Societies in Balance?
The Age of Ageing is Arriving!

Doctoral School on Ageing and Sustainability

IDEA League
A focussed network of leading European Universities of science and technology

Contact
Dr. Ulla Bidian
Secretary General of the IDEA League
www.idealeague.org

Education, Research and Innovation for a better and sustainable future!
Dear Participants,

Welcome to the Doctoral School on Ageing and Sustainability of the IDEA League!

IDEA League, founded in 1999, is a partner network of European technical universities. Our joint activities in education, research and quality assurance, as well as our joint participation in the activities within the framework programmes of the European Union, make us a model of European co-operation.

With this programme we want to give you the unique chance to profit from our network and the exclusive programmes we design for our students.

We bring you, the leading scientists and entrepreneurs of tomorrow together by creating an international and interdisciplinary environment in which you have the opportunity to analyze the various aspects of ageing and sustainability.

Moreover, we will explore the business opportunities, inherent in the demographic shift towards an ageing society, a global challenge, that will impact all aspects of society and the way of living together as we know it.

We are looking forward to working and learning with you.

Our sincere thanks go to all people and institutions who have helped with initiating, planning, financing and supporting this programme, which serves as the pilot for a Doctoral School of the IDEA League.

Prof. Martina Ziefle                                                                                     Dr. Ulla Bidian
Chair of the Scientific Board                                      Secretary General of the IDEA League

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WELCOME!
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The age of ageing is arriving! Among the global challenges that societies are facing in this century, ageing of the population is a key issue. With people having fewer children and living longer, societies in many countries are ageing rapidly. This is both a challenge and an opportunity. The most obvious challenge is the balance between human welfare and economic stability. The ratio of working-age people to retired people is an indicator of this challenge. A fast shrinking work force will result in economic problems, as large portions of state pensions are paid from current tax incomes. On the other hand, a decline in birth rates is an opportunity, as it will help to dam the otherwise unprecedented growth in the world’s population, and could be a step towards achieving global sustainability, if societies respond in a proactive way. In addition, for a large number of people a longer life expectancy will mean an extended period of active and healthy life after retirement.

Active ageing goes hand in hand with „ageing in place“ which is defined as staying in one’s private home, rather than moving to a care facility for the elderly. There is an emerging market to assist with active ageing in general as well as with living independently. This provides plenty of research and business opportunities for devices and services catering to the senior population. Science is essential to help societies meeting the challenges of ageing, and it will require the joint efforts and contributions of scientists from a wide range of fields. An integrative approach is necessary to understand the cross-impacts between the economical, environmental, political, scientific and social contexts of ageing. As a truly interdisciplinary topic, that cannot be reduced to the viewpoint of one specific discipline, ageing in all its aspects is one of the emerging supra-disciplinary fields. Moreover, ageing needs to be analyzed and studied from an international perspective, with Japan being at the forefront of state-of-the-art research and innovation for policies, products and services.

At a global level, the number of those over age 60 is projected by the UN Population Division to increase from just under 800 million today (representing 11% of the world population), to well over 2 billion in 2050 (representing 22% of the world population). In Europe, the age group over 65 years old will increase by 77% by 2050. Thus, the ratio of working-age people to retired people will be 2:1. At the forefront of this demographic transition is Japan, but trends are also evident Europe and the US, as in many other developed countries. Japan is world leader in longevity. In 2030, the number of seniors over 65 years will account for one third of the population, while the number of seniors over 75 years will double. On its way to become a super-ageing society, Japan is already implementing policies and structures to establish the necessary societal infrastructure.
With population ageing of this magnitude and speed, the most obvious concern for societies world-wide is the balance between human welfare and economic stability. At the same time, the age of ageing also brings new opportunities, with people having longer, healthier lives, thus resulting in extended working years. In this setting, optimized conditions for independent and sustainable living, as well as social inclusion are of central concern.

AGEING - A GLOBAL CHALLENGE
The Doctoral School on Ageing and Sustainability is created by the IDEA League partners Imperial College London, TU Delft, ETH Zürich, RWTH Aachen and ParisTech. The members of the IDEA League network have collaborated in education and research activities since 1999, thus relying on a solid basis for joint programmes and actions. Financed by the IDEA League, the programme offers places for 25 outstanding PhD students from the partner universities.

The Doctoral School combines the search for solutions for global challenges with innovative Doctoral training. This training is based on four modules in which the PhD students will be exposed to a range of policies, products, projects and services focusing on ageing and its link to sustainability. Throughout the programme the students will in teams develop a catalogue of ideas for possible products and services, which are generated in “ideation” sessions under the guidance of a coach. In a moderated process, the students are encouraged to make use of this catalogue as a basis for a research, a policy or a business idea. These ideas are presented in form of a pitch in front of a jury. Moreover, the students have options and can decide on learning objectives which are tailor-made for their needs, including training to transform ideas into business plans.

Japan is world leader in longevity. In 2030, the number of seniors over 65 years will account for one third of the population, while the number of seniors over 75 years will double. Japan is on its way to become a super-ageing society and is already implementing policies and structures to establish the necessary societal infrastructure. As this is instrumental for the topic of ageing, module 2 of the Doctoral School will take place in Japan. The visit to Tokyo is a welcome opportunity to collaborate with TokyoTech, a member of the ASPIRE network, which is the Asian partner network of IDEA League.

Module 1: Ageing as a Global Challenge - the European Perspective on Challenges and Opportunities
Module 2 in Tokyo: Ageing as a Global Challenge - Perspective on Challenges and Opportunities in Japan
Module 3: Ideas and Opportunities and their Transition to Europe
Module 4: MBA training

Furthermore, all participating students are encouraged to make use of the IDEA League student grant which finances a research stay at an IDEA League partner university. www.idealeague.org/education/studentgrant
With the Doctoral School on Ageing and Sustainability, the IDEA League partner universities provide a unique training programme for highly motivated PhD students from our outstanding universities of science and technology. These PhD students have the chance to take up the issue of ageing as a collaborative, interdisciplinary and transdisciplinary project, in an international environment. The input is provided by the members of the IDEA League, as well as a number of carefully selected partners, like TokyoTech and the University of Tokyo, the Japanese Government, industry and spin-outs. This input process is designed to go well beyond the boundaries of the various disciplines in which the participating PhD students are working, and will help the students to develop an understanding of the cross-impacts of the different aspects of an ageing society.

