

International Research Master Program

GIST – Governance of Innovations, Sciences and Technologies (MSc)

NAME OF EDUCATION	GIST – Governance of Innovations, Sciences and Technologies (MSc)
DURATION	24 months, incl. 4 months for final master's project
START DATE	September 2011
LANGUAGE	English
EDUCATION TYPE	Full time, blended learning (presence & online courses), project & problem based
DEGREE	Master 'Governance of Innovations, Sciences and Technologies' (MSc)
CREDITS	120 EC
TUITION FEE	2009-2010: €1620 (EU), €6547 (non-EU)
SPECIALIZATIONS	a) Governance of Sciences and Innovations (GSI) b) Technology Dynamics and Assessment (TDA) c) Governance in the History of Science and Technology (GHOST)
WORK COMPETENCES	a) Conceptual reflection b) Empirical investigation c) Research skills and general work skills d) Project work and application
EDUCATION FORMS	50% self study, 25% theory, 25% practice
STUDY ABROAD	Compulsory, max 15 EC

As developments in science, technology, innovation and the contexts in which they take place become increasingly complex, so do the challenges posed to their governance. We find these processes transcending the boundaries of single organizations and nation states, and taking place simultaneously on a global and local scale. Both the so-called "developed" world and regions with emerging politics and/or economies are facing extensive and radical transitions of the social, economic, cultural, political, technoscientific and knowledge order. A changing world requires changing or new tools of analysis. At the same time, the analysis of the governance of innovations, sciences and technologies (GIST) can no longer be separated from the innovation of the analysis of governance.

Participants of this program will develop the knowledge, vision, and reflective attitude to contribute actively to current developments in the governance of innovations, sciences and technologies as researchers or as practitioners.

The master program

The **aim** of the *GIST Research Master* (MSc) degree program is to enable students to analyze the dynamics of sciences, technologies, innovations and their governance in all their complexities.

The *GIST Research Master* teaches you to **understand thoroughly** how social practice, policies and technoscientific phenomena mutually shape each other and thereby structure the world in which we live and work, consume and govern. You learn this by using systematic concepts, heuristics and methods to examine fascinating exemplary cases from past and present. You develop a sensorium for long-term aspects of *GIST* and, at the same time, you learn how to keep in step with current practices. The master program trains you in the most fruitful concepts and research methods of the social and historical sciences. All these insights provide you with a toolkit for successfully confronting the many, often puzzling, problems and promises presented by technosciences, their innovation and governance.

Genomics, robotics, nanotechnology, artificial intelligence, neurosciences and e-health are examples of fields that involve expectations of economic profit and concerns about social and cultural changes. They stir debate among many diverse actors and provide challenges for governance. Studying within the *GIST Research Master* will **open your eyes** to how enormously the sector of science, technology and research is growing, with huge importance for the economy and modern societies in general.

Current issues such as the technoscientific dimensions of energy policies and climate change scenarios, the assessment of large-scale technologies, massive governmental and private investment in sectors such as the life-sciences, the coordination between private and public organizations, and the creation of new products based on technoscientific research all point to the complexity of governance challenges, which often arise under conditions of constant change. The *GIST Research Master* program teaches you in a stimulating international environment **how to orientate in and structure the new and complex realities**, using both approved and innovative means. The ambition is to demystify the governance and innovation of sciences and technologies, to understand them as social processes in terms of practices, habits, rules, conflicts, compromises, discourses and narratives from the perspective of everyday situations up to the level of systems.

In terms of **methodology**, the program builds on its teaching staff's broad-ranging expertise in qualitative research methods (discourse analysis, interviewing, participant observation, etc., and comparable methods from history), quantitative research methods (network analysis, surveys etc.), and policy-oriented and intervening methods (policy

evaluation, etc.). The multi-level character of our research field calls for precise and empirically grounded theories.

The approaches most closely identified with Twente include the concepts of 'evolving socio-technical landscapes', 'transitions of technical regimes', the 'multi-level perspective' (MLP), the 'co-evolutionary approach to reflexive governance', 'constructive technology assessment' (CTA) and 'strategic niche management' (SNP) and cultural history. These have been very **influential** in shaping conceptual thinking about technological change among researchers and policymakers, throughout Europe and beyond. Participants in the program have the opportunity to work firsthand with the authors of and leading specialists in applying such approaches. Studies of *GIST*, especially in the Twente tradition, have the dual potential of application to observing *and* informing actors in the field. But because there isn't any one dominant theory, no single recipe for coping with all the ambiguities in the field, participants learn to adopt a **constructivist** position and constantly reflect on their own impact as well as on the development of images and the beliefs of partners in the manifold fields of the governance and innovation of sciences and technologies.

