



Centre for Research  
on Evaluation,  
Science and Technology



## Science and Technology Studies

*The study of science as a social system*



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**CENTRE FOR RESEARCH ON  
EVALUATION, SCIENCE AND TECHNOLOGY**

## POSTGRADUATE PROGRAMMES IN SCIENCE AND TECHNOLOGY STUDIES

The Centre for Research on Evaluation, Science and Technology (CREST) at Stellenbosch University, South Africa, offers two postgraduate programmes in Science and Technology Studies:

MPhil in Science and Technology Studies

PhD in Science and Technology Studies

### WHAT ARE SCIENCE AND TECHNOLOGY STUDIES?

Science and Technology Studies (STS) interrogate and understand science as a social system and as a force that influences and shape society and life. It looks at science and research in the contexts of people's lives, and studies the interactions and relationships between science and society. Scholars in this field investigate how social, political and cultural forces and values shape scientific research and innovation and how these, in turn, impact on society, politics and culture. They are also interested in how people respond to science – the expectations that people have of science to deliver solutions and innovations, but also the concerns that exist about the boundaries and impacts of cutting-edge science.

As a social endeavour, scientific research is practised by people within various institutional contexts. These include universities, science councils, national research institutes and laboratories, private firms and NGOs. Scientists form epistemic communities with specific rules and norms. They communicate in certain ways amongst themselves and form 'citation cultures' that identify bodies of scholarship. Their research outputs and impacts are scrutinized which calls for an in-depth understanding of the scientific publication system and the best of currently available methods in research evaluation, including bibliometrics and scientometric indicators. Scientific research also needs to be effectively managed. Scientists are further accountable to society at large and under pressure to share their findings beyond the scientific community, which necessitates critical thinking on public science engagement.

The postgraduate programme in STS will introduce students to these different dimension and aspects of science as a complex social system. Our focus is on Africa and South Africa which means that we are particularly interested in topics related to science and development, the nature and formations of research systems in developing countries, public science engagement in the developing context, and ways of measuring research and its impacts in conditions of adversity (such as de-institutionalised research systems, lack of national funding, poor research infrastructure and continuing brain drain).

### WHO SHOULD ENROL?

The programme will be of value to a variety of professionals, academics and managers. More specifically the following people will find the course of value:

- Programme officers in ministries and departments of science and technology and higher education
- Programme officers in research funding agencies and science granting councils
- Research directors and professionals working in research management and science engagement offices at universities and scientific institutions
- Scholars interested in scientific knowledge production: how science is generated, disseminated and utilised
- Scholars who are interested in the history of science and scientific institutions (such as universities, science councils, institutes) on the African continent.

# MPHIL IN SCIENCE AND TECHNOLOGY STUDIES

## REQUIREMENTS AND ASSESSMENT

Candidates obtain the MPhil degree after successful completion of eight coursework modules as well as a research assignment. Attendance of all eight course modules is compulsory. The topic of the research assignment (approximately 15 000 words) must be chosen in consultation with the relevant CREST teaching staff. The modules are assessed by means of written assignments. Students must achieve at least 50% in each of the modules. The research assignment will be internally examined and externally moderated. The eight modules constitute 120 credits (15 credits each) and the research assignment 60 credits.

The admission requirement is an Honours degree in any field of science (the social sciences and humanities included), with an average of 65%. An Honours degree corresponds to level 8 of the South African National Qualifications Framework (NQF). A four-year B.Tech degree (or any four-year Bachelors degree) does not qualify.

## APPLICATION PROCESS

Applications to the postgraduate programme close on **31 August (non-South African citizens)** and **30 September (South African citizens)** prior to the year that studies will commence.

All applicants are encouraged to use the e-application system:

<https://web-apps.sun.ac.za/eAansoek2/alg.jsp?TI=1>

An electronic version of the application form is available in exceptional cases and on request from [info@sun.ac.za](mailto:info@sun.ac.za).

Prospective students must submit the following:

- a full CV detailing their academic as well as professional history and experience
- a certified copy of their academic transcript
- a certified copy of their degree(s) obtained; and
- a one-page motivation (typed) for acceptance to the programme.  
(The motivation should include a description of professional goals, and an explanation of how these align with the MPhil programme in STS.)