The learning goals for the students in the programme are three-fold. Firstly, students should develop an understanding of ageing as an emerging, truly interdisciplinary field of research. Secondly, students should discover their entrepreneurial spirit and learn how to see the potential for business opportunities. Last, but not least, within the framework of the IDEA League, students should form a network of young scientists as an international high-level peer group.

The objectives for the students in the programme are to:
- Examine the dimensions of the issue of ageing from the viewpoint of different disciplines
- Explore the implications of an ageing society first hand in its economical, environmental, political, scientific and social context in Japan, a society at the forefront of the demographic shift
- Discover how the latest science on ageing can be transformed into new policies, products and services, thus offering potential for research projects and business opportunities
- Apply this understanding to the own area of expertise
- Work within multidisciplinary teams supported by coaches to develop research and business ideas
- Learn how to pitch ideas as potential research topics or business ventures
- Complete the programme with a research paper or a business plan.

As attending PhD students are expected to form a network, the IDEA League will foster further activities, for example, exchange to do research in the lab of a partner, as well as participation in our summer school programme and engagement in joint projects of the study associations.
William Abbott, UK
PhD student in Bioengineering
at Imperial College London
I am fascinated by the application of technology
to medicine, particularly by making it affordable
to the masses. My current research focuses on
allowing people with severe disabilities to
interact with their surroundings using only their
eyes. Interfaces such as this are required to
allow patients to communicate their intentions
to technologies such as the powered wheelchair,
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with age. Technology such as this will play an
increasing role in allowing the elderly to
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participants, building interdisciplinary and
international collaborations. I hope to offer my
personal experience of the challenges faced by
the elderly, having lived with and cared for an
aging relative, coupled with technical
understanding and a creative drive for frugal
innovation.

In my spare time I am a keen swimmer and
enjoy other water sports, such as scuba diving,
sailing and wakeboarding. I enjoy travelling and
have spent time in many countries all over the
world; I relish the opportunity to learn about
new environments and cultures. Another hobby
of mine is brewing, producing an array of
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Shirley Beul, Germany
PhD student in ICT
at RWTH Aachen University
In my Ph.D. project I investigate telemedical
consultation services designed as real-time
audiovisual communication channels. They
bridge the geographical distance between
physician and patient and facilitate a remote
medical encounter. Combined with monitoring
technologies they can be integrated in
intelligent living environments to support
older and chronically ill inhabitants in their
everyday life. My study results can be used
for communicative trainings for general
practitioners and be a valuable contribution
to a better healthcare system and the life of
older patients.

I am interested in this Doctoral School to
expand my experience in working
interdisciplinary as well as internationally and
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Besides work, I enjoy sports like running, thai bo, training at the gym, and snowboarding. Moreover, I love to discover new restaurants and food concepts.
My interest on research in health care research comes from my passion to contribute to the society. Since, aging is part of our lives and our needs and abilities change accordingly, we have different expectations on our products related to our changing needs. My research is about implementation, adaptation and acceptance of technological innovations products in the heath care area (by focusing on special users: elderly, disabled etc.). As a case study I will be designing the products and services that will be part of a new building of the senior-living complex called Erasmusheim. During this process I will be co-designing with residents, nurses and care takers of the organization.

I aim to get insights from different cultures related to elderly behavior and care. Visiting Japan is a great idea for us to see how asian mind-set is different. I hope we will share different personal experiences that expands our horizon. For example, I am a tartar living in Turkey, and our culture is quite different. In my free time, I like to discover new places, which could be a restaurant in the city I live, as well as a country that I have never been.

Aging is a tremendous challenge for many societies. In my PhD I am investigating how “Gamification” and “Serious Games” can be used to raise the motivation to regularly carry out exercises and how smart environments may track practices, monitor their accurate execution and give useful feedback for improvements. One central goal of my thesis is to incrementally develop a holistic motivational framework that can be used for creating targeted and adaptive games in ambient assisted living environments. The doctoral school provides an outstanding opportunity to discuss this approach and exchange ideas with other researchers from Europe’s leading universities. This is especially important, as my project cannot be considered isolated, but must be envisioned in a holistic manner by including how cities will change, how mobility within cities and rural areas will evolve and how culture affects these developments. Also, I would like to discuss whether my vision will also accepted in different European cultures or in Japan. Thus, the school will develop an excellent opportunity to identify culture agnostic aspects of serious gaming.
**Students**

**Louise S. Connell, UK**  
PhD student in Biomaterials  
at Imperial College London

My research involves developing synthetic bone graft materials and degradable scaffolds for the stimulation of bone regeneration and repair. The world’s ageing population has led to increasing incidences of degenerative diseases such as osteoporosis. There is not enough natural bone graft material available to cope with demand and so these materials can be used as substitutes without complications such as rejection. I chose this project because of its obvious clinical application. To be successful my materials need to be accepted in a clinical setting and this can only be achieved if their properties fully address the requirements of an ageing population. The Doctoral School in Ageing would provide me with invaluable first-hand experience, enabling me to understand more fully these requirements. I hope to feed this knowledge into my research in order to develop a material that is more applicable for clinical use. I also hope to meet like-minded individuals who share the same passion so that we can develop collaborative links in complementary disciplines raising the quality of our research and the impact that it has on society. When I’m not in the lab, I’m normally found on the river where I row for the university and have won medals representing my country.

**Tisham De, India**  
PhD student in Statistical Genetics  
at Imperial College London

My current work focuses on developing statistical methods and algorithms to elucidate the role of human genetic variation with respect to human phenotype. Such phenotypes can vary from disease related symptoms like Epileptic seizures and insulin resistance for Type2 diabetes to general human physical features like human height and even ageing. My current PhD work involves analyzing and modeling data from these next generation genotyping platforms to better correlate the observed genetic variation to human phenotype. Results from such analysis can help in paving the way to revolutionize personalized medical care for humans. In the light of ageing knowledge from such studies can help in unraveling what genetic or lifestyle factors affect or slow down ageing. Potentially this can decrease the chances of incurring common diseases like mental disorders and heart diseases for the elderly through timely intervention, and thus reduce the overall medical cost for the society. In my free time I like to improve my French and play badminton. I also love travelling and appreciating different cultures especially different cuisines!
Kirsten Henken, The Netherlands
PhD student in Biomedical Engineering at TU Delft

My research is part of a multi-party project that aims at the development of a robotic system that is able to navigate a needle to a target while the patient is in an MRI scanner. My responsibility within the project is to develop a steerable needle that is compatible with MRI and to integrate sensors to provide spatial and force information to the robot and clinician. The project contributes to fast and accurate interventions in patients irrespective of their age or condition, without increasing the burden to the health care system.