Details of the master program

The *GIST Research Master* is a **full-time two-year English** language program composed of 120 ECTS. Half of the program (60 EC) involves compulsory courses during the first year. The second year consists of specialization courses (45 EC) and a master thesis (15 EC). The program is divided into two years, and the years are divided into 4 quarters each. The courses build from basic to advanced courses and research colloquia. Key research and working skills will be developed in *project study* format. Skills ensure academic *and* professional work qualification. The three lines of study (Governance of Sciences and Innovations, Technology Dynamics and Assessment, and Governance in the History of Science and Technology) offer courses from all three STePS research themes. Students select one of the themes as their primary area of focus and ultimately write their master thesis in the context of that theme.

As a **research master**, the program addresses students who wish to carry out small-scale research projects, as well as offering space for professionals who want to combine reflection and research with more practical questions. For both groups, a project-based teaching approach is advantageous.

The **project-based teaching approach** means that students learn step by step to develop a research theme not only for their master thesis, but also in preparation for later applications for research funding. This makes our research master an extraordinary opportunity for ambitious students in a highly stimulating environment. Hence, this research master program explicitly aims at teaching students how to

- a) reflect systematically and critically on GIST issues
- b) carry out a research project
- c) apply for research funding.

The program thus also serves as a solid foundation for potential PhD candidates. The final semester can be viewed as a stepping stone to **subsequent education**. The program is, however, self-contained, providing the tools, skills and experience required conducting social-scientific research and professional work in whole a variety of contexts.

The International Dimension

The *GIST Research Master* program has a definite **international** orientation. Teachers and students come from many countries, and the program is taught fully in English. We have numerous renowned partner institutions in several countries worldwide – research and policy institutions worldwide (incl. UK, Germany, USA, France, South-Africa, South-America, Scandinavia). Students spend part of the program abroad in order to enhance the comparative character of their study and research. The master thesis can be written in collaboration with international research institutions and other organizations in the fields of the governance and innovation of sciences and technologies.

Specializations

The program provides the means for **understanding, assessing, and structuring** the continuously changing interactions among technosciences, innovation and research processes, social practices and institutions, and their governance.

We assume that phenomena and problems in the field can no longer be understood satisfactorily only in terms of the established systems of politics, administration and society. Boundaries between themes, practices and actors have become fluid. New constellations of actors must be investigated as well as newly developing game rules. Constitutive for our approach is thus a three dimensional view including three tracks that focus on reflexive, policy-oriented and historical **perspectives**:

- The *first* addresses problems and specific issues concerning the ideas and practices of the governance and innovation of sciences and technologies.
- The *second* focuses on the dynamics of scientific and technological development and the assessment of related socio-technical change processes.
- The *third* examines scientific and technological change and its governance in the context of longer-term developments and transformations.

The three perspectives are represented in three study tracks which are at the same time closely coupled in respect to research objects and cases, teaching personnel, methods, and the common research colloquia. Students specialize in one of the three dimensions, but are required (and taught) to take the other two into account as well, and thus work with a **realistic**, and therefore holistic, picture of the governance and innovation of sciences and technologies.

Governance of Sciences and Innovations (GSI)

Sciences and innovations are both key resources and causes for concern for industry and policy making in modern society. The production and use of scientific knowledge have increasingly become objects of policymaking. Understanding the **changing governance** of science (in a broad sense) and the conceptualization of research and innovation systems are key issues for contemporary science, technology and innovation studies. Research on 'science and innovation governance' analyzes transformation processes of the research and innovation system, the role of governance and policymaking in this transformation and the processes by which scientific knowledge contributes to governance and innovation. In this track students learn to compare the aims and logics of governance, policy, and innovation approaches. They get structured overviews of the major approaches, and critically study their strengths and weaknesses, as well as of the debates between schools of thought. Theoretical questions as well as practical implications are discussed through examples of particular cases.