The complete application package must be submitted to the Admissions Department at Stellenbosch University. **Incomplete and late applications cannot be considered.**

Applicants will be notified about the outcome of their application by 15 November 2018 at the latest.

**Please note that submitting an application form does not guarantee automatic acceptance to the university or programme.**

## STRUCTURE OF MPhil PROGRAMME

Students obtain the MPhil degree in STS by following any ONE of three options in the programme. The options are: (1) General STS, (2) Research Management and Evaluation and (3) Science and Public Engagement. The relevant coursework modules per option are the following:

Coursework modules	Option 1: General STS	Option 2: Research Management & Evaluation	Option 3: Science & Public Engagement
Sociology of Science	Compulsory for options 1, 2 and 3		
Science Policy Themes	Compulsory for options 1, 2 and 3		
Research Systems in Africa	Elective	--	--
Research Evaluation	Elective	Compulsory	--
Bibliometrics	Elective	Compulsory	Compulsory
Advanced Scientometrics	Elective	Compulsory	--
Research Uptake and Societal Impact	Elective	Compulsory	Compulsory
Science, Technology and Development	Elective	--	--
Science and its Publics	Elective	--	Compulsory
Scientific Communication	Elective	Compulsory	Compulsory
Research Management	--	Compulsory	--
Science Engagement in Society: Theory and Practice	--	--	Compulsory
Science Engagement in Society: Actors and Platforms	--	--	Compulsory

### Notes:

- Two coursework modules are compulsory for the programme, irrespective of the preferred option. These are *Sociology of Science* and *Science Policy Themes*.
- Students interested in option 1 need to select six electives from the list of eight provided. The six electives together with the two compulsory programme modules (*Sociology of Science* and *Science Policy Themes*) will give the eight coursework modules required.
- There are no electives for options 2 and 3. Students interested in either of these options must take the six compulsory modules for that option together with the two compulsory modules for the programme (*Sociology of Science* and *Science Policy Themes*).
- Modules will be assessed by written assignment with strict deadlines for submission. Students get approximately four weeks to complete the written assignment after attending the contact session for a module.
- The *Science and Public Engagement* option focuses on the relationship between science and society from a 'sociology of science' perspective. Students interested to study science mass communication (incl. science journalism) are advised to contact the Department of Journalism at Stellenbosch University.
- It is possible to complete the MPhil programme in one year in the case of full-time students. However, most students take two years to complete. It is recommended that students complete at least six of the eight modules (if not all eight) in the first year of registration. The remaining modules and the research assignment can then be completed in year two.
- The topic for the research assignment needs to be negotiated with the CREST teaching staff during the academic year. A supervisor will be assigned after consultations.
- All course materials are made available to students on *SUNLearn*, the e-learning platform of the university. This means that all students have access to reading materials and assignments on-line.
- All modules are presented in English.

The contents of the coursework modules are elaborated on in the next section.

## CONTENT OF COURSEWORK MODULES

### **Sociology of Science**

Facilitated by: Prof Peter Weingart & Dr Heidi Prozesky

The sociology of science deals with the internal operations of science as well as the relationship of science with its social environment. Internally the focus is on the isomorphism of intellectual fields, i.e. disciplines and research areas, and their social counterparts, on the attribution of reputation as the basis of the 'social structure' within science, and on the normative framework, the conditions and dynamics of knowledge production. The external relations of science refer to the closer coupling of science to politics, the economy and the media. Each of these has its own specific logic of operation differing from that of science. Since science as a social subsystem is self-steering, the fundamental question is what happens to this autonomy of science, i.e. what are the effects of political intervention, economic steering and orientation to the media on the production of reliable, certified knowledge.

### **Science Policy Themes**

Facilitated by: Prof Peter Weingart

This module covers such topics as the institutional arrangements and the policy instruments for funding science and science and technology policy as well as evaluation practices and the impact of New Public Management. The focus will then be specifically on the concept of national innovation systems which has assumed a central place in science policies throughout Europe, the US and South Africa. The assumptions and claims connected with this concept will be probed for the available data on which indicators are based that are supposed to direct innovation policies. This will enable students to acquire the critical capacity to analyze science policies, their potential and their limitations.