IDEA League Doctoral School on Ageing and Sustainability provides a multidisciplinary platform for international students to contribute to a sustainable society in which both working people, children and elderly can be healthy, happy and prosperous. I am very enthusiastic to learn from fellow PhD students and work together on this socially relevant topic. In my free time I like to sail in my small boat, to play (beach)volleyball or go skiing. During holidays I like to make trips all over the world to learn about other cultures.

Christian Morten Jens, Norway
PhD student in Technical Themodynamics at RWTH Aachen University

My personal interest in thermodynamics was born during my graduate studies, where I learned the hard way that the laws of thermodynamics cannot be beaten. This is an important realization, as these laws govern the way we utilize our energy. Therefore, shaping a sustainable future depends heavily on our proper understanding and implementation of thermodynamics. This is something that motivates me and, in my eyes, make my subject highly interesting. The same motivation drove me to apply for this Doctoral School, as I am convinced that thermodynamics can have an important application outside the traditional disciplines where it is used today. I also value the possibility to exchange ideas and thoughts with peers, within an interdisciplinary framework.

A few words about myself, since moving to Germany, my goal has been to experience as much as possible of Aachen and its surroundings, for example, I can recommend visiting Dusseldorf with its excellent Asian food.

David G. García Munzer, Colombia
PhD student in Biologics at Imperial College London

I work in population balance modelling in cell systems. The use of mammalian cells as hosts for the production of high value biologics products has growth rapidly due to their versatility. Monoclonal antibodies are among the most important products in the biopharmaceutical industry but factors such as the large infrastructure investments, high cost and time consuming of experimentation directly affect the competitiveness of using mammalian cells as a production platform. By modelling the biological system, we aim to systemically and quantitatively study these complex systems. Therapeutic biologics (e.g. MAbs), are used in a wide range of applications, from diagnostic up to medical treatments. The programme offers an exceptional opportunity to evaluate the impact of our work beyond the scope of science. We are frequently immersed in our area of study and we are rarely able to get out of our comfort zone and learn from enriching experience such as this one. In my free time, I like to practise sports and travel. I started actively running a few years ago, and currently I’m preparing my 2nd marathon.

Annetje Guedon, The Netherlands/ France
PhD student in Biomechanical Engineering at TU Delft

The goal of my PhD research is improving patient safety and efficiency during the surgical process in hospitals. My interest lies in the use of technology in healthcare. I am convinced that the challenges we will face in the future in healthcare can be overcome by the right combination of technology, research and usability. Ageing is one of the main challenges in healthcare in the next decades and will be an evident theme of work in my career. I am looking forward to working among people with different cultures and backgrounds. Through this doctoral programme, I hope to gain insights from other fields of expertise in the future of healthcare. Outside working hours, I enjoy taking modern dance classes and windsurfing on the cold Dutch waters. Having good meals and spending time with my family and friends also belong to my favourite occupations!

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Architecture is all about planning the functionally, ergonomically and aesthetically optimal space for the anticipated inhabitants. Barrier free design is a big topic in architecture, but the creative possibilities and tasks do not end here. My research topic, ambient assisted living, deals with enhancing space by technology in such a way that it supports the people living in it. I am investigating in the relation of ambient assistive technology and architecture. I find this especially exciting, because on the one hand, ambient assisted technology promises great enhancements for inhabitants, while on the other hand it opens up amazing possibilities for architecture in various ways. Feeling that there is a lot we can learn from a society that is already encountering the demographic problems that we face in the near future, I want to collaborate with Japan for a long time. This programme promises to enable me to foster scientific connections to Japan. I spend my free time doing digital photography, but also engage in traditional crafts like creating copper plate prints. I love to cook (and eat) and host a website on recipes. As for sports, I like swimming, skiing and mountain biking.

When I started my education in Computer Engineering, I was fascinated by the huge amount of opportunities to develop technology for the well-being of people. Joining as a PhD researcher in the group of Interactive Intelligence at TU Delft was the natural outcome of my interest in human computer interaction. My research project envisions an automatic system, which can assess the negative affective state of elderly, just relocated in care centers, and act adaptively to improve it through lighting. Improving the quality of life of elderly aligns with the ultimate goal of the IDEA League Doctorate School, towards a society that can tackle the challenge of meeting the needs of this constantly growing part of the population. I expect that my participation in the Doctoral School will provide new insights regarding the improvement of the quality of life of elderly and allow me to approach the topic working with other researchers at the boundary of different disciplines. In my leisure time I enjoy dancing tango and acting in amateur drama groups. I also like travelling frequently and meeting new people.
IDEA League Doctoral School - Societies in Balance?

Students

After finishing my studies in Biotechnology at the RWTH Aachen and successfully carrying out my master thesis in the field of Nanomedicine at The Scripps Research Institute in California, I pursued a PhD in molecular imaging. This highly interdisciplinary field at the interface of medicine, biology, chemistry and engineering, has a major impact on realizing earlier and more precise diagnosis, as well as safer and more effective treatment for a number of diseases, such as cancer, neurological and cardiovascular disorders. With the ageing of society and the increasing demand for health care, the importance of optimizing the effectiveness of health care systems, in the medical and economical aspects will escalate significantly. Personalized medicine holds great promise for meeting this challenge. I believe the IDEA League programme in Ageing and Sustainability is a fantastic opportunity to reflect and analyze today and future societies and health care systems. Hence, it can help to understand the requirements for medical progress and identify the barriers that might hinder the transition of modern technology. In my free time I like to travel and learn about foreign countries and cultures. Besides, I enjoy doing sports, for example badminton, surfing and dancing.

Marianne E. Mertens, Germany
PhD student in Molecular Imaging at RWTH Aachen University

In my PhD research project I investigate the influence of musical mood induction on self-perception at a neural (brain) and behavioural level in the context of depression. Developmental aspects of self-perception will be assessed by measuring different age groups. Ageing is one of the big topics in healthcare. I hope that the techniques used in neuroscience will help to get a deeper understanding of (degenerative) diseases and facilitate their treatment. This doctoral programme gives me the excellent opportunity to gain insight into how different disciplines meet the challenge of an ageing society. I hope that the exchange of expertise with people from various professional and cultural backgrounds will inspire us to get a multifaceted idea of how to tackle (future) problems. During my free time, I like to travel around. In daily life, I like sports and meeting with friends for a delicious (self-cooked) dinner.

