TWENTE GRADUATE SCHOOL
IGS GRADUATE SCHOOL

UNIVERSITY OF TWENTE.
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As a consequence of demographic, social and economic trends securing the prosperity, health, safety, education and social participation of citizens becomes an ever more daunting task. Moreover, at a macro level, our societies in a European and global context have to meet the needs for sustainable economic growth, careful use of natural resources – e.g. energy, water, clean air – and a just and peaceful international order.

In meeting these societal challenges new, smart technologies hold great promise. But this promise will only be realized if such advances are adopted responsibly and when innovators are responsive to the needs and concerns of the people who work with, use, or are affected by new technologies. This requires a thorough understanding of the social, economic and political contexts in which such technologies are to be adopted.

IGS aims at enhancing our understanding of the governance and management of the interactions in economic, societal and political arenas. Typically, such arenas include a variety of individuals and organizations, with different responsibilities, coming from different sectors (business, civil society and government) and operating at different territorial scales, ranging from villages, townships and cities to the European and global level. IGS has defined eight research spearheads. These spearheads are both general: Innovation of Governance, Management and Entrepreneurship and Technosciences, and thematic: Water, Smart Cities and Energy, Safety & Security, Health, and Education & Training.

For IGS researchers, understanding the governance and management of economic, societal and political systems is not art for art’s sake. After all the trademark of the University of Twente is: cutting-edge research combined with real-world relevance. Hence, increasingly in collaboration with colleagues from the technological faculties, we seek to develop usable knowledge that contributes to our society’s capacity to respond adequately to its present and future challenges.

Prof. dr. Bas Denters
Leader IGS Graduate School at Twente Graduate School

“IF YOU WANT SCIENCE TO DELIVER FOR SOCIETY, THROUGH COMMERCE, GOVERNMENT OR PHILANTHROPY, YOU NEED TO SUPPORT A CAPACITY TO UNDERSTAND THAT SOCIETY THAT IS AS DEEP AS YOUR CAPACITY TO UNDERSTAND THE SCIENCE”. (NATURE, 1-1-2015, P. 5)
The Institute for Innovation and Governance Studies (IGS) is the institute where social and behavioural scientists establish connections with the other - mainly technical - disciplines at the University of Twente through international research.

Behavioural sciences focus on communication, education and psychology. In these fields the interaction between technology, the individual and society plays a central role. Social sciences study the governance and management of technological and social innovation from a multi-level, multi-actor perspective. Research in social sciences performed within IGS is closely linked to the research in the engineering sciences, such as water management, construction and geo-information science. IGS strives to combine scientific excellence with relevance for our stakeholders in the public and private sector.

IGS is a collaboration of more than 400 researchers in departments in the fields of Management, Governance, Behavioural Sciences, Engineering Technology, and Geo-Information Science.

**Spearheads**

We have formulated eight spearheads that we want to place more emphasis on in our research. These spearheads are partly connected to technological developments and partly with our own core areas. It is our ambition to rank among the top internationally in our chosen spearheads.

The spearheads are:
- Innovation of governance
- Technosciences: studies of emerging technologies
- Management and entrepreneurship
- Water
- Health
- Safety and security
- Education and training
- Energy

These spearheads are embedded within the TGS programmes.
The transition towards more efficient forms of (public) organization and the effectiveness and public acceptance of innovation in public governance are increasingly important for economic prosperity and for meeting the grand social challenges facing European societies. These issues have been identified as key research themes on the social sciences research agenda for the next decade.

In the programme, social and technological innovations are studied in research areas for which the University of Twente social sciences research groups have established a reputation of excellence Democratic Governance, Social Policy, Safety and Security Management, Construction Management & Engineering.

The aim of the Innovation of Governance programme is to provide a better understanding of the logic of successful innovations in multi-actor, multilevel systems of public governance. Such an understanding requires a multidisciplinary perspective that is sensitive to the different dominant institutional settings – public hierarchies, economic markets, and social networks – in which the different actors (governments, corporations and third sector organizations) operate. In addition, for many important questions (e.g. regarding citizens’ acceptance of new methods, procedures and technologies or their perceptions of risks and threats), it is also necessary to move beyond an analysis at the level of collective actors and zoom in at the micro-level, where insight into the sociological and social-psychological processes underlying individual reactions is imperative.