### **Research Systems in Africa**

Facilitated by: Dr Nelius Boshoff and Prof Johann Mouton

A research system in a country can be referred to as the network of policies, institutions, linkages and other arrangement which enable a country to carry out its research effectively. This module will discuss the unique environment, conditions and features that define African research systems. The focus will be on main trends in the governance, institutional landscape, R&D funding and scientific output of different African countries. Attention will be devoted to the higher education system as knowledge producer in Africa, together with bibliometric studies of Africa's scientific output, and science funding and research collaboration in Africa.

### **Research Evaluation**

Facilitated by: Prof Johann Mouton

The field of research evaluation has its origins in pioneering work in the 1960s and 1970s. But it is especially over the past thirty years that new demands have intensified for the assessment and evaluation of science and scientific research. Various forms of research evaluation now exist and are prevalent in most science systems in the world. Such evaluation practices range from the highest level where national science systems are regularly reviewed, to evaluations of scientific institutions (universities and science councils), reviews of scientific fields and disciplines and of course research programmes and projects. The course will introduce students to the basic concepts and building blocks of research evaluation at all of these levels. Students will also be introduced to a comprehensive conceptual framework for research assessment at the national level. Various international and African examples of actual evaluation studies will be discussed including the UK RAE and other similar systems, as well as the research evaluation approaches used in the South African science system.

## **Bibliometrics**

Facilitated by: Prof Johann Mouton and Prof Robert Tjissen

Bibliometrics is the quantitative study of the communication behaviours of scientists. Very specifically it analyses the patterns of publication and citation behaviour of scientists and what such analyses tell us about the priorities of scientists, patterns of recognition and visibility of science, who collaborates with whom, who cites whom and how all of these have changed over time and still differ over scientific fields. The course will discuss the basic vocabulary of bibliometrics as well as its history over the past 100 years. Students will be introduced to the major journals in the field, the work of the major research centres in bibliometrics as well as current debates. Specific bibliometric indicators will be discussed in detail with an emphasis on the well-known Journal Impact Factor and the more recent h-index. The course will also involve practical work in our computer laboratory where students will learn how to conduct their own bibliometric analyses on the online version of the Thomson Reuters Web of Science.

## **Advanced Scientometrics**

Facilitated by: Prof Robert Tjissen

Scientometrics has become much more than a handy toolbox with metrics for research evaluation. This module, an extension of the Bibliometrics module, will bring students up to date on recent developments worldwide and introduce other domains such as: world university rankings, measurements of socio-economic impacts, and inclusive innovations. Parallel developments in social media metrics and open access publications will also be discussed. The increasing sophistication of scientometrics, and its relevance for management and policy, requires a critical view of scientometric tools and to endorse professional codes of conduct. The course will therefore also address general guidelines and recommendations to promote good practices in scientometric assessments. The 'do it yourself' part of the courseware offers students the opportunity to explore a range of online scientometric tools and apply them to own datasets.

## **Research Uptake and Societal Impact**

Facilitated by: Dr Nelius Boshoff

Researchers and research performing institutions are under pressure to demonstrate the broader impacts of their research beyond the numbers of citations achieved by research publications. This module will focus on the uptake of research in different user contexts (policymakers and practitioners) by exploring the different paradigms, frameworks and models of research uptake and use. There will be a special focus on the societal impact of research, which includes the challenges of research impact assessment, together with specific assessment approaches such as the payback framework and the search for productive interactions between researchers and society.

## **Science, Technology and Development**

Facilitated by: Prof Rasigan Maharajh

This module will look critically at theories and approaches that purport to explain the relationship between science and technology (innovation) and development imperatives. The focus is on the 'big' issues in Africa: the Millennium Development Goals, poverty alleviation, human resource development, public health and food security. The module also looks at the inequalities that science often creates: within and between countries and regions of the world as well as the effects of 'northern' policies, the role of donor and development agencies and other forces (including globalisation) on the distribution of science and technology capital.

## **Science and its Publics**

Facilitator: Dr. Lars Guenther & Dr. Marina Joubert

Starting out from a historical perspective on the changing relationship between science and society, this module will focus on defining, differentiating and understanding the diverse public audiences for science. It will explore the nature and dynamics of the interactions and relationships between scientists and the audiences they engage with. In this context the origins and evolution of public understanding of science, but also scientists' understanding of the public, will be discussed. Issues such as public trust in science, public controversies based on science, and the ethical/moral/political dimensions of public science engagement are included.