Sarah Oetken, Germany
PhD student in Neuroscience at RWTH Aachen University
An aging society is not only confronted with “living with an older body”, but also it requires enormous resources. Arguably with the growing and aging population, the challenges in this century are to provide clean water and safe food, sustainable energy and to confront climate change.

In that context, my studies are concerned with two age-related topics:

1. To develop an organocatalyst to reverse the formation of carboxymethyl-lysine: a compound believed to be one of the major contributors to ageing-related diseases.
2. To study C-H functionalization reactions: transformations that can put functionality directly into a molecule by replacing hydrogen. If this could be done in a selective economical fashion it could have wide impact across a variety of industries, ranging from energy related to agriculture and pharmaceuticals. I am interested in participating in the programme because it offers me a unique opportunity to learn about the challenges we are facing today, and because I believe it could be a great place to find inspiration and perhaps new multi interdisciplinary collaborations.

In my free time I like to travel, hike or just relax in front of the TV.

My research is focused on technology acceptance in different fields. From the very first beginning of my Ph.D, I was fascinated by the fact that the results of technology acceptance research can in a way mirror our society. Learning more about the why and when people at different ages and gender are using technology or not, enables a special glance on mental models, prevailing attitudes and habits that are forming and influencing current society.

My research can help to design solutions for a future society with respect to the needs and demands of the people living in it. I applied for this programme because it is a great chance to get in touch with young researchers of different disciplines and nationalities to discuss possible answers to the challenges of demographic change. In the context of the programme the mixture of an interdisciplinary team is additionally increased by the combination of researchers from the best technical universities in Europe. I am convinced that ageing in Europe is a challenge, which cannot just be solved in form of a single-country-solution. Particularly in the current context, it can be a chance to work on societal solutions across the boundaries of countries and from my point of view joint research can be a starting point for sustainable structures and approaches.
I am a PhD student in the Biomechanics group of the Department of Mechanical Engineering, Imperial College London. My group is involved in a variety of projects that apply engineering techniques in order to come up with new solutions for the debilitation and pain caused by joint injuries and diseases or as a natural symptom of ageing. We are particularly interested in the development of new joint replacements aimed at helping patients, particularly elderly patients, maintain a good quality of life. My research deals with studying the biomechanics of the ankle joint and the currently available total ankle prostheses, with the ultimate aim of developing a novel ankle implant to replace the natural joint. My project draws its motivation from the fact that today, an increasing number of individuals need to rely on prosthetic joints including ankle replacement prostheses, in order to remain physically active throughout their mature years. In my free time I enjoy hiking around England, swimming in the Imperial Sports Centre, and ballroom/Latin dancing at the Imperial Union Dance Society.

Shannon Lydia Spruit, The Netherlands
PhD student in Ethics and Technology at TU Delft

Coming from an interdisciplinary background in bio-medical sciences, anthropology and philosophy I have always been interested in the interplay of technological, social and political issues. Solving these issues does not require ‘simple’ disciplinary solutions (if they ever exist) but complex, creative and equally fascinating problem solving. Currently, I am part of a larger project that conceptualises new technologies as social experiments. In this project I examine the way in which nanotechnology can responsibly be introduced to society. Many of the applications of nanotechnology are in medicine. These new technologies create opportunities to increase working age, quality of life in elderly as well as for life extension. This might have many positive effects on the way we age, but will likely have a dramatic impact on our societies (both in positive and negative way). For instance, life extension will change the way we organise our labour market and pensioning system. Therefore, it is important to reflect on technological innovations that increase vitality and ageing; do they necessarily lead to a better society or only increase societal and environmental demand? To take my mind of all this serious stuff I love to cook, play with my cats and watch David Attenborough documentaries.
I find the human body – and the brain in particular – fascinating: despite decades’ worth of research, the understanding of something as simple as movement control still eludes us. My research focuses on analysing typical human movement during normal life to infer how the brain selects motion patterns. This can then readily be compared with data from elderly or movement impaired people to quantify changes in mobility, ultimately allowing us to design an environment in a way which minimises their effort along with the necessity and cost of care. I’m interested in working with people from various backgrounds on a central issue of our time, and the intellectual challenge of measuring the impact and possible mitigation strategies of an ageing population by drawing together fundamental and applied research in areas as far apart as medicine and biomedical engineering, finance, economics, civil engineering, sociology. In my spare time, I actively play water polo and enjoy sports like hiking and diving. As well as the cultural aspects of travel, I relish the culinary traits which I eagerly try to replicate myself for friends at dinner parties.

Andreas Thomik, Germany/Italy
PhD student in Bioengineering at Imperial College London

I am researching the use of eHealth and mHealth modalities and their potential application in cardiovascular disease. The area is innovative and exciting with much potential for patient benefit. My goal is to learn from excellent researchers to be able to contribute meaningfully to future knowledge and development. Cardiovascular disease is challenging health care systems worldwide due to changing demographics and lifestyles. The disease is eminently preventable through risk factor modification, irrespective of location or culture. Older populations are becoming more technologically savvy and this will become more so in the future, opening a myriad of possibilities to improve patient outcomes and reduce disease burden. I applied for this programme because it is cross discipline, transcultural and will enable first hand learning from communities grappling with similar issues. It fosters innovation by opening new horizons and enables knowledge transfer from one area to another, in a unique programme that will bring together an interesting and eclectic community.

I am a physician and a clinical teacher, which I find fulfilling. I also enjoy swimming, classical music, travelling and walking holidays with my family.

Myra K. Tilney, Malta
PhD student in eHealth at Imperial College London
My PhD project is a bio-mechanical project which deals with amputee people locomotion and aims at increasing autonomy of amputee people by providing new prosthetic components and rehabilitation protocols. My project will help improve the integration of disabled persons into society, which currently is a major social issue. The topic of ageing is part of my PhD project as the characterization of gait of asymptomatic elderly people is necessary to have a gold standard of the functional level to reach and as the main etiology of lower limb amputation is peripheral vascular disease.

