng (1984) and the D.Eng (1988) degrees in Mechanical Engineering from Hokkaido University. He worked at Tokai Rubber Industries, Ltd. (1978-1981). He became research associate (1984), lecturer (1988), associate professor (1991), full professor (2000), always at Hokkaido University, while being visiting scientist in 1995 at the Medical School of Columbia University (USA). His research fields are: Biomechanics, Bio-mechanical engineering of musculo- skeletal systems, Medical and Healthcare Engineering. He is a member of Science Council of Japan (from 2011) and members of academic society of JSME (Japan Society for Mechanical Engineers), ASME(American Society for Mechanical Engineers), SEM(Society for Experimental Mechanics), and ICBM(International Society for Biomechanics) etc. He has published more than 100 peer reviewed scientific papers and received total eight awards from academic societies and international conference committees.

Hiko Tamashiro, Hokkaido University

Title: Epidemiology of Dementia among the Elderly in Japan. Health Disparity

Abstract: The number of the elderly population (> 65 years of age) has been steeply increasing in Japan, accounting for nearly 25% of the nation's total. The Japanese situation is unique in terms of absolute number of the elderly, speed of ageing, associated health-care system and other complexities.

Japan introduced in 2000 a long-term care insurance especially for the elderly, who used to be cared by families (internally) and are now cared by external professionals. Approximately 15% of the elderly are under the services of this insurance system. On the other hand, it implies that nearly 85% of the elderly are enjoying independent life from the system. Despite being Japan one of the healthiest nations in the world, those who need long-term care and who suffer from dementia and senile-related chronic diseases are also rapidly growing in Japan, resulting in the upsurge of health-care delivery cost.

The Japanese Government estimates that 6.3% (1.49 millions) of the elderly populations > 65 years of age in 2002 who are burdened with both long-term care and dementia will increase to 10.4% (3.78 millions) by 2045.

The lecture will provide other epidemiological evidences of dementia in Japan which will stimulate proactive discussion on this important issue not only for Japan but also other countries, developed and less developed.

Profile: Professor Hiko Tamashiro is Head of the Department of Global Health and Epidemiology of Hokkaido University Graduate School of Medicine in Sapporo (Japan). Concurrently, he is also Vice-chair of the AIDS Vaccine Development Association (NPO) based in Tokyo, and a member of Hokkaido University's Global Center of Excellence Program on Zoonosis Control.

He has an extensive work experience in the field of zoonosis and HIV/AIDS in Sri Lanka in collaboration with the University of Peradeniya. Prior to his current position, he was affiliated with the World Health Organization (WHO) in Geneva, Switzerland. He had also worked at the National Institute of Public Health in Tokyo and at the National Institute for Minamata Disease in Kumamoto Prefecture, both in Japan.

Originally from Okinawa, Japan, professor Tamashiro completed his doctorate degree at the Health Science Center, University of Texas at Houston (USA) and the National Institute of Public Health in Tokyo; he has been actively involved in a range of professional activities concerning global health and epidemiology in Japan and internationally. In addition, he supervises more than 15 graduate students.

Tsuyoshi Yamamoto, Hokkaido University

Title: Sensor Network Technologies for Safe and Comfortable Ageing Society

Abstract: Among the consequences of the ageing of the population is the increased recurrence in elderly people of degradation of intellectual ability, or “Dementia Symptoms”, caused by neurodegenerative diseases. Information technology (IT) will be the key technology to help personal and social problems induced by such symptoms. Sensor network technologies have high potentiality to help ageing society across various fields of application. These technologies enable precise monitoring of environment and human behavior, and can improve quality of life as well. For example, augmented memory system can help can help troubles caused by dysmnesia.

The lecture, moving from the introduction of a sensor node, a small embedded system of outward appearances yet at the same time a fully functional computing entity that includes all layers of network protocol stacks and interfaces for sensors, will provide a brief overview of technological elements of sensor networks and their possible applications for ageing society. To imagine possible applications of these technologies to the elderly it is important to understand first the internal structure of these embedded sensor nodes, data collection and decimation processing.

Resume: Tsuyoshi Yamamoto is Professor at Graduate School of Information Science and Technology, Hokkaido University (Japan). He received a B.Eng and a M.Eng degrees from Hokkaido University, in 1976 and 1978 respectively, and the doctorate in Electronic Engineering in 1986 from Hokkaido University. From 1978 to 1980, he worked at Fujitsu Ltd. In 1982, he was appointed as a lecturer at Department of Electrical Engineering, Hokkaido University. From 1987 to 1988, he worked as consultant at RAND Corporation in Santa Monica, CA. (USA). His research interests include information media technologies, computer graphics, medical image processing. He is a member of ACM SIGGRAPH, IEEE, IEICE(JP), ITE(JP) and IPSJ(JP).