## **Scientific Communication**

Facilitator: Dr. Lars Guenther & Prof Johann Mouton

This module is about understanding how scientists communicate with each other within the science system against the backdrop of the sociology of scientific recognition and reputation. It will identify major role players and current trends within the science publishing industry, explain debates around open access and intellectual property, and reflect on how communication within science influences communication to policy and public audiences. Specific topics for discussion include the communication behaviours and practices of scientists; trends in peer review; the rise and implications of open access publishing and the politics of science publishing in (South) Africa.

## **Research Management**

Facilitator: tbc

Research managers at universities and other research performing organisations operate within a complex environment. This module will introduce students to critical tasks involved in the research management portfolio. These include strategic planning and institutional research policy development (for research units, research focus areas etc.), capacity building and mentorship for both established and emerging researchers, research information management, research ethics, and intellectual property rights, technology transfer and commercialization. Against this background the focus will be on the fundamentals and models of research management, and their relevance to real-life contexts.

## **Science Engagement in Society: Theory and Practice**

Facilitator: Dr. Marina Joubert

This module will explore the rationale for, as well as the nature and scope of, public science communication and engagement. It will include a review of theoretical models in public science engagement before moving on to reflect on global and regional trends and key issues in public science engagement. The meaning and implications of the so-called 'science of science communication', which is about understanding how and why people respond to new scientific information in particular ways, will form part of the module content. The practical component will focus on science communication planning and evaluation.

## **Science Engagement in Society: Actors and Platforms**

Facilitator: Dr. Marina Joubert

Understanding the actors, processes and platforms involved in public science engagement is the core of this module. In addition to looking at the role of platforms such as science centres, science museums, zoos, aquaria, botanical gardens, science festivals, science cafés, science theatre, citizen science, science-art collaborations, media and informal science education, the module will focus on two key role players: scientists (in their role as public experts) and science communication professionals (who work as enablers at the interface between science and society). The influence and impact of the internet, and new/social media, will also be discussed.

# PHD IN SCIENCE AND TECHNOLOGY STUDIES

## REQUIREMENTS AND ASSESSMENT

As is the case with all doctoral studies, doctoral candidates must complete a doctoral thesis that makes an original and novel contribution to the body of knowledge in the field of STS. In addition, all doctoral candidates also have to complete four modules which are selected from the list of modules offered by the MPhil in Science and Technology Studies.

The admission requirement is a Master's degree in any field of science (the social sciences and humanities included), with an average of 65%. An M.Tech degree does not qualify but may be considered in highly exceptional cases.

## APPLICATION PROCESS

### STEP 1: Application form and CV

Interested candidates are required to complete an application form. All applicants are encouraged to use the e-application system: <https://web-apps.sun.ac.za/eAansoek2/alg.jsp?TI=1>

An electronic version of the application form is available in exceptional cases and on request from [info@sun.ac.za](mailto:info@sun.ac.za)

A letter of motivation as well as comprehensive curriculum vitae must be submitted to the postgraduate administrator, Bernia Drake ([berniav@sun.ac.za](mailto:berniav@sun.ac.za)). Once your application and CV have been screened, you will be informed whether you may submit a pre-proposal (Step 2).

### STEP 2: Pre-proposal

The university will register you as a doctoral student only once you have submitted a doctoral proposal and this had been approved by the various committees of the university. In order to avoid wasting time on the development of a proposal which is not acceptable to CREST, we have decided that all prospective doctoral students must FIRST submit a doctoral pre-proposal. CREST assesses pre-proposals for two reasons. Firstly, we need to assess whether your interests coincide with the research expertise and interests of the staff members of the department. There is no point, we believe, in accepting a doctoral student, if we do not have an expert and experienced potential promoter in the department. Secondly, this process allows us to identify the most likely supervisor(s) and to assign such a person to work with you on the final doctoral proposal.

The doctoral pre-proposal must not exceed three pages in length and must include the following:

- Working title of the doctoral thesis
- The motivation or rationale behind the proposed study
- Broad description of the research aims and objectives of the study
- The design and methodology of the proposed study
- An indication of the readings that you have already done or intend doing on the topic.

Once we have received your pre-proposal, it will be discussed at the next departmental meeting after which you will be informed (1) whether you have been conditionally accepted as a doctoral student, and (2) who the person in the department is with whom you should further correspond. If you have been conditionally accepted, you will then be invited to submit a full doctoral proposal (Step 3).