I applied to this doctoral programme both for its topic and for its framework. It is a great opportunity to study the topic of ageing with a larger approach (not only limited to healthcare and integration) with students from different fields and countries. In addition, as the programme lasts over two years it offers a chance to create relationships with the other recruited PhD students in the other countries. Moreover, the programme offers the opportunity to visit other laboratories in Europe and in Japan.

In my personal life I travel a lot and I am very curious to know other cultures. Besides I like dancing, snowboarding and cinema.

With my medical background, working as a veterinarian in an interdisciplinary field of biomedical engineering, it is a great challenge to transfer the know-how of physiological processes into biomechanical concerns. In my current research, the animal takes a role of a coupling element between forward-looking research and human health. Osteoporosis, which is characterized by the loss in bone resulting in an increased fracture risk, is a major health problem affecting about 75 million people in the US, Japan and Europe and is associated with the cost of about €36 billion. Often patients do not fully recover after a fracture and remain disabled or bedridden for the rest of their lives. Appropriate treatment of osteoporotic fractures is challenging, as the poor bone quality demands special implants and augmentation procedures. Therefore, new insights and treatment options are a persistent need to improve bone quality in osteoporotic geriatric patients. I experience every day at our institute, it is both fulfilling and challenging to work in a team of researchers with different backgrounds and areas of expertise. Sharing knowledge and enthusiasm one’s field of interest is my daily motivator. I love travelling and outdoor activities such as running and horseback riding.

**Students**

**Coralie Villa, France**
PhD student in Biomechanical Engineering at ParisTech

**Marcella von Salis-Soglio, Switzerland/ Germany**
PhD student in Biomechanics at ETH Zurich
Joost Verhaar, The Netherlands
Postdoc in Public Administration and Sociology at TU Delft
I have a background in both public administration and sociology. Since four years now, I work as policy advisor at the department of Strategic Development at TU Delft. As part of this position, I am the secretary of the Delft Health Initiative. The Delft Health Initiative is an interfaculty platform of scientists, engineers and designers that seek solutions to emerging challenges in our healthcare system. As a secretary, my contribution is to help organise all activities and to help to focus the university strategy, with a focus on ‘health’ (research, education, valorisation).
Together with the very strong academic and medical institutes in Leiden and Rotterdam, the TU Delft initiated Medical Delta. Recently ‘Vitality’ is chosen as a new ‘strategic area’ for the ‘Medical Delta’ organization. ‘Ageing’ is an important aspect of the vitality-programme. By now some initial preparations have taken place, but after summer 2012 the programme will start officially. I am involved in this collaboration as well.
In the programme, I will work both on my own project/topic and also in fulfilling co-ordinating tasks.

Gary Wills, UK/USA
PhD student in Statistical Mechanics at Imperial College London
I have always found satisfaction in applying mathematical techniques to solve a variety of problems. To date I have largely developed my mathematical ability by applying these techniques to physical systems but I remain aware of the amount of other fields in which quantitative scientists work. Ageing will no doubt also require the input of many mathematicians, physicists and engineers to ensure the numbers add up. This will largely focus on the economics of the problem. It is my hope to be able to apply my mathematical ability to test the viability of potential government solutions. While there will no doubt be demand for people with my skillset in this field in the future, how to get involved in such careers is by no means straightforward. Thus I am hoping to gain insight in how to pursue such a career by attending the Doctoral School in Ageing. Finally, alongside mathematics and physics, my interests include: travel, boardsports (mainly wakeboarding and snowboarding), music (largely electronic) and global affairs.

Britta Worringer, Germany
PhD student in Clinical and Cognitive Neurosciences at RWTH Aachen University
During an earlier research project, I assessed that one of the core deficits that affects most neuropsychological deficiencies in elderly is the ability to multitask. For this reason, I decided to further investigate the issue of human multitasking on a neuro-psychological level. Based on a meta-analysis in which I could extract brain regions of interest, I am currently trying to modulate dual-task performance by using Transcranial Direct Current Stimulation and Transcranial Magnet Stimulation. My goal is not only to show a causal relationship between the activation of brain regions and performance, but also for the future to develop a training or intervention method aiming to preserve the ability to multitask in elderly. Furthermore, I hope that based on my research we can initiate a better realization of environmental adaptation on diminishing cognitive abilities in elderly. Being part of the IDEA League Doctoral Programme on Ageing, I am convinced to get inspired for further research, as well as being able to consider the implementation of a business plan to start an entrepreneurship. In my free time I am an avid runner and tennis player. I also enjoy travelling and getting to know different countries, cultures and people from all around the world.
Joost Verhaar, The Netherlands
Postdoc in Public Administration and Sociology at TU Delft

I have a background in both public administration and sociology. Since four years now, I work as policy advisor at the department of Strategic Development at TU Delft. As part of this position, I am the secretary of the Delft Health Initiative. The Delft Health Initiative is an interfaculty platform of scientists, engineers and designers that seek solution to emerging challenges in our healthcare system. As a secretary, my contribution is to help organise all activities and to help to focus the university strategy, with a focus on ‘health’ (research, education, valorisation).

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In the programme, I will work both on my own project/topic and also in fulfilling co-ordinating tasks.

Students
Martina Ziefle is a professor for Communication Science and Head of the eHealth research group at the Human Technology Centre (HUMTec) at RWTH Aachen University. Her research addresses the human factor in different technology types and using contexts. Technology acceptance decisively depends on the extent to which user diversity is considered and implemented in technological design. A special research focus is directed to the design of medical technologies. Here, the identification of users’ specific needs as well as affective barriers towards new technologies are essential in this sensitive field. In addition to teaching and directing research in HUMTec, she leads various projects funded by industrial and public authorities, dealing with the interaction and communication of humans with technology.

Since 2006 Ulla Bidian is the Secretary General of the IDEA League, the head of the IDEA League office and a member of the Operational Board. She was involved in the development of this Doctoral School from the very beginning when the first concepts were scrutinized. For this pilot programme the IDEA League office acts as the organizer, with the programme content developed in close co-operation with the Scientific Board. Dr. Bidian will take part in all modules, in order to analyze the programme for future development. She is currently exploring options to secure the financing of further programmes for the Doctoral School. Together with the Chair of the Scientific Borad Martina Ziefle, she will represent the IDEA League universities while in Tokyo.
Lefkos Middleton
Professor in Clinical Neurology at Imperial College London

Peter Edwards
Professor for Integrative Biology at ETH Zurich

Peter Edwards is a full professor of Plant Ecology at ETH Zurich and Director of the Geobotanical Institute since September 1993. He directs the research group for community and ecosystem ecology. His research concentrates on ecosystems and large scale ecological processes which cover large areas. Many of his projects focus on the application of ecological research to environmental concerns. He has written over one hundred articles and three books, for the most part, dealing with such topics as the nutrient cycling in ecosystems, the interaction between plants and herbivores, plant ecology in river ecosystems, and the application of GIS in ecology.

