Annual Report 2010

Research Division

Technoscience Studies

**Department of Technology and Aesthetics
School of Planning and Media Design
Blekinge Institute of Technology (BTH)**

Profile areas

Design for Digital Media

ICT for Development

Innovation System and Development

Feminist Technoscience

**The Mission of the Research Division of TechnoScience Studies
is to Expand and Transform
Theoretical and Practical Knowledge Bases
of Technology Research & Development & Innovation**

Contents

Executive Summary

The activities at the Research Division of Technoscience Studies (ToS) during 2010 are characterised by increase in examination, number of PhD students, external funding and international collaboration as well as recruitment of key staff. ToS includes four main profile areas namely Design for Digital Media, ICT for Development, Innovation System & Development and Feminist Technoscience. ToS is closely linked to the undergraduate education with its profiled programmes of Digital Game, Digital Audio Production, Digital Visual Production and Web Development engaging more than 260 students.

The highly appreciated cooperation with and support from the local government of Karlshamn and the Bank of Karlshamn continued during 2010 within the context of NetPort. To participate in developing NetPort as a strong innovation system is an inspiring driving force for ToS, which thus is fulfilling one of the core values in the profile of BTH.

During the year three *doctorate* degrees in the PhD program Technoscience Studies was earned by Ellen Kalinga with her thesis titled "Development of an Interactive e-Learning Management System (e-LMS) for Tanzanian Secondary Schools", by Suzan Lujara with her thesis titled "Development of e-Learning Content and Delivery for Self Learning Environment, Case of Selected Rural Secondary Schools in Tanzania" and by Peter Giger with his thesis titled " Conversation and Figuration from the Horizontality of the 2.0 Decade". In June 2010 Fatuma Simba earned a *licentiate* degree with her thesis "Modelling Connectivity for e-Learning in Tanzania: Case - Study of Rural Secondary Schools".

Six new doctoral students were admitted during 2010. Joshua Mutambi, Julius Ecuru and Carlos Acevedo are doing their research within the International Graduate School for Innovation Systems, Clusters and Innovations, which is an initiative by ToS via the Scandinavian Institute for Competitiveness and Development (SICD) and in collaboration with PACF (PanAfrica Competitiveness Forum) and Universidad Mayor de San Simon (UMSS), Cochabamba, Bolivia. The research work of the fourth new doctoral student, Linus de Petris, is a result of the cooperation between ToS and the local government of Karlshamn. Linus is a public sector doctoral student being a staff member of the local government of Karlshamn as well as having a position as a doctoral student at ToS. Anders Falk became the fifth new doctoral student of the year within the strategy of competence development of our university lecturers in Digital Media. The sixth new doctoral student, Tomas Kjellqvist, is specifically expanding the valuable competence for the strong environment of ToS for research in and with developing countries. During the year ToS had fourteen active doctoral students within the PhD programme including the ones having a doctoral degree at the end of the year. The ties of ToS to international research were strong, with specific links to Norway, Tanzania, Uganda, Rwanda, Bolivia and Germany.

The R&D program within the profile of Design for Digital Media was more firmly established during the year by the new doctor in the profile, Peter Giger, and two new doctoral students, Anders Falk and Linus de Petris. The two first named are active in the Swedish Faculty for Design Research and Research Education, at which ToS is a member. The recruitment of a new professor in the profile started during the year. The latter PhD student is active in the X-ovation project, see below. The programme and linked activities are presented below.

The R&D-project *X-ovation : Developing e-services and e-administration* was firmly established and developed in co-operation with NetPort.Karlshamn, BTH and Karlshamn municipality. The aim of the project is to make visible on going activities of information and communication in the society as well as to develop new services and also new understandings of communication and information between public actors and citizens. Pirjo Elovaara and Linus de Petris from ToS have central roles in the project.

BTH strategic plan 2009 – 2012, goal area number 5, concerns collaboration with developing countries. ToS was during the year strong in realising this goal not only in doctoral training and research but also as witnessed by the following.

SPIDER (The Swedish Program for ICT in Developing Regions) sponsored the R&D project *Women´s Digital Baskets in Rwanda* with Pirjo Elovaara and Kerstin Gustavsson as researchers and which was finalized during the year. The very good results of the project have motivated several partners to find a continuation of the project.

ToS via The Scandinavian Institute for Competitiveness and Development (SICD) had two R&D projects approved by Sida. One is the project "Innovative Clusters Closing the Gap between University and Society in East Africa - a living proof of mode 2 excellence?" with Birgitta Rydhagen as project manager and with a budget frame of 3 190 000 SEK during 2010 – 2012. The other project approved was "Solar power to the poor people: Using innovative clusters to develop business models for technology transfer" with Tomas Kjellqvist as project manager and with a budget frame of 4 400 000 SEK during 2010 – 2012.

Two EU projects were approved during 2010. Our staff member Gerhard Bax is a GIS expert and became a research partner of the project "Impact of climate change and related glacier hazards and mitigation strategies in the European Alps, Swedish Lapland and the Tien Shan Mountains, Central Asia" with FORMAS as national coordinator. The other EU project is called Genis Lab, in which ToS is a partner in a consortium coordinated by a partner in Italy.

The external research funding for ToS during 2010 was 74% of the total research budget counted on processed and granted income.

Background

The research division of Technoscience Studies belongs to the department of Technology and Aesthetics at the School of Planning and Media Design (DSN) at Blekinge Institute of Technology – a profiled University of Applied ICT and Sustainable Development.

The activities at ToS began in 1998 in the then Department of Computer Science and Economics with earmarked funds appropriated by the Parliament through the research bill 1996/97:5. A professor chair in ICT and gender research was filled the 1st July 1999. ToS is a new field of technology and engineering and is highly innovative in terms of development of gender research within technoscience, media technology, methodology for ICT related research and innovation system and cluster development.

In addition to research, undergraduate and graduate education the activities embrace work with knowledge networks, campus development, external engagements, internal work at BTH and support work for external funding of research and research collaboration.

ToS is fully integrated into the profile of BTH in terms of both applied IT and interactions in triple helix constellations.