Research schools for deepening courses: Netherlands Institute of Government (NIG).

**THE CENTRE FOR RISK MANAGEMENT, SAFETY AND SECURITY**

The Centre for Risk Management, Safety and Security combines education and research on risk management, safety and security at the University of Twente. It offers a portal for questions, requests, knowledge exchange and assignments from all sectors in society. It initiates research on risk management, safety and security and disseminates the findings. The Centre also provides the opportunity for education and training. Visit [www.utwente.nl/safety](http://www.utwente.nl/safety).
GOVERNANCE OF KNOWLEDGE AND INNOVATION PHYSICS

Social, political and economic contexts of techno-scientific innovation cannot be black-boxed. In order to understand the logics and meanings of policy-making and many other societal reactions, it makes sense to develop sensors for multiple perspectives for looking at how knowledge and innovations are perceived, ordered, and managed. Governance of Knowledge and Innovation is positioned at the strategic interfaces of science and technology, higher education, innovation, social and political processes and debates on the future of knowledge-based economies. In this programme, we focus on scientifically challenging research topics that are highly relevant for key innovation decision makers in government, business, NGOs and at universities.

Governance and innovation studies in Twente contribute to interactive governance through improved knowledge-in-policy and democratic, deliberative practices of policy design, implementation, and evaluation. Related themes include forecasting, risk and uncertainty, ambiguity, problem structuring, institutionalization of bias, legitimacy, effectiveness, democratic quality, participation and deliberation and policy networks. Programme graduates work in all sorts of public and private agencies engaged in innovation, research, science, and technology that take thorough reflection, sound research and democratic participation seriously.

Internationally, we are in constant collaboration with social scientists in EU-funded research programmes and research grants from various foreign research councils (including Norway and Germany).

Research schools for deepening courses: Netherlands Graduate Research School of Science, Technology and Modern Culture (WTMC) and education within the 3TU. Ethics of Technology programme.
In today’s world, companies have to innovate in order to survive in the long term. As a consequence, managing innovation has become one of the key strategic tasks facing organizations of all shapes, sizes and sectors. Technological and societal dynamics are mirrored in market dynamics. For incumbent firms, existing value creation patterns need innovation, whereas, at the same time, efficiency is tested in extremely competitive international markets. Entrepreneurs recognize new opportunities, leading to major disruptions in the market. Popular concepts such as the exploration-exploitation dilemma and open innovation indicate that the traditional atomistic approaches of individual organizations are no longer sufficient. In the Innovation & Entrepreneurship research programme we adopt a multi-actor, multi-level perspective to study the processes of innovation, entrepreneurship and new business development. Our empirical base is oriented towards university-industry relations, the high-tech industry, the healthcare industry, and the manufacturing & construction industry with an emerging focus on Services and ICT. The central element of much of our research is the development of new technologies enabling improved value creation.

The main purpose of our research programme is to enhance our theoretical and practical understanding of the organization and management of innovation, entrepreneurial and business development processes and strategies at different levels (i.e. network and firm level).

Research schools for deepening courses: European Institute for Advanced Studies in Management (EIASM).
Water is inevitable for human life as water and water systems serve various functions. For each function we need a certain amount of water of a certain quality. In addition, water systems can serve functions as traffic, recreation, etc. A wide variety of water problems occur, from the supply of drinking water, defence against flooding from the sea, droughts and water scarcity, as well as river environments. At the moment, both natural processes as well as human-related processes are putting increased pressure on water systems. Therefore, we need new ways of solving these problems.

Water problems are multidimensional and complex. Usually several stakeholders are involved and the knowledge of the water systems is to a certain extent uncertain. In this context, both monodisciplinary research, i.e. modelling or measuring techniques to reduce uncertainty, as well as a combined effort from natural science and social science methodologies is needed. We need people who are aware of the breadth of the water scope and who can switch between the traditional approaches and – if necessary - combine them. The UT has the unique combination of technical, scientific and social science expertise on this topic. The magnitude and focus of the UT groups is also such that it makes this graduate school programme work. The students in the graduate programme are educated in a broader and more multidisciplinary environment than merely in their own programmes.