As ETH coordinator for the Alliance of Global Sustainability he was involved in several interdisciplinary activities related to sustainability, including the impact of the ageing society.

Lefkos Middleton is a professor and the Head of the Division of Neuroscience and Mental Health and Honorary Consultant Neurologist, Imperial College Healthcare NHS Trust Hospitals. In years 2005-2008, he served on Medical Research Council. He has been an Honorary Consultant to the OECD Biotechnology Unit and has served on numerous academic and professional Boards and Committees. His current research focus is in the genetic epidemiology of neurodegenerative diseases of ageing (Alzheimer’s disease and Parkinson’s disease) and Amyotrophic Lateral Sclerosis. He is the author of 103 peer review papers, 14 book chapters and reviews. He has delivered more than 250 lectures and oral presentations in international scientific and medical conferences and universities, worldwide.

Scientific Board
As an expert in medical imaging Professor Skalli is interested, for example, in neuro-imaging techniques allowing to observe the brain. This research is opening perspectives on some items that were unexpected, not only regarding organic diseases but also about the way the human brain and thoughts actually function. Another research area of interest is ultrasound elastography, which allows to measure tissue elasticity: it is a key issue for the clinical diagnosis of certain diseases, cancers in particular. Finally, there is an extensive research on the skeleton, which is now enabling significant advances in our understanding of ageing mechanisms, or of other pathologies such as scoliosis. She and her team are currently working on 3D modeling of a skeleton.

Lucas van Vliet is the Director of the Delft Health Initiative at the TU Delft, leader of the Quantitative Imaging Group and Head of the Department Imaging Science & Technology. He is on the Board of the International Association for Pattern Recognition (IAPR), the Dutch graduate school on Computing and Imaging (ASCI), and Medical Delta. He works in the field of multi-dimensional image processing, image analysis, and image recognition. He is the (co)author of more than 200 peer-reviewed papers. He applies his research in biomedical applications ranging from single molecule fluorescence microscopy through Computer Aided Diagnosis (CAD) in medical imaging for specific diseases. Some of his initiatives include electron tomography of frozen biological phase-contrast X-ray imaging in medicine, attenuation and phase separation and CTF correction.
Anaïs Sägesser, Switzerland
ETH Zurich
Coach in the IDEA League Doctoral School

My background lies in business with specialisation in technology & information management and intercultural technology adoption. I also bring insights to the fields of comparative religious studies, environmental sciences and practical experience in business engineering, project management and business coaching. Next to my studies and research activities I have worked in management consultancy and related sectors mainly in the financial services industry. Today, I manage and own a limited company specialised in consultancy services and am acting as deputy director & entrepreneurship lead of Climate-KIC Switzerland. My passion lies in empowering people to address societal challenges while providing the framework and skill set to use entrepreneurship as one of the tools to foster change.

Claudia Zingerli, Switzerland
ETH Zurich
Coach in the IDEA League Doctoral School

I am a geographer by background with specialisations in the fields of development studies, political ecology, environmental policy, and knowledge brokerage at interfaces between science, society, industry and practice. Next to my research activities I have been involved in the conceptual design and implementation of innovative teaching and learning formats and courses at ETH Zurich. Today I am a lecturer and scientific co-ordinator in the Competence Center Environment and Sustainability and Climate-KIC Switzerland. I am also acting as the Executive Manager of the Swiss Association for Environmental Research and Ecology (SAGUF). My passion is to bring people from different backgrounds and domains together and to support them in the co-production of knowledge and innovation for sustainable development.

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Coaches

Lucas van Vliet
Professor in Quantitative Imaging at TU Delft

Lucas van Vliet is the Director of the Delft Health Initiative at the TU Delft, leader of the Quantitative Imaging Group and Head of the Department Imaging Science & Technology. He is on the Board of the International Association for Pattern Recognition (IAPR), the Dutch graduate school on Computing and Imaging (ASCI), and Medical Delta. He works in the field of multi-dimensional image processing, image analysis, and image recognition. He is the (co)author of more than 200 peer-reviewed papers. He applies his research in biomedical applications ranging from single molecule fluorescence microscopy through Computer Aided Diagnosis (CAD) in medical imaging for specific diseases. Some of his initiatives include electron tomography of frozen biological phase-contrast X-ray imaging in medicine, attenuation and phase separation and CTF correction.

Wafa Skalli
Professor of Biomechanics at Arts et Métiers of ParisTech

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Module 1
## Module 2

### Sun, 11 Nov 2012
- **07:30**: Arrival
- **08:00**: Introduction
- **08:30**: Overview
- **09:00**: Transport
- **09:30**: Learning about Japan
- **12:00**: Lunch

### Mon, 12 Nov 2012
- **07:30**: Introduction
- **08:00**: Overview
- **08:30**: Transport
- **09:00**: Learning about Japan
- **15:00**: Coaching
- **18:00**: Dinner

### Tue, 13 Nov 2012
- **07:30**: Indorduction
- **08:00**: Overview
- **08:30**: Transport
- **09:00**: Exchanging ideas with TokyoTech
- **15:00**: Coaching
- **18:00**: Dinner
# Module 2

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<thead>
<tr>
<th>Date</th>
<th>Introduction</th>
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<th>Transport</th>
<th>Learning about Japan</th>
<th>Coaching</th>
<th>Free time to explore Japan</th>
<th>Exchanging ideas with Tokyo University</th>
<th>Lunch</th>
<th>Networking with Tokyo University</th>
<th>Coaching</th>
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- **Blue** = Networking
- **Dove** = Site Visit
- **Green** = Logistics
- **Red** = Coaching
- **Yellow** = Science
### Module 3

**IDEA League Doctoral School - Societies in Balance?**

**Fri, 18 Jan 2013**
- 07:30: Breakfast & Transport
- 08:30: Welcome
- 09:00: Coaching
- 09:30: Transport & Lunch
- 10:00: YES Delft
- 11:00: Transport
- 12:00: 3 ME at TU Delft
- 13:00: Dinner
- 18:00: Lunch
- 18:30: Blue=Networking