Staff

Administrators

Anita Carlsson / Head of Administration, Department of Administration, DSN
Madeleine Persson / Economist, Department of Administration, DSN
Ulrika Magnusson / Research education administrator, Department of Administration, DSN

Researchers

Carlos Acevedo / Doctoral student
Gerhard Bax / Associate Professor, senior researcher
Christina Björkman / PhD, senior researcher
Maria Bäcke / Doctoral student
Linus de Petris / Doctoral student
Julius Ecuru / Doctoral student
Peter Ekdahl / PhD, Senior lecturer, acting dean of school
Pirjo Elovaara / PhD, Senior lecturer
Anders Falk / Doctoral student, University lecturer
Peter Giger / PhD, Lecturer
Elisabeth Gulbrandsen / Ph.Lic., Doctoral student
Kerstin Gustavsson / University lecturer
Ellen Kalinga / PhD
Tomas Kjellqvist / Doctoral student, Project manager
Henriette Koblanck / Professor
Peter Lating / PhD, postdoc
Suzan Lujara / PhD
Lydia Mazzi / Doctoral student
Rebecka Molin / Doctoral student
Joshua Mutambi / Doctoral student
Charles Otine / Doctoral student
Birgitta Rydhagen / PhD, Senior lecturer
Fatuma Simba / Doctoral student
Lena Trojer / Professor, Head of Division

Theoretical stance

One of the aims of Technoscience Studies is to develop complex knowledges about ICT including media technologies as reality-producing technologies as well as of the transformations that follow in its wake. ToS is including perspectives of gender research developed within technoscience. This presupposes participation in the appurtenant processes of transformation and knowledge production. Seeing ICT as reality-producing technologies rest on the idea that all of us, researchers in the field included, are enmeshed in development processes. No innocent positions exist. ICT intervenes in and co-creates people's everyday lives. On the other hand, ICT is developed and interpreted and practiced by people. This aim of Technoscience Studies is thus to create theoretical bases as well as practises for developmental processes in ICT-related fields as well as in the context of innovation systems.

The latter has increased in importance for ToS with a strong and upcoming research profile in innovation system and development including the International Graduate School for Innovation Systems, Clusters and Innovations together with a number of international partners.

Within international gender research with strong links to the dominant technological fields of our age – information and communication technology, biotechnology and material technology – there is a widespread understanding of the production of knowledge and technology as processes that take place in distributed systems. In these days and age knowledge is generated in the overlapping borderland of universities, companies and other regional, national and international entities. These processes are not least apparent in our region Blekinge and affect the way in which BTH carries out R&D work. The term technoscience connotes this understanding of the production of knowledge, technology and reality. The way in which technoscience is defined by internationally leading researchers such as Donna Haraway raises questions about boundaries and transgression of the boundaries between science, technology, politics and society, and between humans and non-humans as in the processes of hybridisation between people and machines (cyborg theories).

The PhD program of ToS belongs to the faculty of technology at BTH.

Along with research activities based on the individual research projects, ToS also has a joint research programme organised as division seminars and courses in order to develop epistemological competence for theoretical and methodological work. Prospective doctoral students also participate in this research programme.

Research projects

The research projects are listed below within the four main profile areas of the research division of TechnoScience Studies. The projects can either be doctoral thesis projects or research projects. In some cases the projects belong to more than one profile area.

Design for Digital Media

- *Theoretical Frameworks for ProduSer Oriented Design for Digital Media,* Peter Ekdahl, R&D project

The aim is to develop a research structure as well as theoretical frameworks for the concept ProduSer Oriented Design for Digital Media. When starting the process of producing digital media, there are no separate roles as producer and user. The roles are intertwined in complex and dynamic relations. The understanding of these complex relations opens up for new ways of developing relevant and future oriented applications. The R&D project is closely linked to the under graduate programmes Digital Games, Digital Visual Production, Digital Audio Production, Web Development and Basics for Digital media. The project encompasses development of a deeper and more complex understanding of digital media technology and design as an area of knowledge. The aim of the project is also to define core areas and develop transformational strategies in order to find out how traditional disciplines relate to the core areas of media technology and design including serious gender perspectives.

- *Knowledge Processes during the 2.0 decade - person assemblages with related theoretical and methodological expressions.*
Peter Giger, PhD project, funded by the Government of Karlshamn

The aim is to map out and discuss the epistemological impact of the previous 2.0 decade
The more specific aims are to
- Complete the thesis with the prospective title *Déjà vù or brand new - THE WEB 'Entanglements' in the 2.0 decade*
- Expand and deepen the methodological concepts 'bricolage' and 'recontextualization', and 'person assemblages'
- Share knowledge about the work of Gilles Deleuze for transdisciplinary researchers, contextualized in transdisciplinary projects.
- Implement the above discussed technoscience complexities in practice - for practitioners as well as in learning at an undergraduate level
- Implement the above theories and praxis in the journal project, renamed and re-situated under the prospective title "International Journal of Technoscience" (former "International Journal of Feminist Technoscience). The transformed journal will have a wider audience and focus on transdisciplinary research involving a technoscience view of technology.

- *Women´s Digital Baskets in Rwanda.*
Pirjo Elovaara and Kerstin Gustavsson, R&D project funded by SPIDER 2009 - 2010.

The project aims to bring together rural Rwandan women´s everyday activities and practices, with a specific focus on traditional basket making, ICT and new digital media. The project is conducted as a joint project with the Swedish participants from Blekinge Institute of Technology and the Rwandan participants who are members of the Duhuzimbaraga co-operative. The project has also a contact person within RITA (Rwandan Information Technology Authority).
   As a starting point, the aim of the project is to document traditional skills and knowledge of handcraft methods and products by creating digital documentation of them. In a longer run the project can be developed in at least two directions: to create even more advanced digital documentation in order to facilitate more organized forms of practical training. The web site is a first step to develop an electronic market and e-business for Rwandan handicraft products.
   The project is a learning project, where ICT-skills will be an essential prerequisite for the documentation, presentation and information dissemination parts.

The project also aims at creating an ICT-environment where the benefits of ICT for the participating women and their communities are in focus.