The Netherlands traditionally has a strong reputation for defence against water. Dutch scientists and consultants are often asked to supply expertise in case of water related disasters (Katrina, Tsunami in Atjeh, flooding in Vietnam, water dispute in Iraq and water management in Africa).

Research schools for deepening courses: Netherlands Centre for Coastal Research (NCK), Twente Water Centre (TWC) has an annual PhD best paper award and research school for Socio-Economic and Natural Sciences of the Environment (SENSE).

**THE TWENTE WATER CENTRE (TWC)**
The Twente Water Centre (TWC) is a centre of expertise in the area of water systems and governance. The Centre is unique in bringing together and balancing the natural and social sciences.

To this end, the Centre bundles expertise from various groups located within the University of Twente. Visit [www.utwente.nl/water](http://www.utwente.nl/water)
RESEARCH WITHIN OTHER SPEARHEADS
HEALTH
Health combines expertise in the fields of psychology, epidemiology, economics, medicine, health science and communication science. A design approach is used to deliver innovative interventions and solutions for health promotion and healthcare.
There is a structured PhD programme available within the MIRA institute for students who have studied Biomedical Engineering.

EDUCATION AND TRAINING
Education and Training studies educational developments and the design of curricula and educational programmes. Research on the design of educational programmes focuses on factors that play a role in the productivity and efficiency of the programmes. A variety of research and design methodologies is used to tackle actual issues in the design and evaluation of educational programmes.
There is a structured PhD programme available within the CTIT institute: “Learning in Educational and Training Settings”.

ENERGY
Studies of diffusion of innovations in energy production, distribution and consumption in relation to energy systems. A key assumption is that energy innovations are poorly aligned with current economic, regulatory, policy models and market preferences. A change of energy systems does, however, not only depend on technological innovation. It also involves raising awareness among energy consumers, improved resource management, change of social (and behavioural) practices, preferences, and institutions.

If you are interested in a structured PhD programme within the fields of Health, Education and Training or Energy, please contact Prof. Dr. Bas Denters for more information: s.a.h.denters@utwente.nl

IGS DATALAB – WHERE DATA IS SECURE
Scientists are collecting and analysing an increasing amount of data. This data has to be carefully stored and processed, but it also has to be verifiable for third parties. Datalab is helping researchers to do just that.

Imagine you are conducting research into post-partum depression; at certain moments this means that you have to link together highly personal data from different sources. The law imposes strict requirements on the handling of such data. Not every researcher knows how to process data in accordance with the rules in a manner that can be used scientifically.

Datalab offers an infrastructure of knowledge, software and hardware, which supports science in the broadest sense of the word.

Attention for data policy is important now that data is becoming an increasingly central theme of science. For example, more and more scientific journals want the underlying data presented in articles, so that the research can become replicable. Datalab can create the right format for the data and make them accessible to third parties. In exceptional cases, we can also help with the cleaning up of contaminated data.

Datalab provides information on technical, legal and ethical standards of data policy. Read more on the website: www.utwente.nl/datalab
ADMISSION REQUIREMENTS AND ENROLMENT

THERE ARE TWO WAYS TO ENROL INTO A TGS PROGRAMME. YOU CAN START A MASTER’S DEGREE PROGRAMME AT THE UNIVERSITY OF TWENTE OR YOU CAN START A PHD PROGRAMME IF YOU HAVE ALREADY COMPLETED A MASTER’S PROGRAMME AT THE UNIVERSITY OF TWENTE OR ELSEWHERE.

ARE YOU CURRENTLY A MASTER’S STUDENT?

**MSc**
- You have already obtained your Master’s degree

**PhD**
- PhD research
- Deepening, broadening, academic skills and career development courses, 30 credits

After successfully attaining a Master’s degree, you may enter a Twente Graduate School programme in the PhD phase. PhD candidates may either apply for a PhD position available within one of the research groups or obtain their own funding.