Technology Dynamics and Assessment (TDA)

This track focuses on the dynamics of processes of technological development and innovation and the ways in which socio-technological change can be assessed. Understanding the **dynamics** of technological change is an intellectual challenge, but also of great relevance to those participating in the governance of technology dynamics, those actively engaged in technology development like scientists, technologists and innovation managers, and for so-

cietal actors and audiences more general. The courses will include an introduction and critical discussion of theories, concepts and tools developed in the fields of Science and Technology Studies and Innovation Studies to assess and contribute to the development of technologies in modern society, such as Constructive Technology Assessment (CTA). Innovation and technology dynamics will be analyzed on micro, meso, and macro levels with major themes including user-technology relations, anticipation in innovation, dynamics of socio-technical systems and regimes and the societal embedding of emerging technologies.

Governance in the History of Science and Technology (GHOST)

This research perspective is directed toward broadening and deepening insight in the **long-term development** of science, technology and society and its governance by turning to the resources of social, cultural, intellectual and institutional history. The past thus serves as a kind of laboratory, both in terms of affording the examination of events whose outcomes and consequences are already known and in terms of the opportunity to employ various methods of interpretation. In addition to the interest and importance of history in its own right, this research perspective provides an important background and context for the contemporary and future-oriented research carried out within the department and the faculty.

Career Prospects

Due to the (often experimental) development and promises of new technologies, as well as of scientific and research endeavours, due to all the experimentation and promises, policymakers, citizens, entrepreneurs, journalists and many other societal actors face problems that require **new insights and policies**.

One of the characteristics of this research master program is the emphasis it places on creative reflection and innovative research. Graduates with experience in social science research and advanced conceptual reflection have always been in high demand. The **excellent** research qualifications offered by the program help graduates live up to the expectation that they will be competitive on the national and international job markets for research on and work in the broader (public and/or private) area of the governance and innovation of sciences and technologies.

The master program provides a **strong base** for careers in these domains in general and in policymak-

ing and management more specifically. Graduates are also ideally qualified to conduct scientific research at academic and commercial research and development institutes. They can furthermore work as consultants. The program aims at educating excellent students qualified to make independent contribution to the interdisciplinary study of the governance and innovation of sciences and technologies, with a strong emphasis on qualitative and mixed-methods research.

From Basic to Applied Research

Our governance studies combined with innovation studies, which build on a sound foundation of both science and technology studies and historical studies. Governance studies in Twente contribute to **interactive governance** through improved knowledge-in-policy and democratic practices of policy design, implementation, and evaluation. Related themes are forecasting, risk and uncertainty, ambiguity, problem structuring, institutionalization of bias, legitimacy, effectiveness, democratic quality, participation and deliberation, policy networks, and more. Program graduates will work in all sorts of public and private agencies engaged in innovation, research and science that take thorough reflection, sound research and democratic participation seriously.

Understanding the dynamics of scientific and technological change is not only an intellectual challenge, but also of great **relevance** to societal actors and audiences, ranging from scientists and technologists to government agencies, business firms, non-profit organizations, and the general public.

There are no limits to the **usage of historical knowledge** and skills of revealing long-term structures in a given field. Be it in a Technology Assessment agency, in the governance of innovation in a company, or as a policymaker, it is always crucial to know what historical examples there are for problems and solutions, for promises and fears in a field; historical experiences inform much of what and how we are doing things now and in the future. Of course, interested students are also invited to stay with us and carry out historical studies for academic purposes at the PhD level.

Our study advisor and teaching personnel are glad to assist students in **planning** their career after the master.

Admission

Students of our master program will typically come from a background either in social or natural and engineering sciences. They have completed their

bachelor (or equivalent degree in natural or engineering sciences) and/or have been employed in public or private management of innovation in science and technology.

Applicants are further required to have a good working knowledge of the English language in terms of reading, writing, speaking, and listening.

Further Information

The *International Research Master in the Governance of Innovations, Sciences and Technologies* is a dynamic program organized to respond with great **sensitivity to new developments**. In the students' interest, the courses and specializations can hence vary from year to year, and external top-class teaching personal are involved from time to time. Please, check the STePS website periodically for the latest news.

Our website provides you with all the information needed. If you nonetheless have specific questions, please contact our program **coordinator** Dr Peter Stegmaier (p.stegmaier@utwente.nl).

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