- *Technology as an intrinsic part of humans — from eGovernment to iGovernment*
Linus de Petris, PhD project funded by Swedish Agency for Economic and Regional Growth

The research is set in a municipal eGovernment context and is carried out on a basis of action research. The empirical work is primarily focused on collaboration and interaction processes, externally between government, industry and civil society and internally between municipal coworkers. Thus the research partly becomes a development work with a triple-helix perspective. The theoretical work is based on an interdisciplinary foundation inspired by phenomenology, technoscience, information architecture and cognitive science.

Specific objectives are to
- explore how open data and open collaboration affect eService innovation and development processes
- study the evolution of the Internet in general and the Web in particular in relation to municipal IT- and eGovernment development
- present an understanding of municipal IT-architecture and eGovernment as a ubiquitous ecology needing a holistic approach to design and development
- put in relation the techno and cognitive scientific theories on technology extending and (re)configuring our minds with respect to both social, physical and conceptual aspects, in this analysing consequences for eGovernment processes and development.

- *The digitizing of rituals; aesthetics in digital media*
Anders Falk, PhD project funded by local government of Karlshamn

The main objective is to study rituals as design hooks in digital media.
The more specific objectives concerns the issues of
- the choices of transparent virtual alternatives instead of unsure realities
- changes from gameplay mechanics towards emergent / internal meta systems.

ICT4D

- *Transdisciplinary Research Development in Triple Helix Context in Uganda*
Dr Peter Okidi Lating, post doc project project, funded by Sida.

The aim of the postdoctoral study is to strengthen transdisciplinary research skills of the candidate and improve graduate supervisory skills as part of the staff capacity development in the Faculty of Technology, Department of Engineering Mathematics/Computer Engineering, Makerere University, Uganda, The following specific objectives will be achieved:
   • Publish a book titled " Transdisciplinary research development in Uganda: Co-evolution in triple helix processes".
   • Publish three state-of-the-art journal papers where longitudinal data analysis method is used.
   • Start learning to jointly supervise a PhD student under the Innovative Systems and Clusters Program (ISCP).

- *Development of an Interactive e-Learning Management System for Tanzanian Secondary S Schools*

Ellen Kalinga, PhD project funded by Sida.

The main objective of this research was to develop an interactive e-learning management system (e-LMS) (hereby referred as TanSSe-L system) to be used by Tanzania secondary schools to support teaching and learning processes. The more specific objectives are based on the services to be offered by the TanSSe-L system:

- To develop a module to enable the creation, storing, publication and sharing of learning materials.
- To develop mechanisms for protecting the database and the information stored, as well as for managing users of the system and the work flow of the learning materials.
- To develop ways of evaluating students' learning progress through the TanSSe-L system, including means of assessment.

- *Development of e-Learning Content and Delivery for Self Learning Environment: Case of Selected Rural Secondary Schools in Tanzania,*
Suzan Lujara, PhD project funded by Sida.

The main objective of this research work is to develop and deliver appropriate, self-learning and pedagogically sound e-Learning content using ICT tools. With this new measure of incorporating ICT in education, the inequalities in accessing learning materials will be greatly reduced or removed thus enhancing the equity and quality of education in rural secondary schools in Tanzania. The specific objectives of this research are to design and develop shareable e-Learning content for secondary schools as well as to determine pedagogical and technological factors in the design of e-Learning content for the self-learning environment.

- *Modelling Connectivity for e-Learning in Tanzania: Case - Study of Rural Secondary Schools.*
Fatuma Simba, PhD project funded by Sida.

Broadband access network (last-mile connectivity technology) is a prerequisite to deliver multimedia e-learning contents. The main objective of this research project is to model a cost-effective and performance efficiency connectivity solution for rural secondary schools to access e-learning services. Specific objectives are:

1. To determine a cost-effective access network technology (last mile connectivity technology) to the rural areas.

2. To evaluate performance of the cost - effective technology in order to identify key performance parameters for the e-learning services to be delivered with the required quality of service (QoS).

- *Data Mining in Health Care: HIV patient monitoring in Uganda,*
Charles Otine, PhD project funded by Sida.

The main objective of the research project is to develop the incorporation of data mining techniques in the monitoring of health care of AIDS patients in Uganda. The more specific objectives are to
- review critically the literature on data mining in health care and patient monitoring focusing on AIDS patients.
- assess the status of information systems in health care in Uganda.
- develop the conditions for integrating data mining in AIDS patient monitoring.
- identify the constraints to incorporating data mining in monitoring of AIDS patients in Uganda.
- explore the deployment of data warehouses for use in data mining or knowledge discovery in AIDS.

- *Geo Spatial Technologies as Decision Support Tools for Road Infrastructure Maintenance in Uganda*
Lydia Mazzi, PhD project funded by Sida.

The main objective is to develop an integral framework for incorporating geo-information technologies as decision support tools in road infrastructure maintenance works in Uganda.
More specifically the project will
- identify gaps in the use of GITs in the road infrastructure maintenance process of Uganda and identify the limitations to enhancing the use of these technologies,
- develop a model for predicting infrastructure areas due for maintenance with a view to facilitate the prioritization of road infrastructure maintenance actions, and
- develop an algorithmic framework that incorporates GITs as decision support tools in road infrastructure maintenance in Uganda
The main supervisor for Lydia Mazzi is Associate Professor Gerhard Bax.

Innovation System and Development

- *Business Incubation Systems as an integral development strategy for industrialization of Uganda*
Joshua Mutambi, PhD project funded by Sida

The main objective of the research is to establish the impact of the BI initiatives and to develop the most suitable model of small business incubation that can stimulate Industrialization in Uganda"
Specific objectives are
- to study experiences in other countries in respect to business incubation and industrial development and in the context of Government support
- to determine the factors of business incubators that affect growth and productivity of businesses in Uganda
- propose an appropriate Ugandan Business Incubator model.

- *Unlocking the Binding Constraints in Uganda's Innovation System*

Julius Ecuru, PhD project funded by Sida

The main objective of the research project is to establish priorities for interventions within Uganda's innovation system.
Specific objectives are to
- map actors in Uganda's innovation system
- assess the patterns of interactions with respect to knowledge generation and exchange among the actors
- model the flow of knowledge and information among the actors
- identify the binding constraints and opportunities within the innovation system.