**Sat, 19 Jan 2013**
- 07:30: Breakfast & Transport
- 08:30: Coaching
- 09:00: Transport & Lunch
- 10:00: Field Trip
- 11:00: Inspiration Talks I-III
- 12:00: Lunch
- 13:00: Dinner
- 18:00: Lunch
- 18:30: Dove=Site Visit

**Sun, 20 Jan 2013**
- 07:30: Breakfast & Transport
- 08:30: Pitching
- 09:00: Transport & Lunch
- 10:00: Transport & Lunch
- 11:00: Transport & Lunch
- 18:00: Dinner
- 18:30: Green=Logistics
- 19:00: Red=Coaching
- 19:30: Yellow=Science

**Notes:**
- Blue=Networking
- Dove=Site Visit
- Green=Logistics
- Red=Coaching
- Yellow=Science
Module 4
Combating Ageism

Louise Connell, Annetje Guedon, Anne Schaar

IDEA League Doctoral School - Societies in Balance?

Initially, our group was interested in creating an awareness campaign to address the issue of ageism throughout Europe and tackle the problem of group thinking (“them and us”) that leads to discrimination between the generations and an inherent segregation in our society.

However, during our research, we discovered that the problem was much larger than we expected: Our research revealed that starting a campaign would be difficult, because an awareness of ageism is not currently a priority in EU policy and legislation. We found that legislation was limited to age discrimination within the workplace and did not address wider discrimination leading to isolation and loneliness, abuse, and ill health.

Consultation with advertising and marketing companies led us to understand that we would need considerable backing from governmental bodies, charities and private foundations if we were to undertake the sort of awareness campaign we envisaged. We realised that there was a gap in policy making that first needed to be filled. We finally decided that our project would involve writing a policy paper collecting the considerable research carried out and link it to potential solutions. This would form the basis of governmental lobbying to highlight our cause.
Combating Ageism

... is an image campaign.

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Combating Ageism

Louise Connell, Annetje Guedon, Anne Schaar
Combating Ageism

Louise Connell, Annetje Guedon, Anne Schaar
Combating Ageism
Louise Connell, Annetje Guedon, Anne Schaar
... is a photo and emotion sharing social network to connect generations.

We learned that loneliness is linked to serious health problems and death among elderly. We identified that the differing communication styles between the old and the young is a major contributing factor. The elderly rely on written letters, the telephone or face-to-face communication, while the young are additionally connected via mobile technology, social networks such as Facebook and Twitter or InstaGram. This technology gap has lead to intergenerational communication breakdown. We propose a novel tool to bridge this technology gap without the elderly having to learn complex computer interfaces.

Our application InstaGran targets both the elderly and young. Young people can integrate InstaGran into their daily routine, sharing pictures and messages from their mobile devices. This fits with their communication style, but now, via InstaGran they can send them to their grandparents too. The elderly receive pictures via InstaGran in their living room on a digital picture frame or any cheap (<€100 ) or “hand-me-down” tablet. The point being that it does not need to be an expensive powerful device. A one-button user interface makes InstaGran usable for elderly, whereas younger people can extend and customize InstaGran by purchasing photo filters, effects and new features. We hope to use the baby boomer generation as ambassadors for our product because we believe they will want to promote interaction between their parents and children, they hold significant purchasing power and they are sufficiently tech savvy to appreciate the concept.

InstaGran allows the elderly to break into the modern communication styles without learning complex user interfaces. InstaGran allows the young to keep in regular contact with their elderly relatives, strengthening these relationships. InstaGran is a simple communication bridge between young and old to combat loneliness in old age.
InstaGran
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Application Development Steps

1. The Idea (All team members)
2. Functionality Layout (Kai)
3. Design (Philipp & William & Kai)
4. Going Live (William and Asli)
   - iTunes & Google accounts for Instagram (check the Trademark approval)
   - Check the agreements with 3rd parties

InstaGran
William Abbott, Asli Boru, Philipp Brauner, Kai Kasugai
InstaGran
William Abbott, Asli Boru, Philipp Brauner, Kai Kasugai
InstaGran
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Studies have shown that 40% of the patients do not take their medication correctly giving rise to the major problem of 'Medication Adherence' leading to further medical complications amongst patients and higher healthcare costs to the society. To address this problem which mainly affects the chronically ill and the elderly population, our team consisting of Andreas Thomik & Marianne Mertens (Biomedical Engineers), Myra Tilney (Physician), Sarah Oetken (Clinical Sciences) and Tisham De (IT) aim to launch a streamlined medication service through an integrated medical drug dispensing system (including central and portable devices) combined with an e-journal/record system.

Our product called Medical Monitoring system - MeMo, will be created and designed in such a way that it will be easy and intuitive to use, with aesthetically designed user interface and will be smart enough to address the most persistent questions often asked by the patients and their relatives like – Why do I take these pills? Are these pills safe? What are its side effects and most importantly what is my medical history? This is where MeMo will step in to provide a state-of-the-art solution and easy to understand interface for the patients, their care-givers, doctors, pharmacists and also the health insurers.
... is an e-journal system helping to keep track of taking medication.

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A Global & Worsening Problem

Prevalence of multi-morbidity by age and socioeconomic status

Tackling the Problem

Supportive doctor in the loop

Safe responsible data block

Intelligent automatic record

Personal up-to-date information

Educative easy understanding

MeMo Intuitive Medicine

MeMo Tisham De, Marianne Mertens, Sarah Oetken, Andreas Thomik, Myra Tilney
MeMo
Tisham De, Marianne Mertens, Sarah Oetken, Andreas Thomik, Myra Tilney
One of the most difficult challenges our ageing society faces is the increasing dependency of non-working individuals on the working population, result of increased life expectancy and expected retirement. This situation is likely to become even harder in the near future, posing major difficulties for the Western society to remain socially and economically sustainable.

Sensei agency aims to re-integrate post-retirement-aged individuals in existing working environments. Our objectives are to encourage the re-establishment the value of elderly in society, to facilitate their social integration and to help combating the dependency ratios between non-working and working populations. Additionally, we aim at enriching various job sectors (e.g. engineering and healthcare) with a highly competent and experienced workforce, which holds precious knowledge, expertise and a tremendous (currently under-used) potential. In this way elderly can contribute not only to economy, but also to younger generations. In order to achieve these aims, we plan to offer flexible contracts for retirees who wish to continue working, and also to create ‘retiree-friendly’ jobs in which experience makes a difference.