VACANCIES
Unlike in many other countries, most PhD candidates in the Netherlands are paid employees, often working directly for the university. Research projects are defined by the head of the research group, who then recruits graduate students to carry out project research. If a PhD position is offered in a research field of your choice, you are kindly invited to apply to such a vacancy. Vacancies for PhD positions at the University of Twente, including those connected to Twente Graduate School, are published on the vacancies website [www.utwente.nl/vacancies](http://www.utwente.nl/vacancies).

OWN FUNDING
You may also enter a Twente Graduate School programme as PhD candidate with your own funding or with an international scholarship. In that case, research projects are initiated on the basis of proposals submitted by graduate students as part of their application procedure. A professor in a relevant field has to commit himself to the candidate and the proposed line of research.

Before a proposed research plan is taken into consideration, it must be clear that the candidate plans to submit an application for a secured funding scholarship. Please note that the University of Twente is not in a position to offer fellowships or similar funding for PhD candidates, other than the vacancies mentioned above. For information about the documents required for the application see: [www.utwente.nl/tgs](http://www.utwente.nl/tgs).
ARE YOU CURRENTLY A BACHELOR’S STUDENT?

BSc
- You have already obtained your Bachelor’s degree
- Two-year programme with discipline related courses, 120 credits*
- Opportunity to start an integrated MSc/PhD programme in the second year

MSc
- PhD research
- Deepening, broadening, academic skills and career development courses, 30 credits

PhD
- You have already obtained your Master’s degree
- PhD research
- Deepening, broadening, academic skills and career development courses, 30 credits

*Some of our Master’s programmes are one-year programmes (60 credits).

If you currently are a Bachelor’s student or have recently obtained your Bachelor’s degree, and are interested in pursuing a PhD through one of the structured research programmes TGS coordinates, have a look at the Master’s programmes involved.

Talented students can write their PhD proposal as part of their Master’s degree programme. For more information about the Master’s programmes, the admission requirements, and the tuition fee have a look at: www.utwente.nl/master.

ADDITIONAL INFORMATION
If you would like more information about Twente Graduate School, please go to the TGS website: www.utwente.nl/tgs.
PHD CANDIDATE
LEILA NIAMIR
Since secondary school I have been interested in research – and especially research in natural sciences. During my Bachelor’s degree, I put my enthusiasm into practice by working as a technical and research assistant in several projects and studies. I graduated as a Master’s student at the University of Tehran in Information Science in December 2012. I felt that I would like to continue my education in such a way that I could work precisely at the interface of science and technology in order to apply my knowledge and technical skills. In order to face such interdisciplinary challenges, I therefore applied and received a full Erasmus Mundus scholarship for the Diploma course in Geoinformatics at the University of Twente Faculty of Geo-information Science and Earth Observation (ITC) in January 2013. Truly, It was one of my greatest and most pleasurable experiences.

Here, the story of University of Twente began. I found the University of Twente to be a place with many opportunities where I could fulfil my ambitions, and where everything is gathered to lead you to your scientific goals. I was given this opportunity to start a new era in my life, something I had always wished for. In February 2014, I joined the Department of Governance and Technology for Sustainability (CSTM) and IGS research institute as a researcher. The main content of my PhD research is the design and implementation of an Agent-based energy market model to study the transition to green energies and a low-carbon economy, which is part of the “COMPLEX” EU FP7 project. This project has brought an international team of 17 partners together to explore new energy technologies, new ways of using landscapes and new policy instruments to support the transition towards a low carbon society by 2050.

I am delighted to perform my PhD project and research here. First of all, I am really passionate about my research topic, because its nature is interdisciplinary and applied, and I also believe that climate change is one of the major challenges and topics confronting the world. My greatest wish is for this PhD thesis to support climate change mitigation movements. And second, I enjoy working in projects where many experienced scientists and researchers strive to take steps that improve human lives. I am happy to meet and work with many interested researchers (PhD/Postdoctoral) and excellent professors at the University. It provides me with brainstorming sessions and colloquia, where I can talk about my research challenges and where new ideas arise. I am grateful for the chance to have participated in many related courses and to have given presentations in workshops and even at a conference during my first year as a PhD candidate, because these opportunities have helped me to expand my scientific network and communication skills.