- *Formation of clusters focusing generation of a co-evolution context of university and industry in Cochabamba region, Bolivia*

Carlos Acevedo, PhD project

Main objective is to develop knowledge about the cluster shaping process focusing the generation of a co-evolution context between the university and the cluster firms based on the experiences of Cochabamba city, Bolivia.

Specific objectives are to
- describe the clustering process taken place in the region of Cochabamba, Bolivia
- determine success factors in the clustering process for the development of a co-evolution context between the university and the cluster firms
- analyse the impact reached during the clustering process in the framework of co-evolution processes.

- *Aid, Knowledge and Technology Transfer*

Tomas Kjellqvist, PhD project

Main objective
Recent critique of development aid by Easterly and Moyo has among other things pointed to how recipients get dependent on aid. This study will use the debate created by these authors as a context to analyse how development paradigms on technology transfer in the energy sector has contributed to shape the situation that the authors are criticizing.

Specific objectives are
- to analyse how the role of knowledge and knowledge institutions have been treated in development paradigms, with snapshots from the 1960's, 1970', 1980's, 1990's and the first decade of the 21th century
- based on this model propose an experimental model for introduction of renewable technologies to reduce poverty
- to make recommendations for the next era of technology transfers linked to the climate change mitigation and adaptation funding mechanisms.

- *Solar power to the poor people: Using innovative clusters to develop business models for technology transfer*

Tomas Kjellqvist, project manager, R&D project funded by Sida

This project proposes to improve the productive uses of energy in innovative clusters with solar energy installations adapted to their needs. The project will draw on previous experience of income generation through almost 75 innovative clusters in South Africa, Tanzania and Uganda. These 75 clusters are based on agglomerations of small and medium sized enterprises with a total geographical spread encompassing both urban and rural surroundings. Each cluster consist of a number of firms that are linked in a production chain or operate in the same trade, but cooperate to achieve joint competitiveness. They involve people in different productive functions throughout the value chains, and we find these people in very different socio-economic situations. Investing in solar technology for clusters would show long-term social and economic effects as the involved individuals of all social strata could increase their incomes over time.

The clusters can provide opportunities to test and improve solar energy technology in real world applications as they represent a wide range of trade areas. Working with clusters means that there are opportunities to replicate solutions and to find advantages of scale. The cluster members have acquired a basic understanding of entrepreneurship and an openness to technological change. As a result they would be prepared to adopt solar technologies and adapt them to their needs. They have good experiences of participation in capacity building programs. Besides opportunities to try out solar energy technologies the clusters could develop adapted business models to apply for loans to construct experimental sites. These sites will be an arena to define research for further development of solar technology and for improving mechanisms for technology transfer.

In this case, technology transfer and capacity building requires a close collaboration between the cluster entrepreneurs as end-users, solar technology firms as providers of technology, and universities as providers of training, expertise and new knowledge. Policymakers at national and municipal levels need to be involved to at an early stage to facilitate and give political, and possibly financial, support to the activities. A constellation of these actors is commonly referred to as a "Triple Helix". The actors are in a continuous dialogue to solve problems and transcend barriers with joint efforts. The Triple Helix requires that the respective actors join in to share their own specific knowledge and networks, and are prepared to learn things of use to their own activity area from the others. If such trust is established, the effects of the project are more likely to be sustainable. Each actor could also use his/her network for dissemination of the results, which provides for replication of approaches and solutions in a wider context.

Feminist Technoscience

- *The New Production of Politics,*

Elisabeth Gulbrandsen, PhD project

The main objective is to explore conditions for developing responsible technoscientific cultures - in and beyond the academy. The linearity as well as the division of labour suggested by the "technology push" and "society pull" policy models are heavily criticized for ignoring the complexity and dynamics that emerge partly as a consequence of the success and pervasiveness of science and technology in late modernity. Science and society have both become transgressive invading each other's domains, and policy questions are enhanced into political questions. A third,

more interactive policy model is emerging figured in transdiscursive terms like "strategic science", "innovation system", "postnormal science", "technoscience", "mode 2", "agora".

- *Knowledge Processes during the 2.0 decade - person assemblages with related theoretical and methodological expressions*, see above.
Peter Giger, PhD project

- *A Sight/ Site for Transparency or Opacity? Notes on Knowledge Production and Feminist Technoscience.*
Rebecka Molin, PhD project

The research is devoted to looking at ways of understanding the visual, and to discuss the image as a site for negotiations between subjectivity, gendered relations, technology and technological artefacts. This is done partly by laying focus on the proliferation of imagery within the digital visual form(at), and on the double relationship between the use, spread and development of images and the use, spread and development of technological artefacts. The theoretical frame argue for the urgency of making images matter beyond the borders of either a clear re-presentation of reality, or the more postmodern theoretical perspectives that put emphasis on the empty image. In this, I engage with cultural thinker Jean Baudrillard and feminist technoscience theorist Donna Haraway, in order to try to understand the (im)material consequences of technology in relation to the production of the visual.

- *X-ovation : Developing e-services and e-administration*
Pirjo Elovaara, de Petris, Linus Peter Giger, financed by Swedish Agency for Economic and Regional Growth, 2009-2012

R&D-project in co-operation with NetPort.Karlshamn, BTH and Karlshamn municipality. The aim of the project is, taking a point of departure from the partners´ competences, experiences, perspectives and interests, to make visible on going activities of information and communication in the society. The aims are also to develop new services and also new understandings of communication and information between public actors and citizens.

- *Women´s Digital Baskets in Rwanda,*
Pirjo Elovaara and Kerstin Gustavsson, R&D project funded by SPIDER, see above.

- *Epistemological Issues in Computer Science Education from Gender Research Perspectives,*
Christina Björkman, research project

This is a project with university teachers in computer science at a Swedish university. The focus of the project is gender, knowledge and learning in computer science, and the project aims to deepen the teacher's knowledge and experience in these areas in order to develop their teaching. In the longer perspective, this concerns how to make computer science more interesting to a larger group of people than is the case today. This can be accomplished by, for example, discussing issues such

as what computer "is", and how it is presented, and to learn to respect and accommodate greater diversity among students and their backgrounds, interests, motives and understandings?