We at Sensei (the Japanese for a teacher or mentor) firmly believe that these would help bridging generations, while keeping the society socially and economically sustainable.
Sensei Agency
... is an employment agency for the elderly generation.

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Jens Morten, Italo Sanhueza, Ran Sopher, Shannon Spruit, Britta Worringen
Sensei Agency
Jens Morten, Italo Sanhueza, Ran Sopher, Shannon Spruit, Britta Worringer
... is a new technology for compression stockings. Compression stockings provide pressure to the legs to avoid fluid accumulation and to prevent the occurrence of and guard against further progression of venous disorders. In 2004, 225,000 people (1.5%) in the Netherlands wore compression stockings. Of these people, 15% is dependent on home-care for putting them on and taking them off. That means that every morning and every night a professional care taker has to come to their homes to help them with this physically strenuous task. In the future, less health care professionals will be available, while the number of people that wear compression stockings will increase.

Shape-on aims at improving the user-friendliness of compression stockings and its solution is twofold. The first product is a devices that aids in putting currently available stockings on and off. The second product are shape memory stockings that shrink around the user's legs after heating them. These stockings will not only make it easier to put on and remove the stockings, but also improve the comfort and esthetics. In addition, the physical burden of health care providers as well as the financial burden to society will be relieved.
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Shape-On
David Garcia, Kirsten Henken, Coralie Villa
A tech-savvy elderly generation is at the basis of technological devices and services that help overcome the hurdles of ageing. Due to ongoing demographic changes, it appears inevitable that healthcare will shift to preventative solutions which will include more healthcare technology in the home (as for example the IDEA League students got to see at Fujitsu in Tokyo). The elderly generations however are the group least familiar/confident with such technology. Our hypothesis is that if our target group were able to use everyday technology such as smartphones, they would be more likely to use/accept these solutions. Thus regulation is required to coax manufacturers into designing such products. The best way to do this is in form of financial incentives. Thus our group proposed setting up a council to review applications for such grants from potential manufacturers of such products. As the scheme would have to be funded by public money, we also devised a method of evaluating the success of the scheme after a few years to justify continued funding and decide whether the initial hypothesis was correct. We carried out an initial survey with a group of elderly people in Germany and received largely encouraging feedback. Thus we are confident of the potential of the scheme and our next step would be to gauge whether manufacturers might be interested as well.
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they would be more likely to use/accept these solutions. Thus regulation is
required to coax manufacturers into designing such products. The best
way to do this is in form of financial incentives. Thus our group proposed
setting up a council to review applications for such grants from potential
manufacturers of such products. As the scheme would have to be funded
by public money, we also devised a method of evaluating the success of the
scheme after a few years to justify continued funding and decide whether
the initial hypothesis was correct. We carried out an initial survey with a
group of elderly people in Germany and received largely encouraging
feedback. Thus we are confident of the potential of the scheme and our
next step would be the gauge whether manufacturers might be interested
as well.
Tech-Savy Elderly
Shirley Beul, Christina Katsimerou, Gary Willis
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IMPRESSIONS - Photos
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IDEA League Doctoral School - Societies in Balance?
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IDEA League Doctoral School - Societies in Balance?
„Ageing involves much more aspects than I could think of (social, economic etc). Great ideas are not enough - they have to be translated into practice. And that is exactly what we are learning here. “

„The human factor should always be considered when creating and developing new technology.”

„Ageing has an impact on almost every sector of our society.“

„The doctoral school has helped me think outside my subject a lot more. It has been a long time since I last thought about ethics/culture/demographics.“

„Peter Edwards - Great overview on the topic of ageing + enthusiastic speaker.“

„Only universities are divided into disciplines, the world is multi-interdisciplinary by nature.“

IMPRESSIONS - Testimonials
“The trip to Japan really brought the ageing problem to life for me. It showed me what it means for a society to age (both positive and negative). Being away in a strange environment makes you reflect on your own country (e.g. healthcare systems, solidarity, justice) and situation.”

“I feel it is a great initiative. It brings people of diverse background together and expose us to a new challenging environment. It is definitely a great opportunity!”

“If you want to create or shape leaders you need to expose them to different societies.”

“My stereotypical view of Japan culture has been completely overturned. I have seen a completely different side from the one that European media projects.”

“The coaching is very well guided.”

“Impressions - Testimonials”

The programme was precise, yet fully packed.”

The doctoral school has helped me think outside my subject a lot more. It has been a long time since I last thought about ethics/culture/demographics.

Only universities are divided into disciplines, the world is multi-disciplinary by nature.

Ageing has an impact on almost every sector of our society.

Ageing involves much more aspects than I could think of (social, economic etc). Great ideas are not enough - they have to be translated into practice. And that is exactly what we are learning here.

The human factor should always be considered when creating and developing new technology.
„The week in Tokyo was a very interesting experience. While some talks and presentations just contributed to a holistic view of an ageing society, others will directly influence my research. “

„Organization was perfect!“

„The lectures were very inspiring. “

„Tokyo was especially important for teambuilding and networking within our groups. “

„I have learned that addressing societal problems cannot be achieved by only developing new methods, technologies and services, but that cultural aspects have always to be taken into account. “

„In Tokyo we learned that it is unpopular for Japanese to study outside Japan and it would be great to create incentives for Japanese students to do a project in Europe/one of the IDEA League universities. “
“The most interesting thing is the willingness of elderly Japanese to share with us, what they do. They welcomed us very nicely and answered our questions.”

“It was great that the students rather than the supervisors presented the projects.”

“It is quite interesting to see how in Japan they are approaching the ageing problem both from an organization point and integrating the elderly in society.”

“Great time with amazing people of so much relevant input for my further career and personal development.”

“The programme was well balanced and we saw a good amount of different projects, both from industry and research.”

“The programme in Tokyo was very educational and really got me thinking about the topic of ageing and sustainability. If I were the scientific board of IDEA, I would expect more and more specific output, because the programme goes much deeper than just personal growth.”

IMPRESSIONS - Testimonials
Societies in Balance?

The Age of Ageing is Arriving!

Doctoral School on Ageing and Sustainability

IDEA League

A focussed network of leading European Universities

of science and technology

Education, Research and Innovation for a better and sustainable future!

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