### **STEP 3: The doctoral proposal**

Once you have received the go-ahead on the basis of the pre-proposal that you have submitted, you must now concentrate on developing a full doctoral proposal that meets the university guidelines. During this period, you will be registered as a prospective doctoral student (maximum of one year) in order for you to gain access to the information and library resources of the university. In our experience, it takes the average doctoral candidate between three and six months to develop a proper doctoral proposal that meets the requirements of the university. The doctoral proposal is a document that is interactively developed between you and your supervisor. Your supervisor will give you continuous feedback, until all parties are satisfied that the proposal meets all the requirements. Once you have reached this stage, your proposal is submitted for review within the university system.

### **STEP 4: The review process**

Your doctoral proposal essentially moves through three stages of review within the university system:

1. A *Doctoral Admission Committee*. This committee consists of the head of CREST, your supervisor(s), another CREST academic staff member, and two members of other academic departments. Where possible, we request that doctoral candidates be present during this discussion of their doctoral proposals before this committee.
2. The *Faculty Research Committee*. Once the Doctoral Admission Committee has approved the proposal, it is forwarded to the Faculty Research Committee for assessment. It must be submitted to the last meeting of the year (usually in October).
3. The *Faculty Council*. If the Faculty Research Committee approves the doctoral proposal, a recommendation to this effect is sent to the next Faculty Council meeting and subsequently goes for ratification to Senate.

The doctoral proposal may at any stage of this process be referred back to the candidate for changes and revisions.

### **STEP 5: Registration**

You will finally be registered as a doctoral student once your doctoral proposal has been approved by the Senate of the University. Registration takes place in January.

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## PROGRAMME LECTURING STAFF (In alphabetic order)

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**Dr Nelius Boshoff** is a Senior Lecturer at CREST and the Academic Coordinator of the Science and Technology Studies postgraduate programme. His interests include studies of research collaboration, the societal impact of research, and bibliometrics with a focus on Africa.

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**Dr Lars Guenther** is a Postdoctoral Fellow at the Research Chair in Science Communication. He received his doctorate at the Institute of Communication Research at Friedrich Schiller University in Jena, Germany. His research interests mainly focus on science and health journalism, public perceptions of science and technology, as well as the public communication of risks and (un)certainty.

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**Dr. Marina Joubert** is a Science Communication Researcher and Lecturer at CREST. Her research focuses on the factors affecting scientists' participation in public science communication and engagement. She also presents an introductory online course in science communication theory and practice.

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**Prof Rasigan Maharajh** is concurrently Professor Extraordinary at CREST, the Nodal Head of SciSTIP, the founding Chief Director of the Institute for Economic Research on Innovation (IERI) at Tshwane University of Technology, an Associate Research Fellow of the Tellus Institute in Boston, and the Chairperson of the Southern Africa Node of the Millennium Project.

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**Prof Johann Mouton** is the Director of both CREST and the DST-NRF Centre of Excellence in Scientometrics and Science, Technology and Innovation Policy (SciSTIP). His main research interests are the philosophy and methodology of the social sciences, higher education knowledge production, sociology of science, scientometrics and science policy studies.

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**Dr Heidi Prozesky** manages the research portfolio at SciSTIP, while still actively undertaking research and supervision in the field of science and technology studies. She holds a PhD in Sociology, on gender differences in the publication productivity of South African scientists, and has developed social research methods and environmental sociology as additional fields of specialisation.

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**Prof Robert Tijssen** holds the Chair of Science and Innovation Studies at Leiden University in the Netherlands, and is a Professor at CREST. His research interests focus on studies of the interconnections between science, innovation and higher education systems.

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**Prof Peter Weingart** holds the South African Research Chair in Science Communication at CREST. He is Professor Emeritus of Sociology and Science Policy at the University of Bielefeld, Germany and former director of the Institute for Science and Technology Studies as well as of the Center for Interdisciplinary Research at that university.

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## CONTACT PERSON FOR MORE INFORMATION

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**Mrs Bernia Drake** is the Postgraduate Administrative Co-ordinator at CREST. Please contact her for all enquiries related to the MPhil and PhD programmes in STS: [berniav@sun.ac.za](mailto:berniav@sun.ac.za) or telephone +27 21 808 3394. For more information on CREST go to: [www0.sun.ac.za/crest](http://www0.sun.ac.za/crest)

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