- *Theoretical Frameworks for ProduSer Oriented Design for Digital Media,*
 Peter Ekdahl, R & D project, see above.

- *Innovative clusters closing the gap between University and Society in East Africa. A living proof of Mode 2 excellence?*
Birgitta Rydhagen, project manager, funded by Sida 2010 - 2012.

Universities in East Africa collaborate in innovative cluster initiatives in diverse locations in knowledge production in the context of application. This means that scientific researchers participate in socio-economic development and poverty reduction by developing knowledge in close collaboration with actors in local communities, with business and Government. The umbrella organization PACF (Pan African Competitiveness Forum) provides a supportive structure and facilitates collaboration between cluster groups in different African countries.

  The study focuses on two cases where cluster initiatives develop innovative solutions to address changing situations - climate change, increasing global market competition, deteriorating natural resources and an increasing need for diversified income generation among women and men. One case is the Tanzanian Zanzibar cluster for seaweed production. The other case is salt production cluster in lake Katwe, Uganda. Both clusters aim towards increasing product quality and product diversity to increase the income, and at the same time improve social conditions for workers and their families. Many of the participants are women.

  The main aim is to study how innovative clusters can foster timely implementation of knowledge products with socioeconomic relevance. Focus is on the research component, since socioeconomic development is part of the strategic policies of universities in Uganda and Tanzania. The project includes focus group discussions and participatory exercises with PACF key persons and cluster members. Research results will be disseminated continuously and through a final report to research participants in the two clusters and to PACF partners. Together with one research partner from Tanzania and Uganda respectively, we will also participate in conferences arranged by Sida and UNESCO.

- *Feminist TechnoScience and a Shared Fragile Future - challenging the epistemological infrastructure in technology.*
Lena Trojer, R&D project

The intention is to bring forward discussions on *how* we, as researchers in technoscience, are deeply involved in technological transformation processes through our knowledge production. The focus is turned towards the knowledge production itself and the university as partner in distributed research processes. The contemporary situation is understood as circumstances, where the boundaries between universities, industry, public sector and other kind of institutions and authorities are exceedingly hazy concerning knowledge production and evolving into complex co-evolving processes. The discussion is kept to the role and accountability of the actors at the universities. There is an emphasis on the need for (self)reflection in technological transformation processes as far as scientists are concerned.

Other ongoing projects

- OECD-initiative on New governance approaches for multilateral cooperation in Science, Technology and Innovation (STI) to address global challenges, Elisabeth Gulbrandsen
- Sms application project "iFarms", Uganda, Sweden, Philippines, sponsored by SPIDER, see below under Internationalisation
- Partner in the national graduate school InterGender financed by VR and coordinated by Linköping University
- Collaboration with Bauhaus University, Weimar, for developing a joint R&D program
- GenisLab; The Gender in Science and Technology LAB, EU project within FP7
- Digital Storytelling, a regional project within Deltagarden (www.deltagarden.se), Pirjo Elovaara
- Research collaboration with Faculties of Technology at Makerere University, Uganda, University of Dar es Salaam, Tanzania and Universidad Mayor de San Simon, Bolivia, see below under Internationalisation.
- R&D collaboration in PACF (Pan African Competitiveness Forum) and ISCP-Bolivia (Innovation System and Cluster Program) funded by Sida.
- Nationella genusforskarskolan (National Gender graduate school) in Umeå, Christina Björkman, Pirjo Elovaara
- R&D in design methodology for lecturers at the media technology under graduate and graduate programs.

Postgraduate degrees awarded

Licentiate of Technology Pirjo Elovaara 2001 02 02
Licentiate of Technology Christina Björkman 2002 06 14
Licentiate of Technology Peter Ekdahl 2002 10 25
Doctorate of Technology Birgitta Rydhagen 2002 12 18
Licentiate of Technology Annelie Ekelin 2003 01 27
Licentiate of Technology Inger Gustafsson 2004 05 07
Doctorate of Technology Pirjo Elovaara 2004 05 28
Doctorate of Technology Christina Björkman 2005 05 23
Doctorate of Technology Peter Ekdahl 2005 12 09
Licentiate of Technology Peter Giger 2006 06 09
Licentiate of Technology Peter Okidi Lating 2006 12 04
Doctorate of Technology Inger Gustafsson 2008 01 18
Licentiate of Technology Ellen Kalinga 2008 05 28
Licentiate of Technology Suzan Lujara 2008 05 28
Doctorate of Technology Peter Okidi Lating 2009 03 06
Licentiate of Technology Fatma Simba 2010 06 28
Doctorate of Technology Ellen Kalinga 2010 12 08
Doctorate of Technology Suzan Lujara 2010 12 08
Doctorate of Technology Peter Giger 2010 12 15

Publications

Ecuru, Julius, **Naluyima**, Hellen, (2010) "Biotechnology Developments in Uganda and Associated Challenges" in *African Crop Science Journal*, vol. 8 issue 4, African Crop Science Society.

Elovaara, Pirjo, **Sefyrin**, Johanna, **Öhman**, May-Britt, **Björkman**, Christina (editors) (2010) *Travelling Thoughtfulness - feminist technoscience stories,* Department of Informatics, Umeå University, ISSN 1401-4507; 10.04

Elovaara, Pirjo, **Mörtberg** Christina, (2010) Cartographic Mappings – Participative Methods in Proceedings of the 11th Conference on Participatory Design, PDC 2010. ACM Press. ISBN 978-1-4503-0131-2.

Giger, Peter, (2010) *Conversation and Figuration from the Horizontality of the 2.0 Decade*, Blekinge Institute of Technology Doctoral Dissertation Series, ISBN 978-91-7295-193-8

Gulbrandsen, Elisabeth, **Trojer**, Lena (2010) "re-thinking excellence; getting smart between the no longer and the not yet - comments on the convergence of knowledge and politics" in *Travelling Thoughtfulness - feminist technoscience stories*, (editors) Elovaara, Pirjo, Sefyrin, Johanna, Öhman, May-Britt, Björkman, Christina, Department of Informatics, Umeå University, ISSN 1401-4507; 10.04

Kalinga, Ellen, (2010) *Development of an Interactive E-learning Management System (e-LMS) for Tanzanian Secondary Schools*, Blekinge Institute of Technology Doctoral Dissertation Series No. 2010:10, ISBN 978-91-7295-191-4

Lujara, Suzan, (2010) *Development of E-learning Content and Delivery for Self Learning Environment - Case of Selected Rural Secondary Schools in Tanzania*, Blekinge Institute of Technology Doctoral Dissertation Series No. 2010:11, ISBN 978-91-7295-192-1

Mazzi,Lydia, K., **Tickodri**, Sandy, S., T., **Bax**, Gerhard, (2010) "An Overview of the Gaps and Limitations in the Utilization of GITs for Road Infrastructure Maintenance in Uganda", conference paper, the 5th ESRI Eastern Africa User Conference (EAUC), Transportation and Utilities. Safari Park Hotel, Nairobi - Kenya. 10th - 12th November 2010

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Mörtberg, Christina, **Stuedahl**, Dagny, **Elovaara**, Pirjo (2010) "Designing for Sustainable Ways of Living with Technologies" in Ina Wagner, Tone Bratteteig, Dagny Stuedahl (eds) *Exploring Digital Design: Multi-disciplinary Design Practices,* London: Springer.

Molin, Rebecka, (2010) Notes on Representation as Visual Optics in International Journal of Feminist Technoscience, Open Peer Review Journal, ISSN 1654-6792, URL: http://feministtechnoscience.se/.

Otine, Charles, **Kucel**, Samuel, **Trojer**, Lena, (2010) "Dimensional Modeling of HIV Data Using Open Source" in the *Proceedings of World Academy of Science, Engineering and Technology* Issue 63.

Rydhagen, Birgitta (2010) Saving the world (techno)scientifically. In Elovaara, Pirjo, Sefyrin, Johanna, Öhman, May-Britt, Björkman, Christina (editors) (2010) *Travelling Thoughtfulness - feminist technoscience stories,* Department of Informatics, Umeå University, ISSN 1401-4507; 10.04

Rydhagen, Birgitta (2010) Report on *Swedish Gender research within the areas of sustainable development, climate change and environmental studies* to Vetenskapsrådet.

Simba, Fatuma, (2010) *Modeling Connectivity for e-Learning in Tanzania: Case-study of Rural Secondary Schools*, Blekinge Institute of Technology Licentiate Dissertation Series No. 2010:05, ISBN 978-91-7295-178-5

Publications about Division of TechnoScience Studies and its Staff Members

Rwanda satsar stort på sin utveckling: Kvinnor, korgar och digitala verktyg Commersen March 17, 2010 http://www.e-pages.dk/ronneby/49/12

Lena Trojers blog, Intranytt, BTH, nr 1, 2010

X-ovation ett spännande utvecklingsprojekt, Intranytt, BTH, nr 3, 2010

XPO 2010, Intranytt, BTH, nr 3, 2010

E-learning program för Tanzania, Intranytt, BTH, nr 4, 2010

Första mötet med SICD advisory group, Intranytt, BTH, nr 4, 2010

Rwanda blog, Intranytt, BTH, nr 5, 2010

Postgraduate activities

InterGender

ToS partner in the VR funded National Graduate School
InterGender links Swedish PhD programs in Gender Studies and set up relations to four major European Research Schools within the area. Participants are Gender Studies units at the universities in Blekinge, Göteborg, Linköping, Luleå, Lund and Örebro that have established Gender Studies as a research training area of its own, as well as Gender Studies units at the universities of Stockholm, Uppsala and Umeå. International partners are the Finnish, the Dutch and the Inter-Nordic gender research schools as well as the transdisciplinary gender research school at Humboldt University, Berlin. InterGender is linking these strong, but scattered research training units in a joint, systematized program of PhD courses, PhD supervisors' courses, thematic research seminars and conferences. A clustering of PhD students in long-term trans-institutional and ICT-facilitated discussion groups is an aim. It is expected that InterGender will generate synergies and a

significantly enhanced level of quality due to critical mass and complementary expertise of the research staff. Pirjo Elovaara, Rebecka Molin and Lena Trojer are working with InterGender.

Research supervisor training

FLUS, 4,5 ECTS
The two universities BTH and Linné University in Växjö and Kalmar provide a joint research supervisor training for staff holding a Ph.D. The Faculty Board has tasked Lena Trojer with being the programme director on BTH's behalf.

Division Seminars and Graduate Course

Staff engaged in research at Technoscience Studies as well as lecturers gather for division seminars and graduate courses, where research activities and fundamental choices for our understanding of the field are discussed and developed and where individual researchers present their work for discussion. The following division graduate course and seminars were held during the year:

2010 04 27	Open research seminar on research activities at ToS
2010 05 06	Seminar on the project X-Ovation, Linus de Petris, Pirjo Elovaara, BTH
2010 06 15	Open research seminar on strategies for development of ToS
2010 10 18	Aesthetics as basic concept for Media technology, Peter Ekdahl, BTH, lecture at Graduate course Aesthetics for Digital Media
2010 11 22	Understandings of Aesthetics in Social Media, Peter Giger, BTH, lecture at Graduate course Aesthetics for Digital Media
2010 12 17	Perspectives on Foundations of Aesthetics, Ass. Prof. Claes Entzenberg, Uppsala University, lecture at Graduate course Aesthetics for Digital Media.

Development of the R&D profile Design for Digital Media

Position
The development work of the Media Technology Group in the undergraduate programs indicates that the core knowledge foundation of design for digital media is evolved in the expression of the production (in Swedish gestaltande produktionen). Consequently there are specific demands on the epistemological and methodological bases as well as the formation of the R&D profile to support the activities.

The objectives of the R&D profile of Design for Digital Media are:
- to strengthen and more clearly articulate the design environment for undergraduate courses
- to develop Master programs and courses on graduate level
- to develop the research profile of Design for Digital Media in the PhD program of Technoscience Studies into a specific PhD program of its own
- to provide relevant qualifications for the teacher staff of Media Technology at graduate level
- to strengthen cooperation with external education and research actors nationally and internationally
- to develop co-production with the industry and the public sector.

The R&D profile of Design for Digital Media includes the following:
- Seminars developing the conceptual repertoire. The activities are open to the teacher as well as researcher staff. This enables us to identify and prioritise the needs of qualification for our

teachers. The activities include seminars with guest speakers, literature and writing workshops, participation in conferences with papers.
- Courses at graduate level to qualify the teachers and invite applicants from other university sections and colleges in order to broaden our networks.
- Graduate school at the national level in collaboration with other universities. This facilitates teachers' qualifications and networking.
- Research groups focusing three areas: theory, development of design education and applied research.

The Swedish Faculty for Design Research and Research Education
Design for Digital Media at ToS is a member of the Swedish Faculty for Design Research and Research Education, which aim is to create a national centre for solid, critical and future-oriented platform for research, advanced practice and education in the field of design.

The Design Faculty was founded in December 2007 financed by Swedish Council of Research (VR) and Royal Institute of technology (KTH). The main activity is to coordinate a national graduate school of design in cooperation with about 20 research institutions in Sweden. The overarching aim is to establish design as an academic discipline by linking other disciplines and the specific knowledge areas of design practice. The graduate school presently includes about 30 doctoral students with backgrounds within design, architecture, technology, economy, fashion or pedagogics all with a focus on design research.

The Design Faculty functions as a national resource platform for design research and the partner institutions. It supports and initiates design research as well as promotes design for research councils and other supporters.

Research Development of Design Methodology
Professor Henriette Koblanck continued to be linked to ToS during 2010. The focus of the collaboration is development of design understandings and design practices for the research profile Design for Digital media. Henriette Koblanck holds a professor chair in design at the Department of communication and design at Linné University. Thanks to her work ToS and DSN, campus Karlshamn is full member of the research network S&R, Swedish Design Research Network. This broadens the national network considerably for the profile Design for Digital Media as well as brings the research into the national graduate school named Design faculty together with additional 18 universities in Sweden, se below. Henriette Koblanck works with a longterm competence development within design for research and teaching staff at ToS and DSN. Peter Giger and Anders Falk participated in activities at the Design faculty during the year.

Internationalisation

Technoscience Studies was involved in the following international R&D&I activities:

Partners in Developing Countries

Cooperation with the College of Engineering and Technology (CoET) at the University of Dar es Salaam, on an e-learning project. The form of cooperation is via doctoral studies. Three doctoral students, Ellen Kalinga, Suzan Lujara and Fatuma Simba were doing their Ph.D. studies at both

CoET and BTH, with a Tanzanian research supervisor and a Swedish research supervisor (ToS, Lena Trojer, Birgitta Rydhagen). Fatuma Simba got er licentiate degree in June. Ellen Kalinga and Suzan Lujara defended successfully their doctoral theses in December.

Cooperation with the Faculty of Technology at Makerere University, Uganda, on e-learning, datamining, GIS and innovation system projects. The form of cooperation is via doctoral studies and one postdoc. Four doctoral students, Charles Otine, Lydia Mazzi, Joshua Mutambi and Julius Ecuru are doing their Ph.D. studies at Makerere University and BTH with a Ugandan research supervisor and a Swedish research supervisor (ToS, Lena Trojer, Gerhard Bax). Peter Okidi Lating from Makerere University is doing his postdoc in collaboration with BTH, ToS.

Cooperation with the Universidad Mayor de San Simón (UMSS) in Bolivia on development of innovation systems. The form of cooperation is via doctoral studies. One doctoral students, Carlos Acevedo at UTT (Technical Transfer Unit at UMSS) is doing his Ph.D. studies at BTH with two Bolivia research supervisors and two Swedish research supervisor (ToS, Lena Trojer, Birgitta Rydhagen).

The R&D project ***Women´s Digital Baskets in Rwanda*** with Pirjo Elovaara and Kerstin Gustavsson as researchers was finalized during the year. The very good results of the project have motivated several partners in Rwanda to find a continuation of the project.

ToS was involved in a ***collaboration project concerning SMS-services for the rural areas in Uganda***. The title of the project is "Leveraging mobile platform technology to address the information and development needs of marginalized communities (rural and urban poor)." The project management is located at the Faculty of Technology, Makerere University, in Uganda, with ToS at BTH as the Swedish collaborating partner. The collaboration also involves the ICT cluster in Uganda.

The **Scandinavian Institute for Competitiveness and Development** (SICD) continued as a project at ToS with support from Sida and VINNOVA with its activities in East and West Africa and Bolivia, see the website //si4cd.wordpress.com. The mission of SICD is to support social and economical development by facilitating cluster development and innovation. SICD includes a collaboration between Swedish and African partners since 2003 and Bolivian partners since 2007.

Dan Sjögren, Tomas Kjellqvist, Lena Trojer together with external experts constitute an international team working with Sida funded programs on ***Innovation Systems and Innovative Clusters Africa and Bolivia*** in partnership with SICD. The African program is coordinated by PACF (Pan African Competitiveness Forum). PACF conducted during 2010 an annual conference in Ghana and cluster training workshops in Ghana and Nigeria. In Bolivia the SICD team was facilitating training of cluster development in Cochabamba in collaboration with UTT at UMSS and with DIPGIS at UMSA (Universidad Mayor de San Andrès) in La Paz.

The implementation of ***the International Graduate School on Innovation Systems, Clusters and Development*** continued during the year in close collaboration with PACF and UMSS in Bolivia. Joshua Mutambi, Julius Ecuru and Carlos Acevedo are doing their research within the International Graduate School. Other PhD students are affiliated. An international group of supervisors is beginning to be formed. Discussions continue with the Vice Chancellor of the Nelson Mandela

African Institute of Science, Technology and Innovation in Arusha, Tanzania concerning an African university hub for the International Graduate School.

Partners in High Income Country

Bauhaus University, Weimar

The collaboration with Bauhaus University and its Media Faculty continued during the year although initiative in an International Graduate Course Media Urbanism could not find funding and thus be postponed. The development of long term relations with Bauhaus University in Weimar is highly valued by ToS and will find its concrete activities in due time.

The GENIS – LAB

The project aims to implement structural changes in a group of selected scientific organisations in order to overcome the factors that limit the participation of women in research. The nine partners are: CSIC (Spanish Superior Council for Scientific Research) Institute for Polymer Science and Technology, Spain; IPF - Leibniz Institute of Polymer Research Dresden, Germany; FTM UB _ Faculty of Technology and Metallurgy, University of Belgrade, Serbia; NIC_National Institute of Chemistry, Slovenia; INFN, National Institute for Nuclear Physics, Italy; BTH_Blekinge Institute of Technology, Sweden. Technical partners are: FGB- Fondazione Giacomo Brodolini, Italy; ITC/ILO_ International Training Centre of the International Labour Organization, Un Agency, International; ADS - Italian women in science organization, Italy.

Tsinghua University, Beijing

The collaboration between Tsinghua University, the renowned technical university in China, continued during the year with postgraduate teaching in gender and technology at Tsinghua University and long term cooperation planning.

Cooperation between BTH, business and the community/politics

The cooperation profile of BTH is an explicit praxis in the activities of the Division of Technoscience Studies. Indeed, this praxis in itself constitutes empirical results for the production of knowledge, broadens the understanding of technology and innovation and creates relevance for the activities of ToS.

BTH campus Karlshamn

Most staff at the Division of Technoscience Studies are deeply involved in BTH's construction of a university campus in Karlshamn. This effort began in 2000 and has intensified as operations grow. During the past year this effort involved advanced cooperation in what is described as a triple helix context. The collaboration at NetPort also pertains to all kinds of undergraduate education and student issues, cooperation with upper secondary schools and other education providers, various EU project constellations, support for research also in cooperation with experience-based learning, local government and business contacts, incubation activities with participation in the savings bank's foundation to promote economic development, Sparbankens Näringslivsstiftelse, etc. The long term support from the local Government of Karlshamn is highly appreciated and constitutes a base for a very fruitful development of NetPort.

NetPort and BTH are situated in the same premises. There are many activities going on at NetPort, which means visibility for BTH's presence in Karlshamn and a form of indirect marketing. The contacts with NetPort's director and staff during the year were vital for a fruitful collaboration especially in the profile area of Digital Media at BTH campus Karlshamn.

Commissions

Below is a presentation of commissions the staff members at the Division of Technoscience Studies had during the year, both at BTH and elsewhere. A conclusion to be drawn from the list of commissions as well as what is presented above, is that the collected expertise found at ToS is relevant in numerous important contexts.

Christina Björkman
• Co-supervisor for a PhD student at the National Gender Graduate School, Mid Sweden University.

Peter Ekdahl
• Member of steering group of the school TKS, 2004 -
• Member of the steering board of School of Future Entertainment in Karlshamn
• Coordinator for a pedagogical development project between BTH Media Technology and an upper secondary school in Karlshamn, 2001 –
• Member in the national assessment of the Media Technology programmes at campus Karlshamn, 2006 –
• Member of Izon, a network for Young Communication, 2005 –
• Co-supervisor for the PhD students Peter Giger, Rebecka Molin and Anders Falk
• Acting dean of School of Planning and Media Design, 2009 –

Pirjo Elovaara
• Opponent at Caroline Wamala´s final seminar for her doctoral dissertation "Does IT Count? Complexities between *access* to and *use* of ICTs (Among Urban Farmers in Uganda)", Luleå Technical University, May 18, 2010
• Co-supervisor for Thomas Persson in his PhD project "Making the Desirable Feasiability - towards an Integration of Gender Knowledge into Informatics Study Programs" (Nationella genusforskarskolan / Mittuniversitetet)
• Co-supervisor for Linus de Petris in his PhD project "Technology as an intrinsic part of humans — from eGovernment to iGovernment"
• Member of the Gender Expert Group at National Research Council
• Board member of the National Graduate School InterGender, 2008 –
• Member of the GADNET – network
• Reviewer for Information, Communication and Society Journal, Graduate Journal of Social Science and Women, Work and Organization
• Committee member for IADIS ICT, Society and Human Beings conference
• Committee member of the 6th European Symposium on ICT and Gender

Peter Giger
• Member of the planning committee for the culture house, Östra Piren, Karlshamn
• Member of the web 2.0 network of Swedish libraries

• Member of the research network "Digital Art and Culture in the Age of Pervasive Computing'
・ Editor and technical developer of International Journal of Feminist Technoscience

Elisabeth Gulbrandsen
• Co-supervisor to PhD student Peter Giger and Rebecka Molin

Birgitta Rydhagen
• Contact person at BTH in the national research network Gender and Development studies (GADNET)
• Second supervisor to PhD students Ellen Kalinga, Suzan Lujara and Carlos Acevedo.
• Reviewer for International Conference on Engineering and Meta-Engineering (ICEME)
• Reviewer for the European Journal of Engineering Education (EJEE)

Lena Trojer
• Board member of SPIDER, Swedish Program for ICT in Developing Regions, 2004 – 2010
• Board member of the National Graduate School InterGender, 2008 -
• Member of the National Steering Committee for the Innovation Systems and Clusters
   Programme (ISCP) in Tanzania 2006 -
• Member of PACF Council 2010 –
• Member of the Advisory Board for the Swedish Secretariat for Gender Research 2010 –
• Member of the International Advisory Board for the Second International Conference on
   Advances in Engineering and technology (AET2011)
• Director of Scandinavian Institute for Competitiveness and Development, DSN, BTH, 2008 -
• Board member of "Sparbanken i Karlshamns Näringslivsstiftelse", 2002 –
• Board member of NetPort.Karlshamn, 2004 –
• BTH programme director of The Research Supervision Training commissioned by the Faculty
   board of BTH
• Reviewer of application for a position as senior Lecturer in Media Technology, Södertörn
    University
• Reviewer of application for a position as associate professor (docent) at Tema Genus, University
   of Linköping
• Reviewer of a paper for the journal NORA
• Guest professor at Tsinghua University, Beijing, China, September 2010

www.bth.se/tks/teknovet.nsf